

**REPORT NUMBER: SINCAP-CAL-12-017**

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

**CHRYSLER GROUP LLC  
2012 Jeep Liberty Sport 4X2  
4 Door SUV**

**NHTSA No: MC0335**

**PREPARED BY:  
CALSPAN CORPORATION  
P.O. BOX 400  
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**February 14, 2012**

**FINAL REPORT**

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

**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: \_\_\_\_\_

### Technical Report Documentation Page

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**15. Supplementary Notes**

**16. Abstract**

A 55/28 kph 90<sup>0</sup> Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2012 Jeep Liberty Sport 4x2 4 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 the Calspan Corporation Crash Test Facility in Buffalo, New York, on 12/9/2011.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.30 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 1°C. The target vehicle post-test maximum crush was 255 mm at level 2. The test vehicle's performance was as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	IARV	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	52.74
Maximum Thoracic Rib Deflection	mm	44	21.69
Total Abdominal Force	N	2500	967.77
Pubic Symphysis Force	N	6000	-992.21

Measurement Description	Passenger ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC <sub>36</sub> )	N/A	1000	188.74
Resultant Lower Spine Acceleration	G	82	52.80
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3883.09
Maximum Thoracic Rib Deflection	mm	38*	31.97
Maximum Abdominal Rib Deflection	mm	45*	27.66

\* 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.

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## **SECTION 1**

### **TEST PURPOSE AND PROCEDURE**

#### **PURPOSE**

This moving deformable barrier side impact test is part of the MY 2012 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00126. The purpose of this test is to generate comparative side impact performance in a 2012 Jeep Liberty Sport 4X2 4 Door SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated August 2011.

## SECTION 2

### SUMMARY OF TEST RESULTS

#### SUMMARY

A 2012 Jeep Liberty Sport 4X2 4 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 62.30 km/h (38.71 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Calspan Corporation Transportation Sciences Center in Buffalo, New York on December 09, 2011. Pre-test and post-test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

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

The Dummies were instrumented in the following manner:

#### DRIVER ATD (ES-2re)

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

#### PASSENGER ATD (SID-IIs)

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

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

### DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	52.74
Maximum Thorax Rib Deflection	mm	44	21.69
Combined Abdominal Force	N	2500	967.77
Pubic Symphysis Force	N	6000	-992.21

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC36)		1000	188.74
Lower Spine (T12) Resultant Acceleration	G	82	52.80
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3883.09
Maximum Thoracic Rib Deflection	mm	38*	31.97
Maximum Abdominal Rib Deflection	mm	45*	27.66

\*Proposed IARV

### SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

#### GENERAL COMMENTS

1. Camera No. 6 does not have a time stamp due to an internal malfunction and needs to be sent back to the manufacturer after NCAP testing to be repaired.
2. P1 serial number - F034
3. P2 serial number - 300

#### DATA ANOMALIES:

- Vehicle CG AZ is questionable
- MDB CG AZ is questionable

### **SECTION 3 Occupant and Vehicle Information**

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and Instrumentation Data

Data Sheet No. 6 – Test Vehicle Accelerometer Locations

Data Sheet No. 7 – MDB Accelerometer Locations

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – MDB Summary of Results

Data Sheet No. 10 – Test Vehicle Profile Measurements

Data Sheet No. 11 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 12 – MDB Exterior Static Crush Measurements

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

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

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
Test Date: 12/9/2011

**TEST VEHICLE INFORMATION AND OPTIONS**

NHTSA No.	MC0335
Model Year	2012
Make	Jeep
Model	Liberty Sport 4X2
Body Style	4 Door SUV
VIN	1C4PJLAK8CW100927
Body Color	Light gray/silver
Odometer Reading (km/mi)	257 / 160
Engine Displacement (L)	3.7
Type/No. Cylinders	V6
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	4-Speed
Overdrive	Yes
Final Drive	Rear Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All-Wheel Drive (AWD)	No

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	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	No
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 Pretensioners	Yes
Rear Pass. Seat Belt Pretensioners	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	--

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

No

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Chrysler Group LLC
Date of Manufacture	7/11
Vehicle Type	4 Door SUV

GVWR (kg)	2,541
GAWR Front (kg)	1,248
GAWR Rear (kg)	1,452

**VEHICLE SEATING AND WEIGHT CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				430.0	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Weight (RCLW) (kg)				89.8	(A-B)

**VEHICLE SEAT TYPE**

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

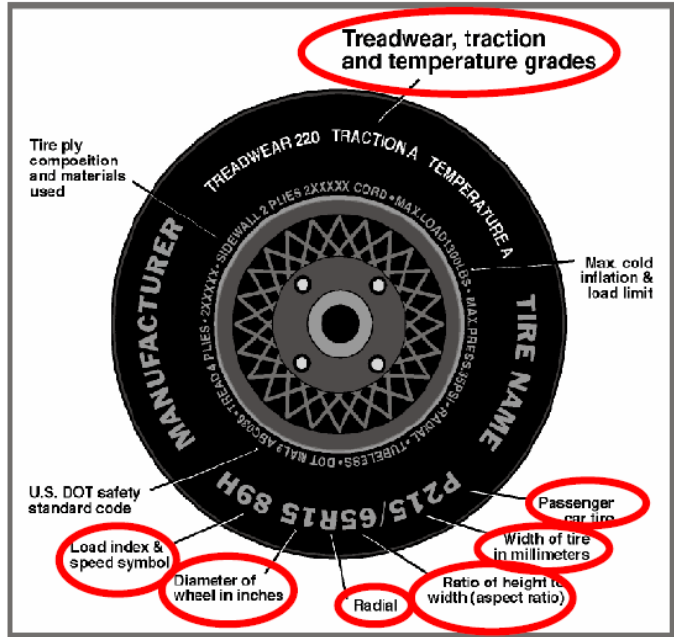
**DATA SHEET NO. 1 ... (CONTINUED)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**VEHICLE TIRE INFORMATION**

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



**TIRE PLACARD INFORMATION**

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	228	228
Recommended Tire Size	P225/75R16	P225/75R16

**TIRE SIDEWALL INFORMATION**

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	P225/75R16	P225/75R16
Tire Manufacturer	Goodyear	Goodyear
Tire Name	WRANGLER ST	WRANGLER ST
Tire Type	Passenger	Passenger
Tire Width	225	225
Aspect Ratio	75	75
Radial	Yes	Yes
Wheel Diameter	744	744
Load Index/Speed	101S	101S
Treadwear	640	640
Traction Grade	B	B
Temperature Grade	B	B
Tire Material	RUBBER	RUBBER

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
Test Date: 12/9/2011

**TIRE PRESSURES**

	Units	LF	RF	LR	RR
As Delivered	kPa	228	228	228	228
Tire Placard	kPa	228	228	228	228
Owner's Manual	kPa	228	228	228	228
As Tested	kPa	228	228	228	228

**MDB TIRE SPECIFICATIONS**

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

**TEST VEHICLE AXLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	487.5	444		513	546.5		529.5	547	
Right	kg	434	437		437	523.5		435	516	
Ratio	%	51	49		47	53		48	52	
Totals	kg	921.5	881	1,802.5	950	1,070	2,020	964.5	1,063	2,027.5

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1,802.5	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.8	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	89.8	(C)
Calculated Target Vehicle Test Weight (TVT <sub>W</sub> )	kg	2,029.1	(A+B+C)

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

**WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVT<sub>W</sub>**

Component Description	Weight (kg)
None	
Ballast / Equipment Added	0.0

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**TEST VEHICLE ATTITUDE AND CG**

Measurement Description	Units	Fully Loaded	As Tested	Meets Requirement**
LF	mm	811	812	Yes
RF	mm	817	820	Yes
RR	mm	825	822	Yes
LR	mm	811	812	Yes
Vehicle CG (Aft of Front Axle)	mm	1,413	1,428	
Vehicle CG (Left+)/Right(-) from Longitudinal Centerline)	mm	48	39	

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

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**SEAT POSITIONING**

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

**SCRL ANGLE RANGE**

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

*\*if applicable*

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

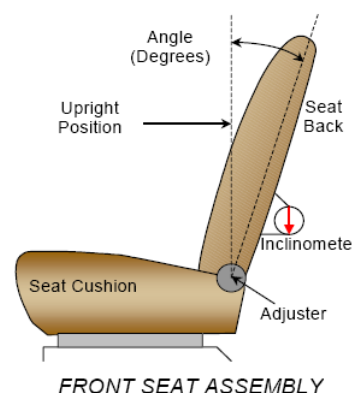
**SEAT FORE / AFT POSITION**

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	230	24	120	12
Front Passenger Seat	230	24	120	12
Front Center Seat*				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

*\*if applicable*

**SEAT BACK ANGLE ADJUSTMENT**

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/ Seated Dummy	7 to 51.8	-	25.4	-
Front Passenger Seat	7 to 51.8	-	25.4	-
Front Center Seat*				
Struck Side Rear Seat w/ Seated Dummy	Fixed	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Rear Center Seat*	Fixed	Fixed	Fixed	Fixed

*\*if applicable*

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**SEAT BELT ANCHORAGE ADJUSTMENT**

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

	Total No. of Positions	Placed in Position
Driver Seat	5	2
Rear Seat	Fixed	Fixed

**HEAD RESTRAINT ADJUSTMENT**

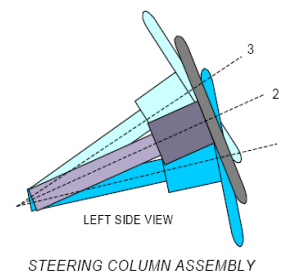
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total No. of Positions	Placed in Position
Driver Seat	5	0
Rear Seat	3	2

**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion. There is no telescoping option for this vehicle.

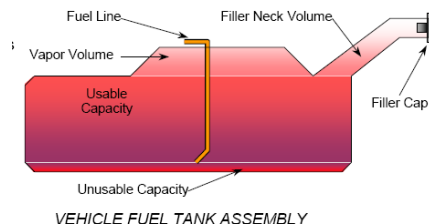
	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	69.1	
Geometric Center – Position 2	66.0	
Uppermost – Position 3	62.8	
Telescoping Steering Wheel Travel		
Test Position	66.0	



**FUEL PUMP**

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

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



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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**FUEL TANK CAPACITY**

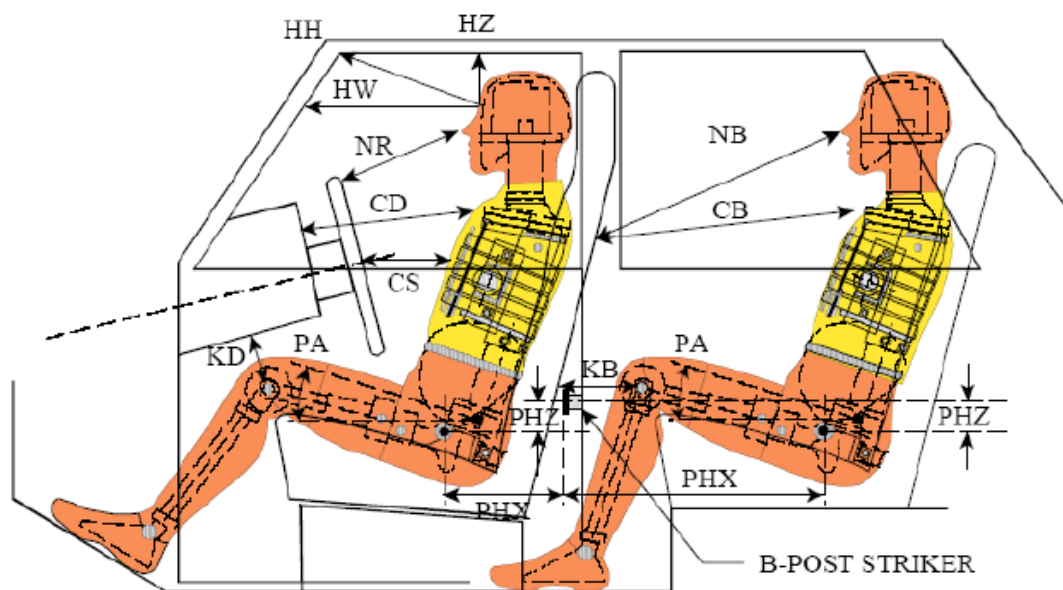
	<b>Liters</b>
Usable Capacity of "Standard Tank" (see Form No. 1)	73.8
Usable Capacity of "Optional Tank" (see Form No. 1)	
Usable Capacity of Standard Tank (see Owner's Manual)	73.8
Usable Capacity of Optional Tank (see Owner's Manual)	
93% of Usable Capacity	68.6
Actual Amount of Solvent Used in Test	68.5
1/3 of Usable Capacity	24.6

Is the Actual Amount of Solvent Used in the test equal to 93% ± 1% of the Usable Capacity stated in Form No. 1?     **Yes**         **No**

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



**LEFT SIDE VIEW**

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

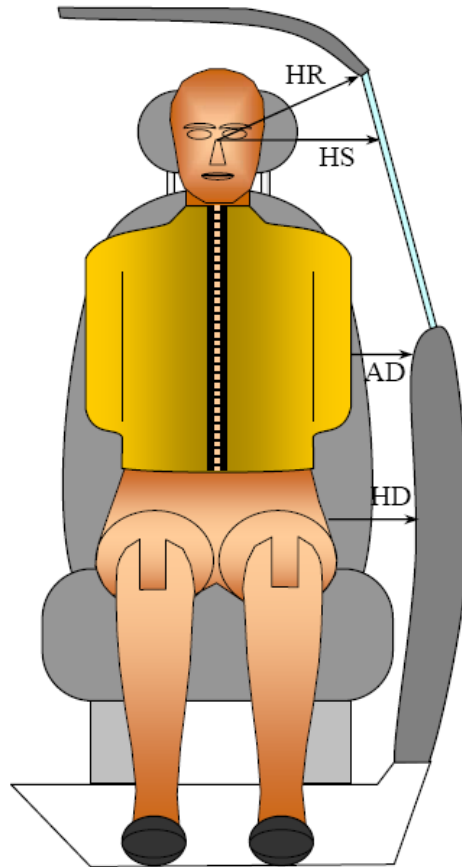
**DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION**

Driver Code	Pass. Code	Measurement Description	Driver (Serial No. F034)		Passenger (Serial No. 300)	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	458			
HW		Header to Windshield	582			
HZ	HZ	Head to Roof Liner	200		347	
NR	NB	Nose to Rim/Seat Back	483		488	
CD	CB	Chest to Dash/Seat Back	630		482	
CS		Chest to Steering Wheel	425			
KD(L)/KDA(L)°	KB(L)/KBA(L)°	Left Knee to Dash/Seat Back	128	6.4	238	16.2
KD(R)/KDA(R)°	KB(R)/KBA(R)°	Right Knee to Dash/Seat Back	131	7.2	240	17.6
PAX°	PAX°	Pelvic Tilt Angle X		-23.8		19.0
	PAY°	Pelvic Tilt Angle Y				0.4
PHX	PHX	Hip Point to Striker (X-Axis)	223		234	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	120		244	

**DATA SHEET NO. 4  
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



*FRONT VIEW OF DUMMY*

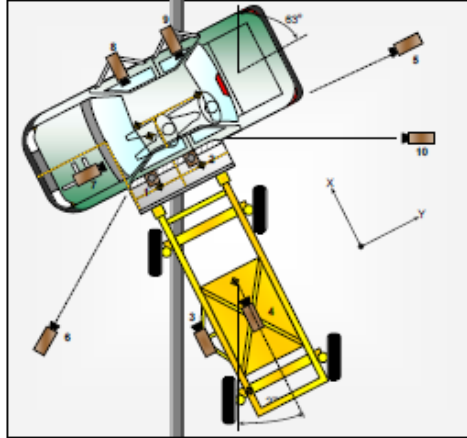
**DUMMY LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement Description	Units	Driver (Serial No. F034)	Passenger (Serial No. 300)
HR	Head to Side Header	Mm	160	290
HS	Head to Side Window	Mm	345	415
AD	Arm to Door	Mm	65	161
HD	Hip Point to Door	Mm	118	179

**DATA SHEET NO. 5  
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



**CAMERA LOCATIONS AND DATA**

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Overhead Overall	300	0	5150	14	1000
2	Overhead Close-up	0	0	5150	28	1000
3	Left Impact Point (MDB)	-1470	0	-847	25	1000
4	Side Overall (MDB)	-1140	838	-1587	12.5	1000
5	Rear	4900	3270	950	50	1000
6	Left Front	2790	1449	950	24	1000
7	Driver Front (OB)				25	500
8	Driver Side (OB)				12.5	500
9	Passenger Side (OB)				12.5	500
10	Real-time Left Rear				-	30
11	Real-time Inrun				-	30

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

If applicable, explain why camera(s) did not operate as intended: Camera No.6 does not have a time stamp due to an internal malfunction and needs to be sent back to the manufacturer after NCAP testing in order to be repaired.

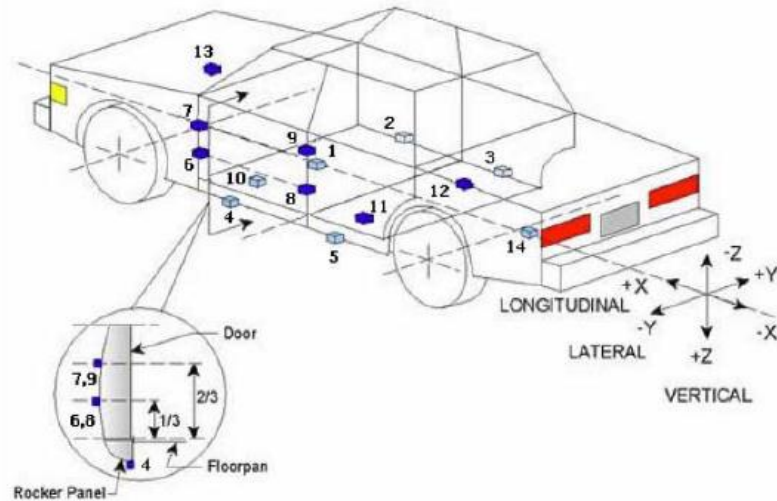
**INSTRUMENTATION**

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	23
MDB Accelerometers	7
<b>Total</b>	<b>62</b>

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



**TEST VEHICLE ACCELEROMETER LOCATIONS**

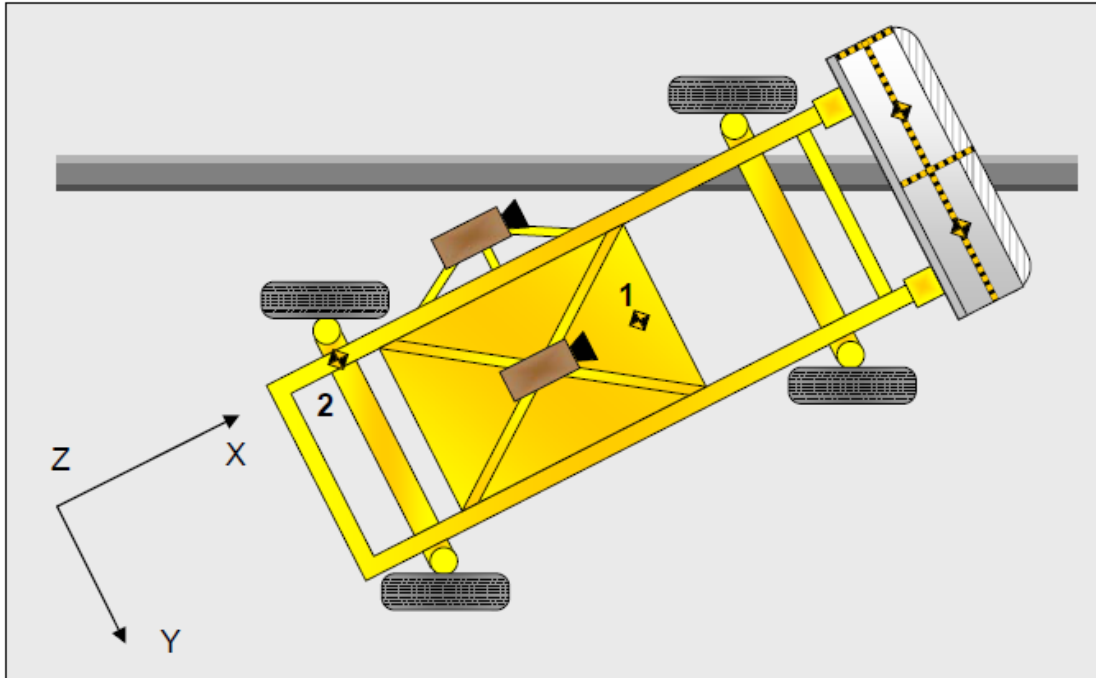
No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2,201	93	-690
2	Right Sill at Front Seat	2,380	631	-484
3	Right Sill at Rear Seat	1,883	628	-455
4	Left Sill at Front Door	2,601	-512	-462
5	Left Sill at Rear Door	1,691	-622	-428
6	A-Post Lower	2,924	-467	-474
7	A-Post Middle	2,810	-546	-1,204
8	B-Post Lower	1,974	-634	-514
9	B-Post Middle	1,886	-648	-1,120
10	Front Seat Track	2,097	-487	-536
11	Rear Seat Structure	1,484	-593	-468
12	Rt. Rear Occ. Compartment	2,040	367	-432
13	Engine Block	3,680	-146	-937
14	Rear Above Axle	1,091	21	-806

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

**DATA SHEET NO. 7**  
**MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
Test Date: 12/9/2011



**MDB ACCELEROMETER LOCATIONS**

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

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

**DATA SHEET NO. 8  
POST-TEST OBSERVATIONS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**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	Interior Side Headliner	Curtain Airbag
Left Side of Head	Interior Side Headliner	Curtain Airbag
Back of Head	HeadRest	None
Left Shoulder	Curtain Airbag	Passenger Door
Upper Torso	Driver's Side Door	Passenger Door
Lower Torso	Driver's Side Door	Passenger Door
Left Hip	Driver's Side Door	Passenger Door
Left Knee	Driver's Side door	Passenger Door

**POST-TEST DOOR PERFORMANCE**

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

**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	B-Pillar was pushed in but no separation occurred
Sill Separation	None
Windshield Damage	None
Side Window Damage	None
Other Notable Effects	None

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

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

**IMPACT POINT LOCATION DATA**

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		2695
Vertical Impact Reference Line (Aft of Front Axle - Intended Impact Point)	mm		410
Actual Impact Point (Aft of Frontal Axle)	mm		441
Horizontal Offset (+ forward / - rearward)	mm	+/- 50 of Intended Impact Point	-31
Vertical Offset (+ down / - up)	mm	+/- 20 of Intended Impact Point	8

**DATA SHEET NO. 9  
MDB SUMMARY OF RESULTS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
Test Date: 12/9/2011

**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	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.2
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

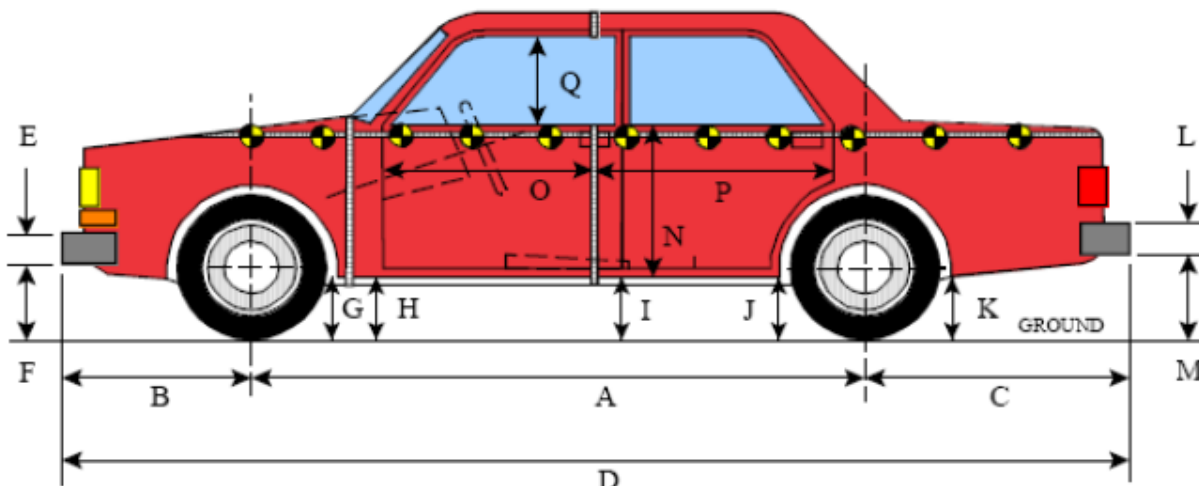
**MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE**

Vertical Location			From Centerline		Maximum Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	800	Right	235
B	Top of Bumper	533	700	Right	171
C	Mid-Level	686	800	Left	159
D	Top of Stack	813	800	Left	195

**DATA SHEET NO. 10  
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



**LEFT SIDE VIEW**

All MEASUREMENTS IN (mm) WITH TOLERANCE OF  $\pm 3$ mm

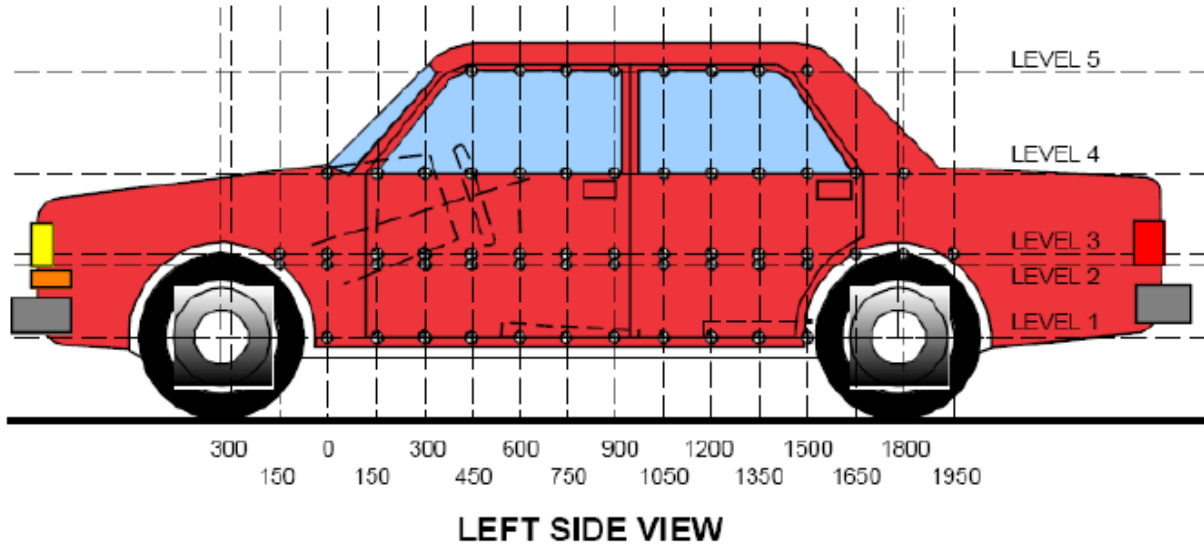
**VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION**

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2,695	2,695	0
B	Front Axle to FSOV	751	749	-2
C	Rear Axle to RSOV	1,052	1,051	-1
D	Total Length at Centerline	4,498	4,495	-3
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	489	521	32
G	Sill Height at Front Wheel Well	246	260	14
H	Sill Height at Front Door Leading Edge	323	338	15
I	Sill Height at B Pillar	329	309	-20
J1	Sill Height at Rear Wheel Well	327	332	5
J2	Pinch Weld Height at Rear Wheel Well	320	328	8
K	Sill Height Aft of Rear Wheel Well	361	361	0
L	Rear Bumper Thickness	160	160	0
M	Rear Bumper Bottom to Ground	529	517	-12
N	Sill Height to Window Bottom of Front Window Sill	753	725	-28
O	Front Door Leading Edge to Impact CL	613	607	-6
P	Rear Door Trailing Edge to Impact CL	1,215	1,117	-98
Q	Front Window Opening	438	457	19
R	Right Side Length	4,432	4,432	0
S	Left Side Length	4,430	4,421	-9
T	Vehicle Width at B-Pillar	1,780	1,617	-163

**DATA SHEET NO. 11**  
**TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011



**MAXIMUM EXTERIOR CRUSH MEASUREMENTS**

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	437	237	1350
2	Driver Hip Point	654	255	1650
3	Mid-Door	778	203	1650
4	Window Sill	1,110	83	1350
5	Window Top	1,679	6	2250

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

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

**EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL**

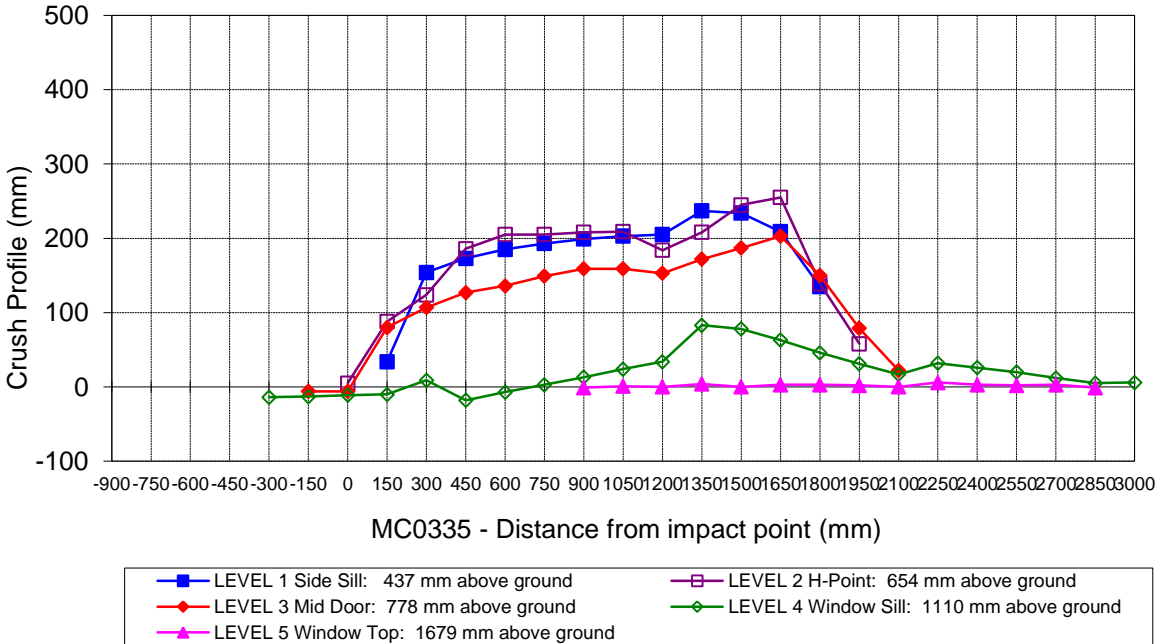
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				-765					-779					-14	
-150			-919	-794				-925	-807				-6	-13	
0		-907	-901	-815			-902	-907	-826			5	-6	-11	
150	-862	-854	-852	-826		-828	-766	-772	-836		34	88	80	-10	
300	-842	-864	-857	-834		-688	-740	-750	-825		154	124	107	9	
450	-848	-871	-862	-836		-675	-685	-735	-854		173	186	127	-18	
600	-853	-878	-868	-843		-668	-673	-732	-850		185	205	136	-7	
750	-856	-883	-872	-848		-663	-678	-723	-845		193	205	149	3	
900	-859	-887	-875	-853	-609	-660	-679	-716	-840	-610	199	208	159	13	-1
1050	-861	-889	-878	-858	-666	-658	-680	-719	-834	-665	203	209	159	24	1
1200	-862	-890	-879	-860	-672	-657	-706	-726	-826	-672	205	184	153	34	0
1350	-862	-890	-879	-862	-678	-625	-682	-707	-779	-674	237	208	172	83	4
1500	-861	-889	-878	-861	-677	-627	-644	-691	-783	-677	234	245	187	78	0
1650	-859	-888	-877	-860	-680	-650	-633	-674	-797	-677	209	255	203	63	3
1800	-879	-886	-872	-858	-679	-744	-747	-722	-812	-676	135	139	150	46	3
1950		-906	-905	-855	-677		-848	-826	-824	-675		58	79	31	2
2100			-908	-850	-674			-886	-833	-674			22	17	0
2250				-845	-673				-813	-667				32	6
2400				-838	-670				-812	-667				26	3
2550				-830	-665				-810	-663				20	2
2700				-820	-661				-808	-658				12	3
2850				-806	-650				-801	-651				5	-1
3000				-790					-784					6	

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

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: NCAP Side MDB Impact Test

NHTSA No.: MC0335  
 Test Date: 12/9/2011

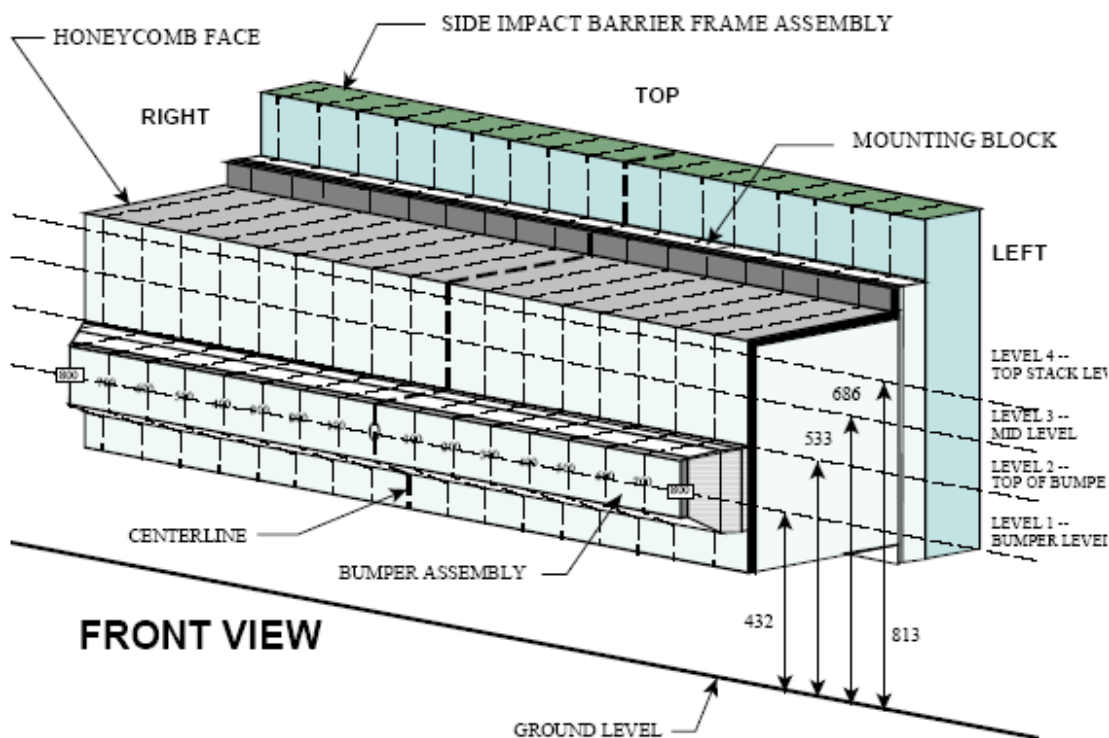


**Vehicle Exterior Crush Measurements - Visual Representation**

**DATA SHEET NO. 12  
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE**

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
 Test Program: Side MDB NCAP

NHTSA No.: MC0335  
 Test Date: 12/9/2011



NOTE: Dimensions are shown in millimeters, mm

**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	235	205	171	140	131	132	135	138	141	143	146	149	152	156	167	181	192
2	171	146	116	103	101	100	104	108	110	113	116	119	122	125	130	143	156
3	121	79	67	71	91	107	89	70	62	61	62	59	61	70	98	144	159
4	99	108	112	118	128	142	118	105	104	115	122	132	139	129	148	164	195

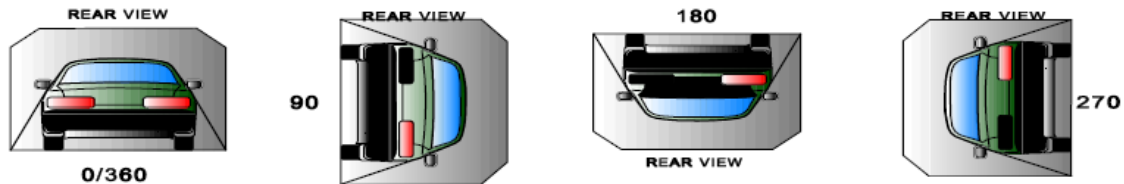
**FMVSS NO. 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2012 Jeep Liberty Sport 4X2      NHTSA No.: MC0335  
 Test Program: Side MDB NCAP      Test Date: 12/9/2011

Test Time: 5:20 PM      Temperature: 1°C

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

**FMVSS NO. 301 STATIC ROLLOVER DATA**



**ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	69	300	369
90 to 180	68	300	368
180 to 270	63	300	363
270 to 360	65	300	365

**FMVSS NO. 301 ROLLOVER SPILLAGE TABLE**

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

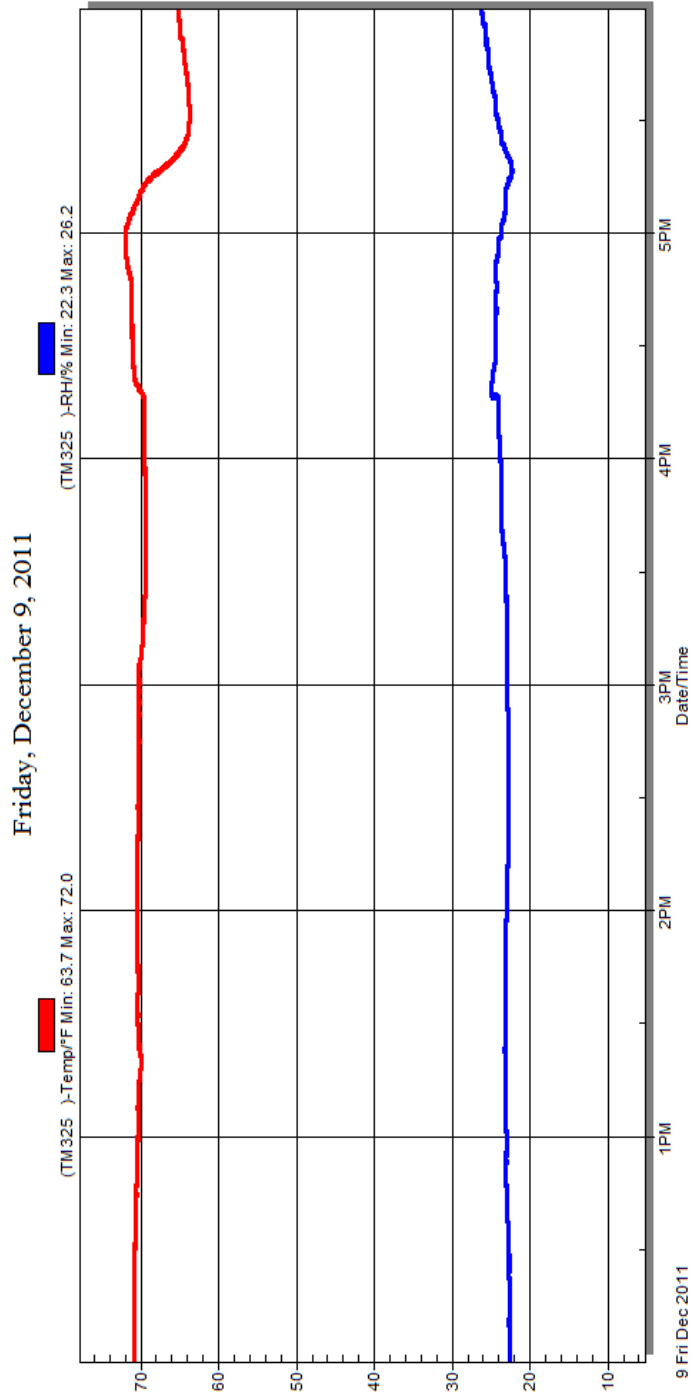
**ROLLOVER SOLVENT SPILLAGE LOCATION TABLE**

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

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

Test Vehicle: 2012 Jeep Liberty Sport 4X2  
Test Program: Side MDB NCAP

NHTSA No.: MC0335  
Test Date: 12/9/2011



**APPENDIX A**  
**PHOTOGRAPHS**

## TABLE OF PHOTOGRAPHS

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003	Pre-Test Frontal View of Test Vehicle	A-6
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005	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-7
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008	Post-Test Left Side View of Test Vehicle	A-8
009	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-9
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<b>072</b>	Pre-Test Passenger Inner Door Panel View	<b>A-40</b>
<b>073</b>	Post-Test Passenger Inner Door Panel View	<b>A-41</b>
<b>074</b>	Post-Test Rear Passenger Dummy Close-Up Head Contact with Vehicle View	<b>A-41</b>
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<b>076</b>	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View	<b>A-42</b>
<b>077</b>	Post-Test Rear Passenger Dummy Close-Up Torso Contact with Side Airbag View	<b>A-43</b>
<b>078</b>	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View	<b>A-43</b>
<b>079</b>	Post-Test Rear Passenger Dummy Close-Up Pelvis Contact with Side Airbag View	<b>A-44</b>
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<b>084</b>	Pre-Test Top View of MDB Impactor Face	<b>A-46</b>
<b>085</b>	Post-Test Top View of MDB Impactor Face	<b>A-47</b>
<b>086</b>	Pre-Test Left Side View of MDB Impactor Face	<b>A-47</b>
<b>087</b>	Post-Test Left Side View of MDB Impactor Face	<b>A-48</b>
<b>088</b>	Pre-Test Right Side View of MDB Impactor Face	<b>A-48</b>
<b>089</b>	Post-Test Right Side View of MDB Impactor Face	<b>A-49</b>

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

# Photo Not Available

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

# Photo Not Applicable

No Torso Side Airbag

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 with Vehicle Interior View

# Photo Not Applicable

No Pelvis Airbag

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



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



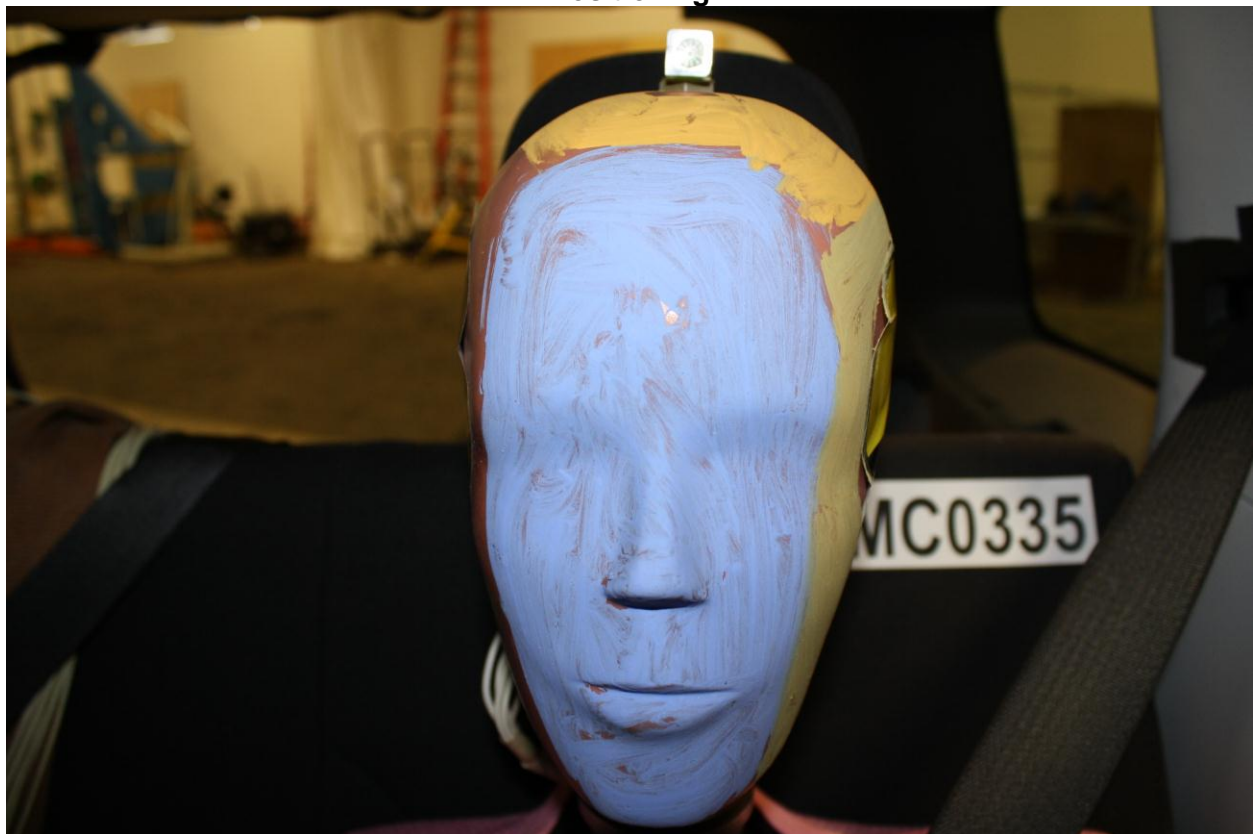
Figure A-55: Pre-Test Left Side View of Passenger Dummy Shoulder and Door Top View



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



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



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



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



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



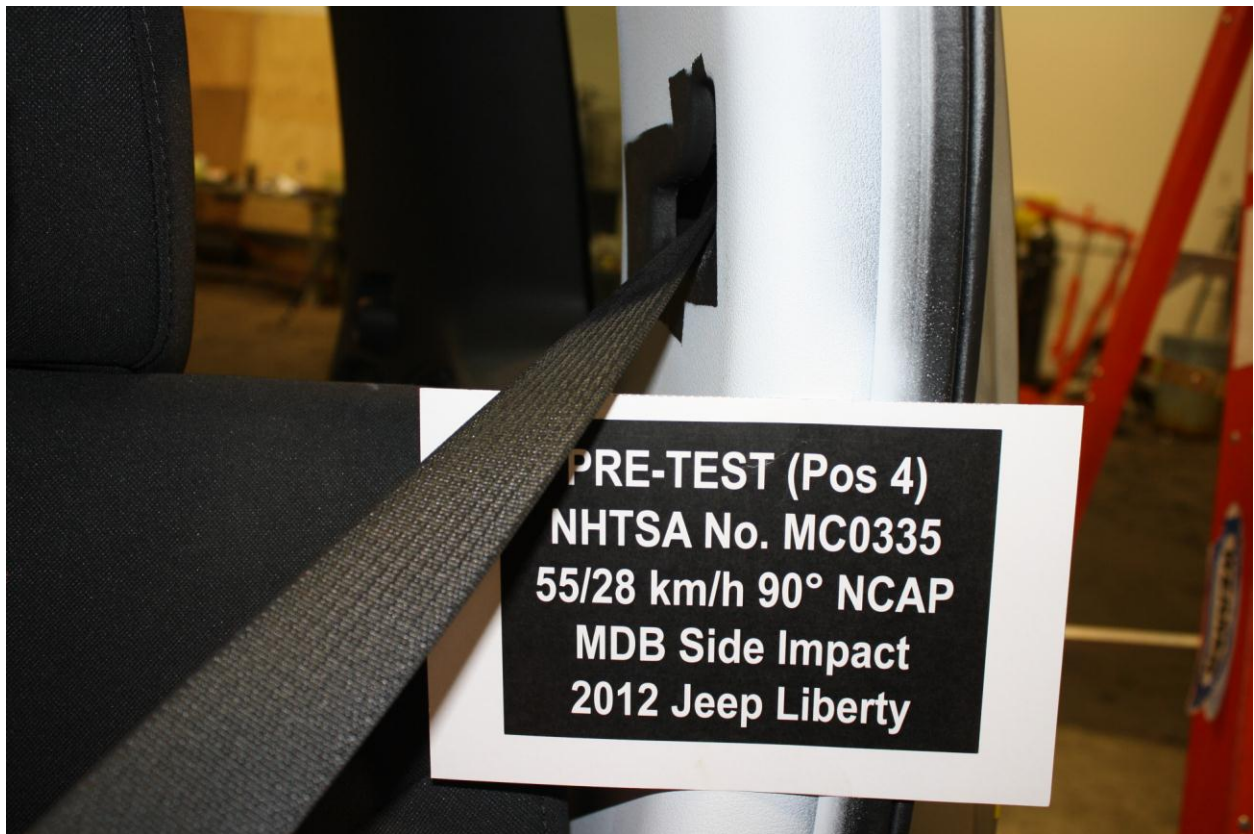
**Figure A-61: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket**



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



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



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



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

# Photo Not Applicable

**Seatback is Fixed**

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



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



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



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



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



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



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



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

# Photo Not Applicable

**Head only contacted the Curtain Airbag**

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



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



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

# Photo Not Applicable

No Torso Side Airbag

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



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

# Photo Not Applicable

No Pelvis Airbag

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



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



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



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



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

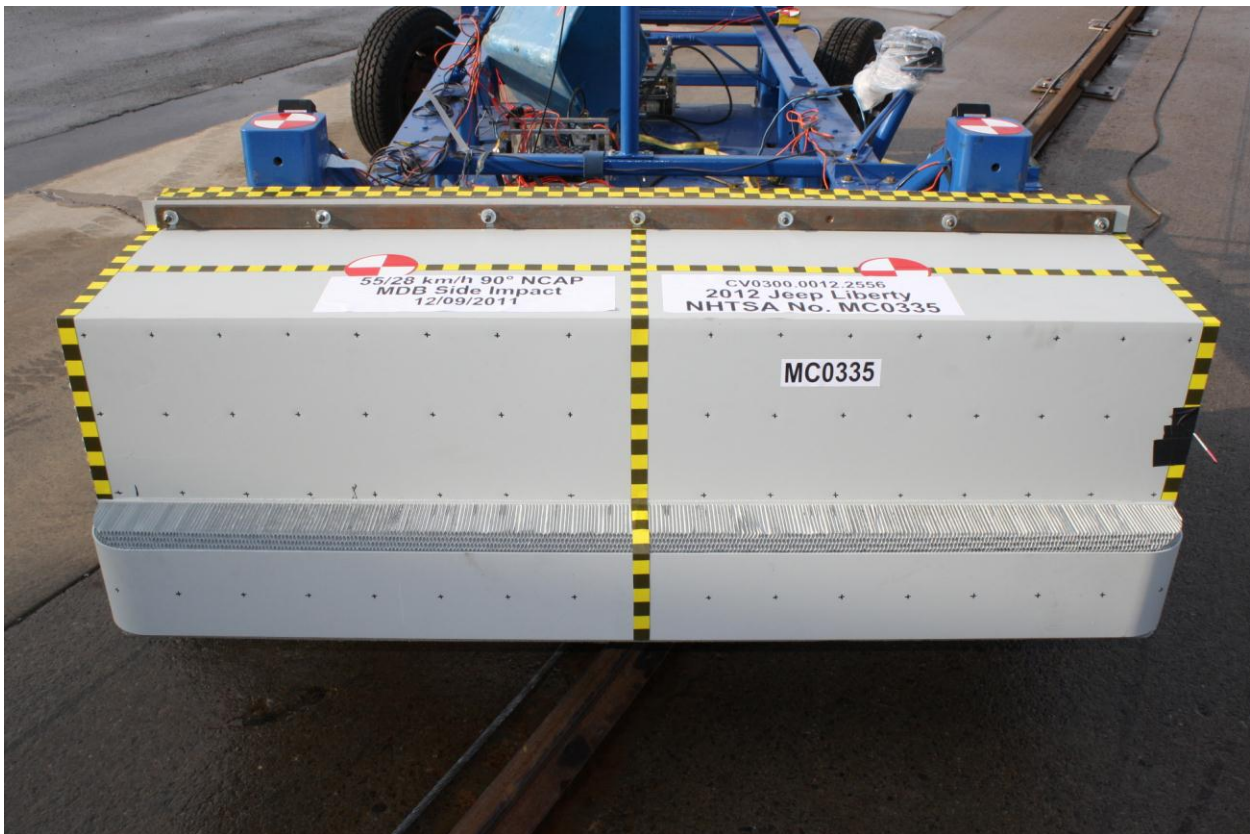


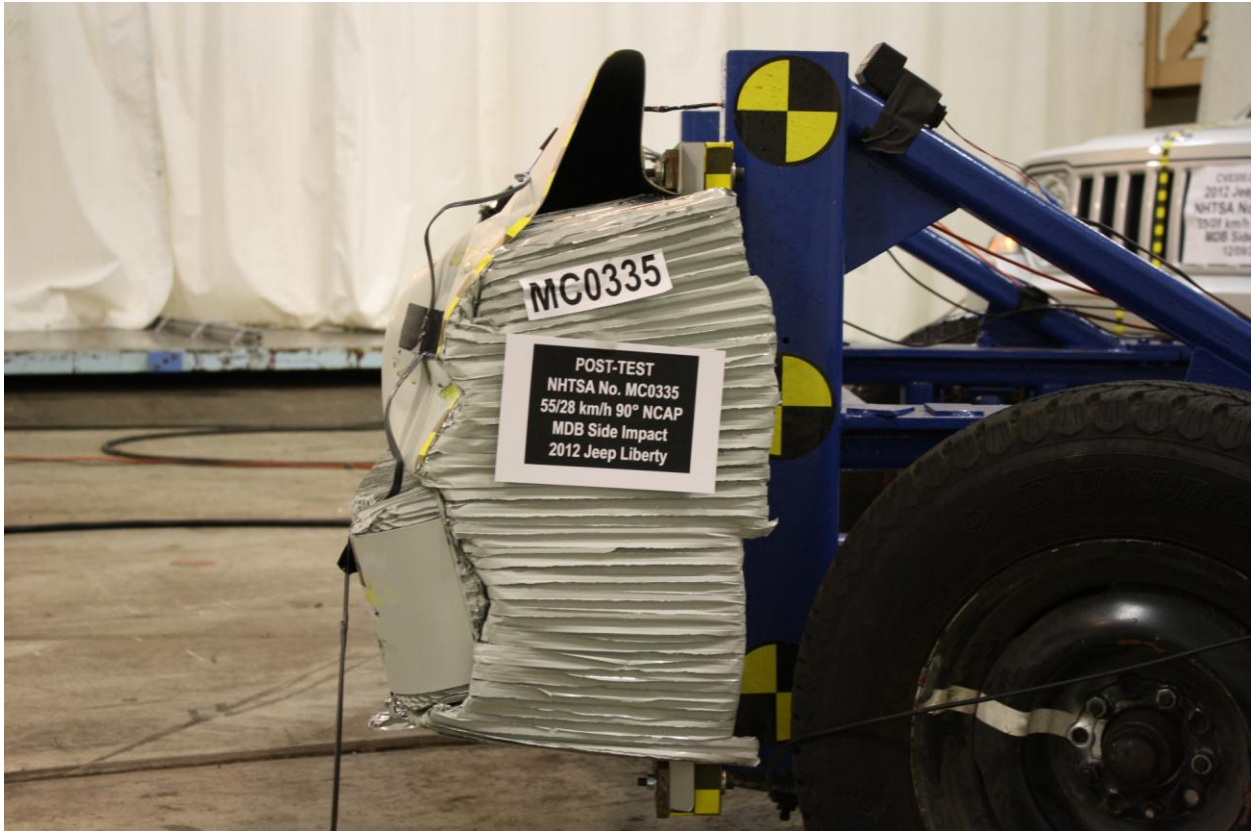
Figure A-84: Pre-Test Top View of MDB Impactor Face



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



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



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



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



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



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

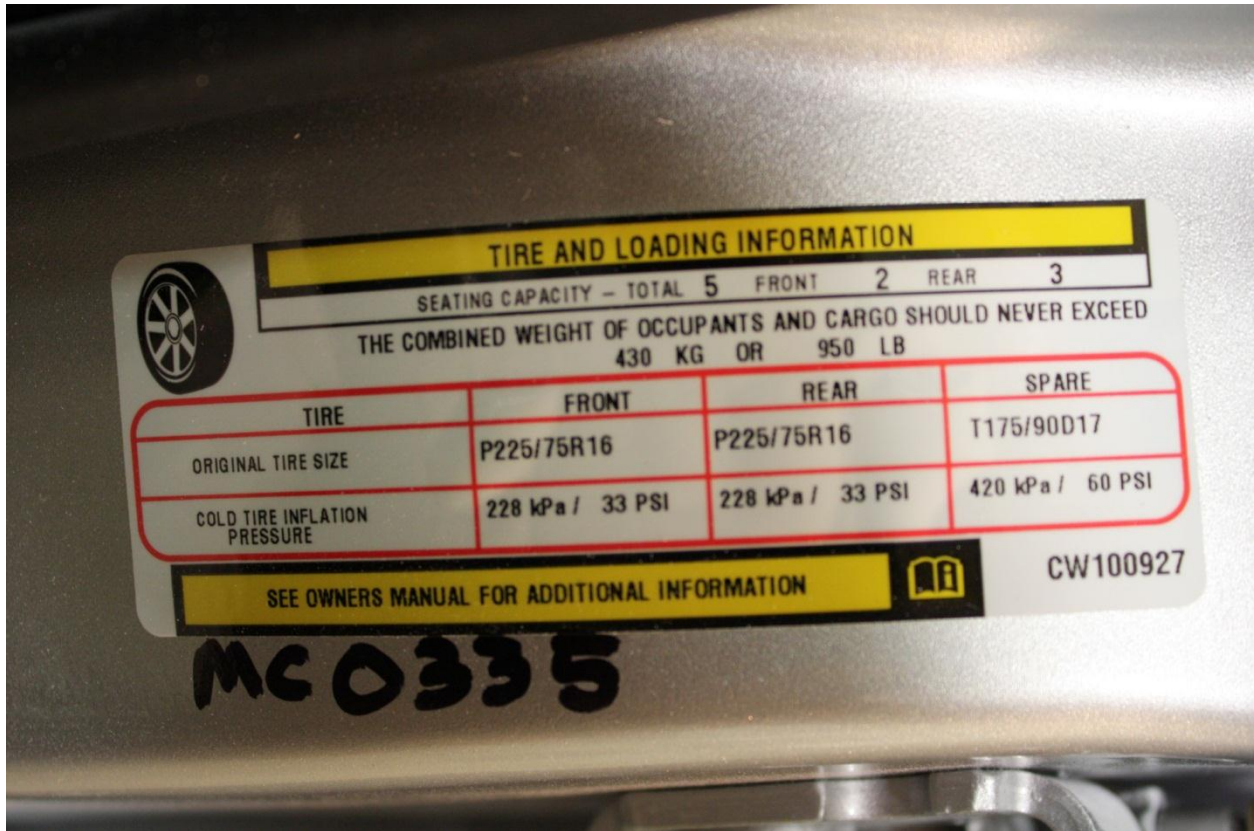


Figure A-91: Close-Up View of Vehicle's Tire Information Placard or Label



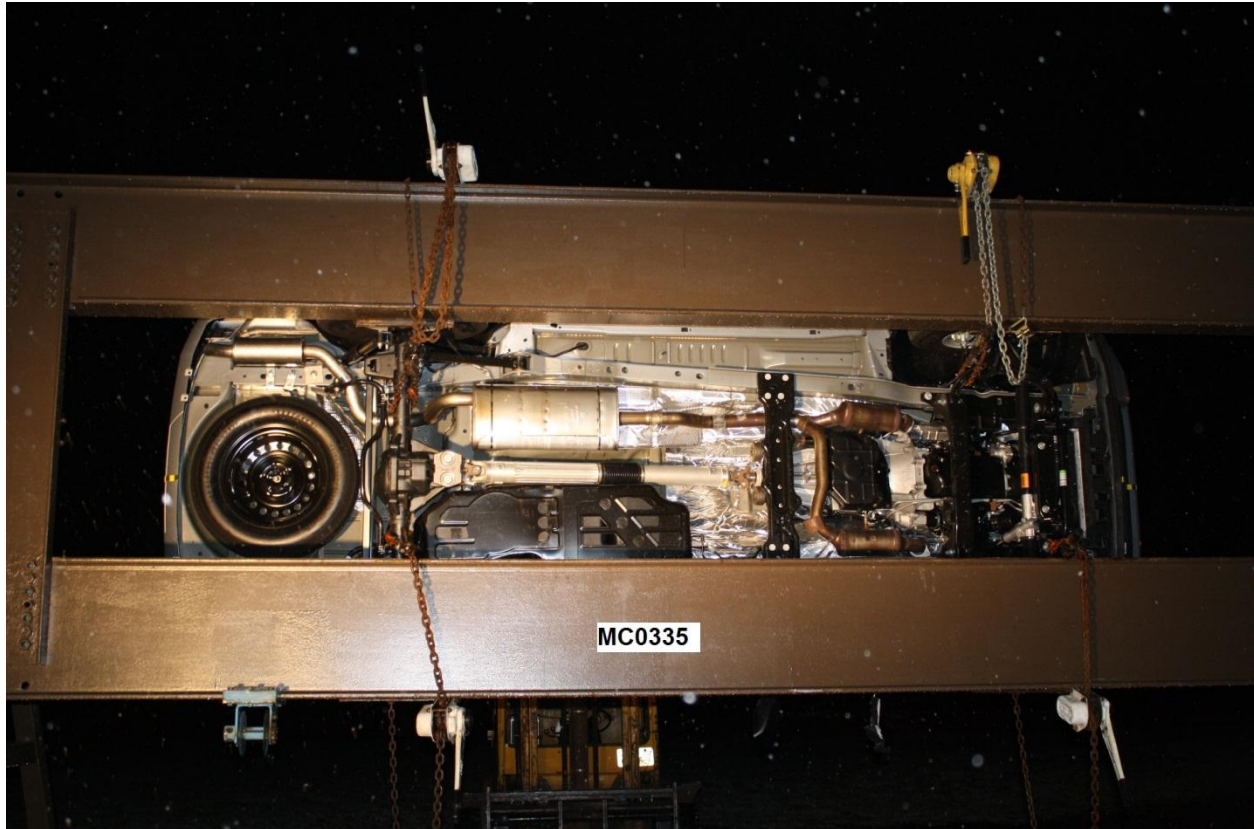
Figure A-92: Pre-Test Ballast View



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



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



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



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



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



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



Figure A-99: Impact Event

## Jeep. 2012 MODEL YEAR LIBERTY SPORT 4X2

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: **\$23,360**

**JEEP LIBERTY SPORT 4X2**  
 Exterior Color: Bright Silver Metallic Clear Coat Exterior Paint  
 Interior Color: Dark Slate Grey Interior Color  
 Interior: Premium Cloth Bucket Seats  
 Engine: 3.7 Liter V6 Engine  
 Transmission: 4-Speed Automatic Transmission

**STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)**  
**FUNCTIONAL/SAFETY FEATURES**  
 Brakes Assist  
 Electronic Stability Control  
 Electronic Roll Mitigation  
 Hill Start Assist  
 All Speed Traction Control  
 Anti-lock 4-Wheel Disc Brakes  
 Active Head Restraints  
 Advanced Multistage Front Airbags  
 LATCH-Ready Child Seat Anchor System  
 Rear Door Child Protection Locks  
 Supplemental Side-Curtain Front and Rear Airbags  
 19.5-Gallon Fuel Tank  
 Compact Spare Tire  
 Enhanced Accident Response System  
 Power Windows with Driver's One-Touch-Down Feature  
 Speed Control  
 Speed-Sensitive Power Locks  
 Rear Window Wiper / Washer  
 Sentry Key Theft Deterrent System  
 Solar Control Glass  
 Tire Pressure Monitor with Warning Lamp

**INTERIOR FEATURES**  
 Air Conditioning  
 Cabin Air Filtration System  
 Front Passenger Side Fold-Flat Seat  
 Rear 60 / 40 Split-Folding Reclining Seat  
 Media Center 130 CD/MP3  
 Audio Jack Input for Mobile Devices  
 SiriusXM Satellite Radio w/ 1-Yr Radio Subscription  
 For More Information, Call 1-888-339-7474  
 6 Speakers  
 Remote Keyless Entry  
 Sun Visors with Illuminated Vanity Mirrors

**EXTERIOR FEATURES**  
 16" x 7.0" Cast Aluminum Painted Sparkle Silver  
 P225/75R16 BSW All Season Tires  
 Power Heated Exterior Mirrors w/ Manual Fold-Away  
 Tinted Windshield Glass  
 Automatic Headlamps  
 Halogen Headlamps  
 Flipper Liftgate Glass

**OPTIONAL EQUIPMENT**  
 Customer Preferred Package 288  
 California Emissions

**DESTINATION CHARGE** \$795

TOTAL PRICE: \* **\$24,155**

**WARRANTY COVERAGE**  
 5-year or 100,000-mile Powertrain Limited Warranty,  
 3-year or 36,000-mile Basic Limited Warranty,  
 24-hour towing assistance; certain restrictions apply.  
 Ask Dealer for a copy of the limited warranties or  
 see your owner's manual for details.

**5 YEAR / 100,000 MILE  
POWERTRAIN WARRANTY**

VIN: 1C4PJAK80W-100927 LAWRN 7381  
 ASSEMBLY POINT: TOLEDO, OHIO, U.S.A.  
 ENGINE: UNITED STATES  
 TRANSMISSION: UNITED STATES

For more information visit: [www.jeep.com](http://www.jeep.com)  
or call 1-877-IAM-JEEP

Chrysler Group LLC

### EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

<p style="font-weight: bold; margin: 0;">CITY MPG</p> <p style="font-size: 2em; font-weight: bold; margin: 0;">16</p> <p style="font-size: x-small; margin: 0;">Expected range for most drivers 13 to 19 MPG</p>	<p style="font-size: x-small; margin: 0;">Estimated Annual Fuel Cost</p> <p style="font-weight: bold; margin: 0;">\$2,502</p> <p style="font-size: x-small; margin: 0;">based on 15,000 miles at \$3.00 per gallon</p> <p style="font-size: x-small; margin: 0;">Combined Fuel Economy</p> <p style="font-weight: bold; margin: 0;">18</p> <p style="font-size: x-small; margin: 0;">10 ——— 32 All SUVs</p>	<p style="font-weight: bold; margin: 0;">HIGHWAY MPG</p> <p style="font-size: 2em; font-weight: bold; margin: 0;">22</p> <p style="font-size: x-small; margin: 0;">Expected range for most drivers 18 to 26 MPG</p> <p style="font-size: x-small; margin: 0;">Your actual mileage will vary depending on how you drive and maintain your vehicle.</p>
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See the FREE Fuel Economy Guide at dealers or [www.fueleconomy.gov](http://www.fueleconomy.gov)

#### GOVERNMENT SAFETY RATINGS

<b>Frontal Crash</b>	Driver Passenger	Not Rated Not Rated
Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.		
<b>Side Crash</b>	Front seat Rear seat	Not Rated Not Rated
Star ratings based on the risk of injury in a side impact.		
<b>Rollover</b>	★★★★	
Star ratings based on the risk of rollover in a single vehicle crash.		
Star ratings range from 1 to 5 stars (★★★★) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA).		

[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

#### PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS COUNTRY:  
U.S. / CANADIAN PARTS CONTENT: 76 %  
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:  
FINAL ASSEMBLY POINT:  
TOLEDO, OHIO, U.S.A.  
COUNTRY OF ORIGIN:  
ENGINE: UNITED STATES  
TRANSMISSION: UNITED STATES

Figure A-100: Monroney Label

A-54

TR2556

### Active Head Restraints – Front Seats

Active Head Restraints are passive, deployable components, and vehicles with this equipment cannot be readily identified by any markings, only through visual inspection of the head restraint. The head restraint will be split in two halves, with the front half being soft foam and trim, the back half being decorative plastic.

When AHRs deploy during a rear impact, the front half of the head restraint extends forward to minimize the gap between the back of the occupant's head and the AHR. This system is designed to help prevent or reduce the extent of injuries to the driver and front passenger in certain types of rear impacts. Refer to "Occupant Restraints" in "Things To Know Before Starting Your Vehicle" for further information.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, press the adjustment button, located at the base of the head restraint, and push downward on the head restraint.

For comfort the Active Head Restraints can be tilted forward and backward. To tilt the head restraint closer to the back of your head, pull forward on the bottom of the head restraint. Push rearward on the bottom of the head restraint to move the head restraint away from your head.



#### Note:

- The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see your authorized dealer.
- In the event of deployment of an Active Head Restraint, refer to "Occupant Restraints/Resetting Active Head Restraints (AHR)" in "Things To Know Before Starting Your Vehicle" for further information.

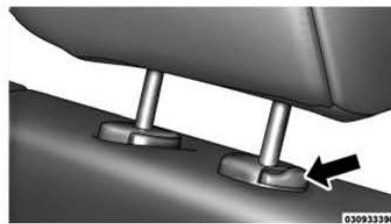
#### Warning!

- Do not place items over the top of the Active Head Restraint, such as coats, seat covers or portable DVD players. These items may interfere with the operation of the Active Head Restraint in the event of a collision and could result in serious injury or death.
- Active Head Restraints may be deployed if they are struck by an object such as a hand, foot or loose cargo. To avoid accidental deployment of the Active Head Restraint ensure that all cargo is secured, as loose cargo could contact the Active Head Restraint during sudden stops. Failure to follow this warning could cause personal injury if the Active Head Restraint is deployed.

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

### Rear Head Restraints

The two outboard seat are equipped with adjustable head restraints. To raise the head restraint, pull upward on the head restraint. To lower the head restraint, press the adjustment button, located on the base of the head restraint, and push downward on the head restraint.



#### Note:

- The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see your authorized dealer.
- Refer to "Occupant Restraints" in "Things To Know Before Starting Your Vehicle" for information on tether routing.

#### Warning!

**Driving a vehicle with the head restraints removed or improperly adjusted could cause serious injury or death in the event of a collision. The head restraints should be checked prior to operating the vehicle and never adjusted while the vehicle is in motion.**

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

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA PLOTS**

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

**TABLE OF DATA PLOTS**  
**Driver & Passenger Dummy Instrumentation Plots**

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

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](http://www.NHTSA.dot.gov).

#### **Additional Driver & Passenger Dummy Instrumentation Data**

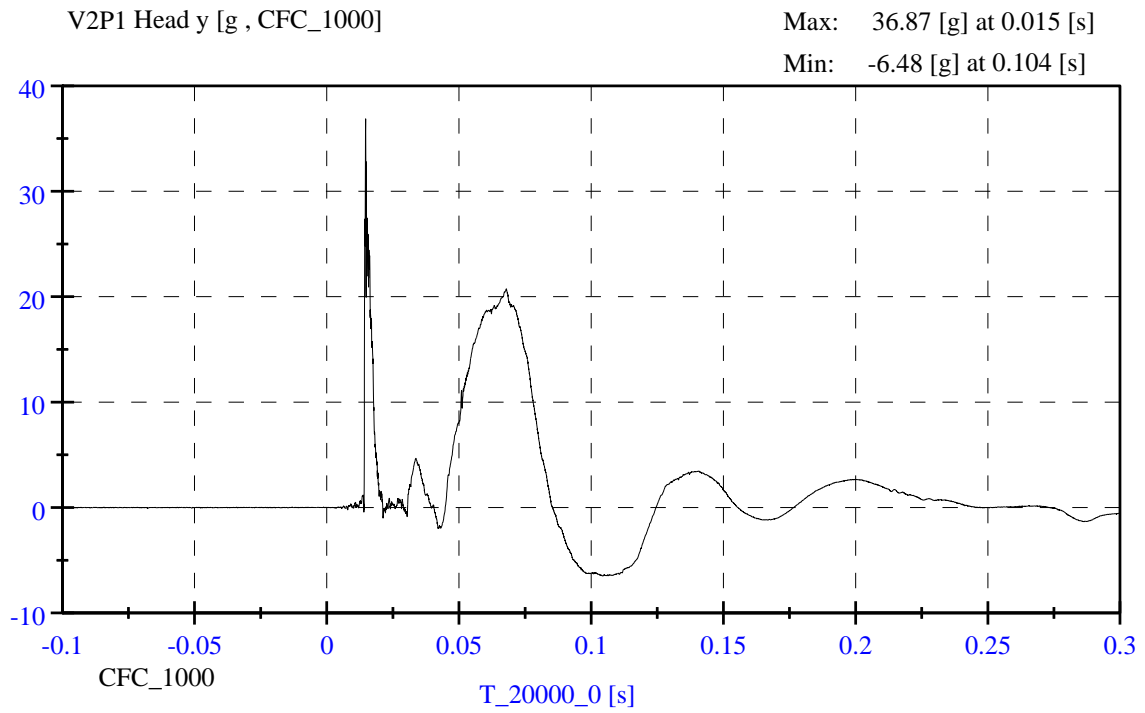
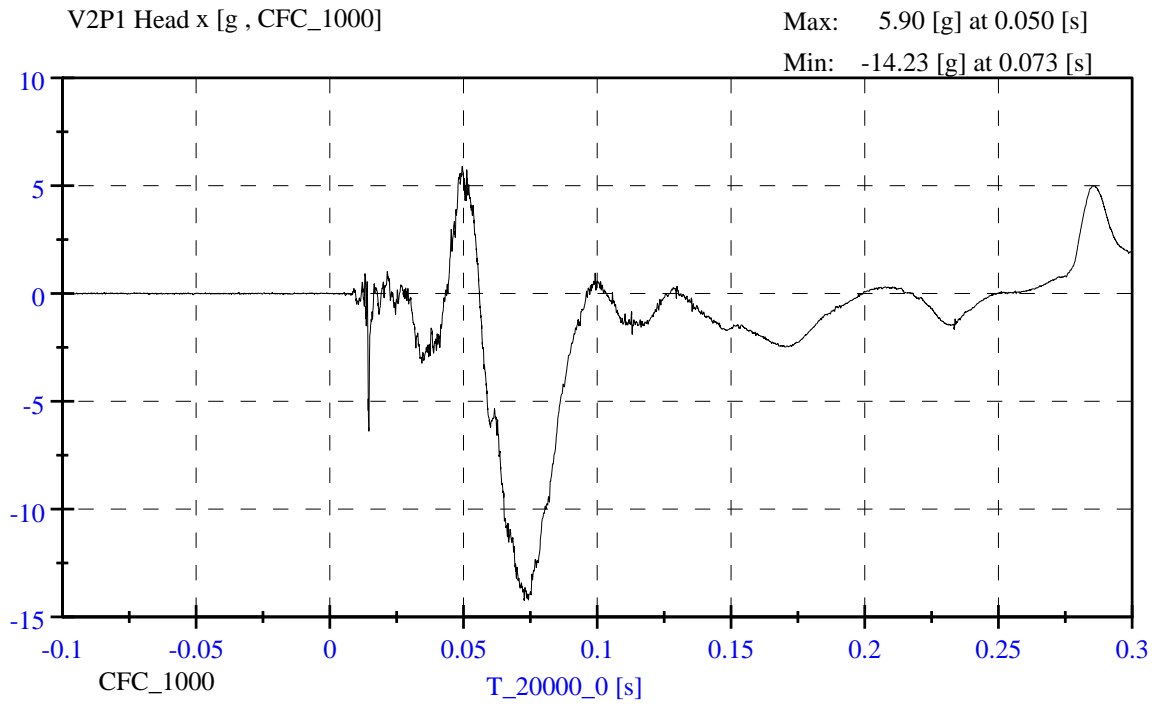
Driver Lower Spine T12 Acceleration (X)  
Driver Lower Spine T12 Acceleration (Y)  
Driver Lower Spine T12 Acceleration (Z)  
Passenger Upper Thorax Rib Deflection (Y)  
Passenger Middle Thorax Rib Deflection (Y)  
Passenger Lower Thorax Rib Deflection (Y)  
Passenger Upper Abdomen Rib Deflection (Y)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

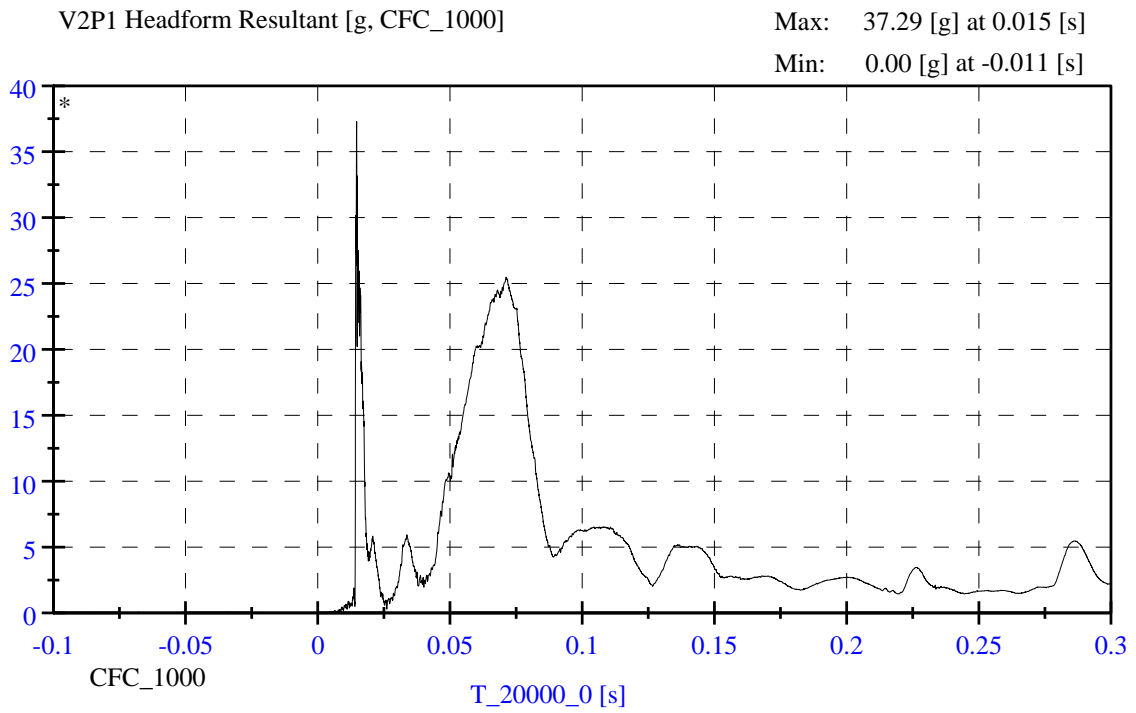
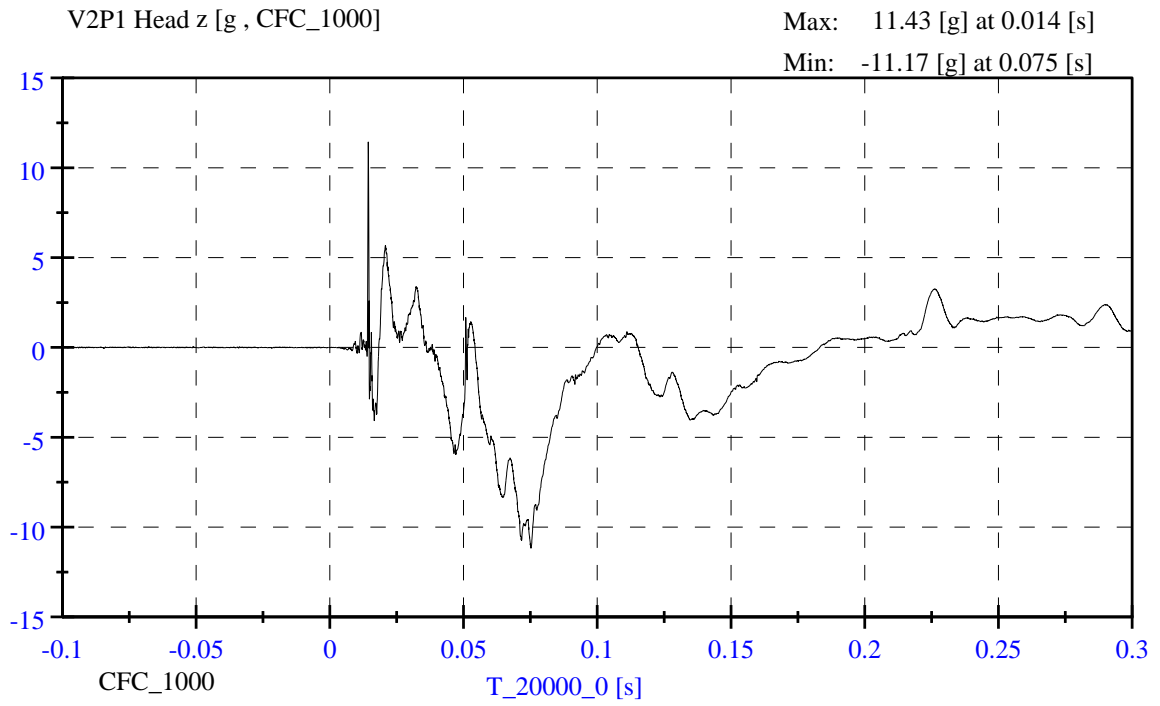
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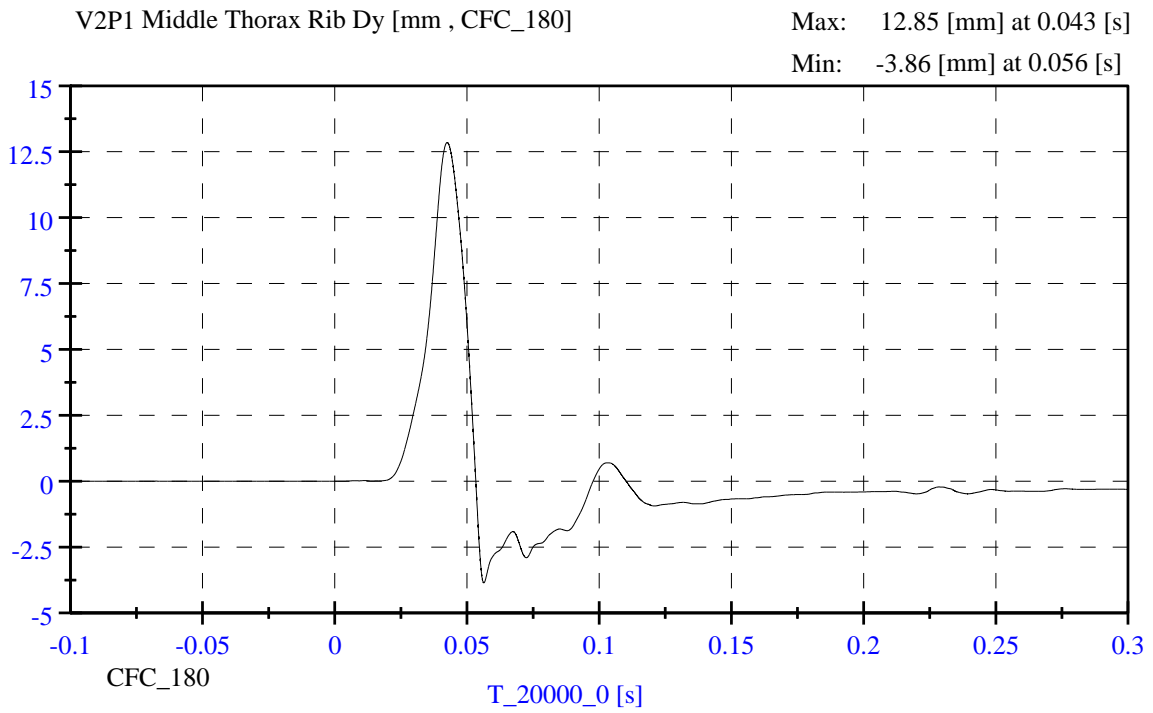
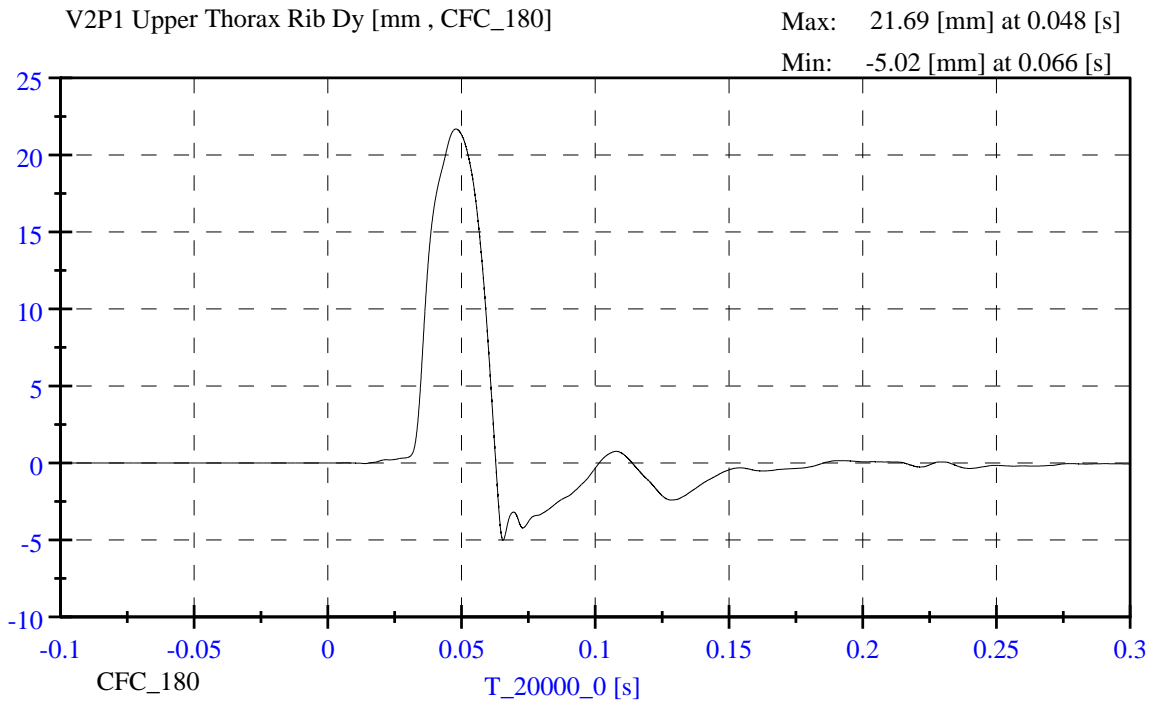
Vehicle Center of Gravity Acceleration (X)  
Vehicle Center of Gravity Acceleration (Y)  
Vehicle Center of Gravity Acceleration (Z)  
Right Side Sill at Front Seat Acceleration (X)  
Right Side Sill at Front Seat Acceleration (Y)  
Right Side Sill at Front Seat Acceleration (Z)  
Right Side Sill at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

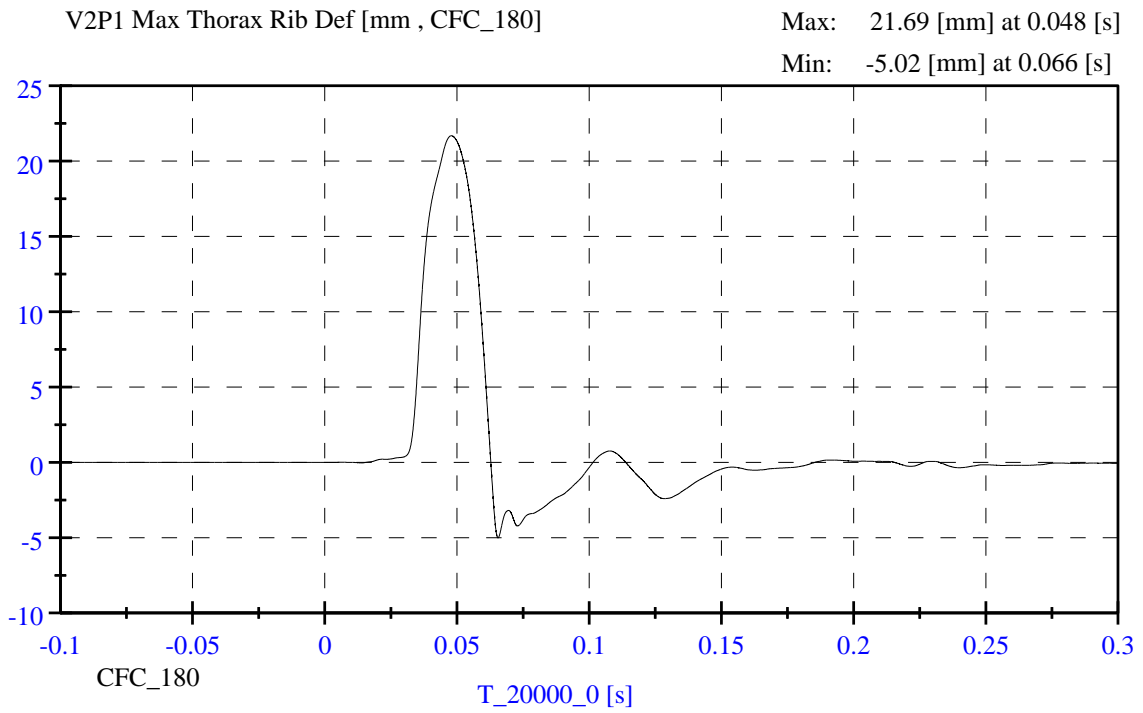
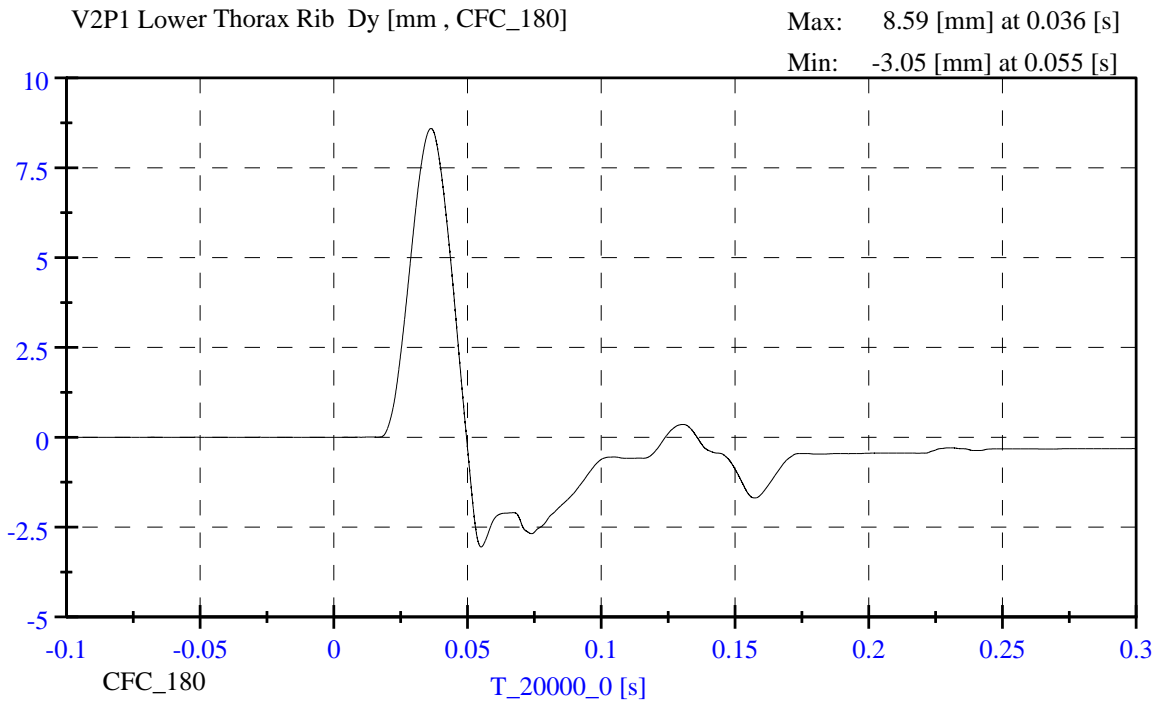
## **MDB Instrumentation Data**

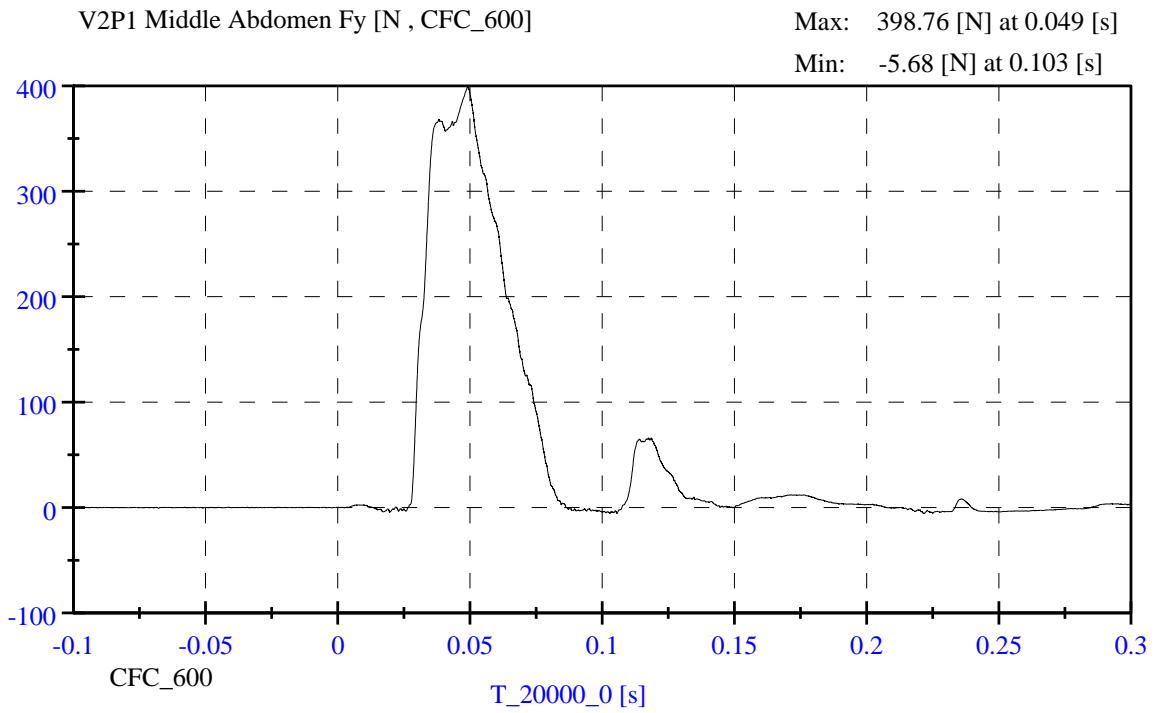
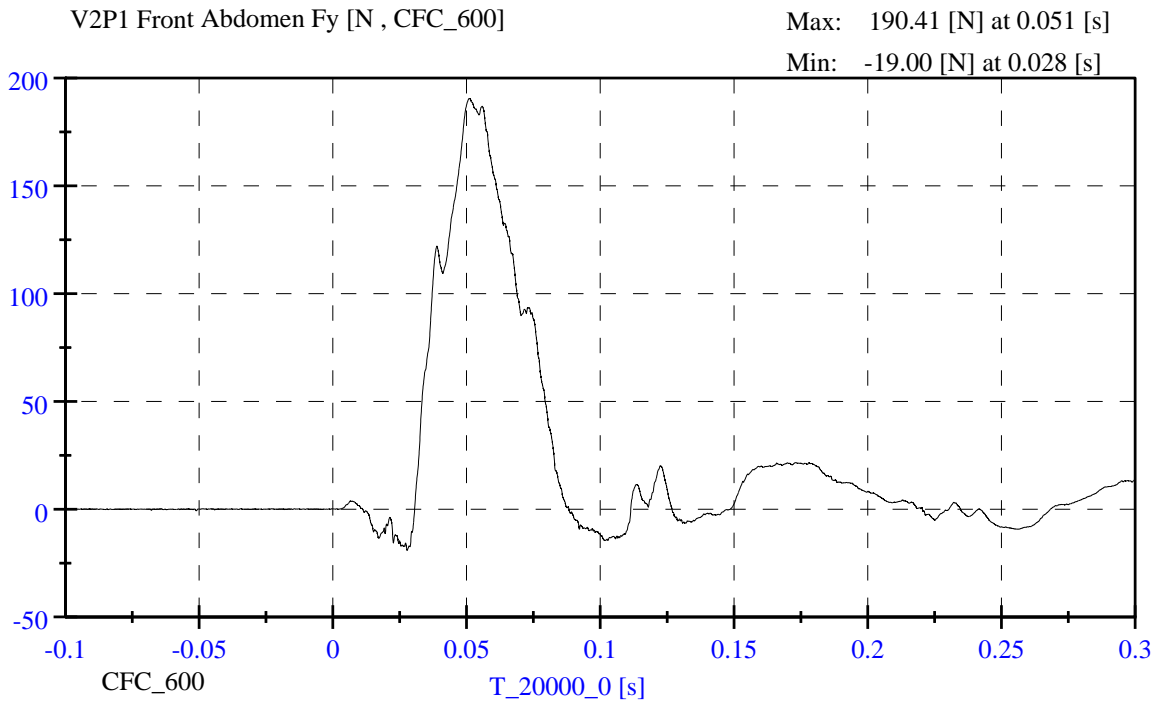
MDB Center of Gravity Acceleration (X)  
MDB Center of Gravity Acceleration (Y)  
MDB Center of Gravity Acceleration (Z)  
MDB Rear Acceleration (X)  
MDB Rear Acceleration (Y)  
Left MDB Contact Switch  
Right MDB Contact Switch

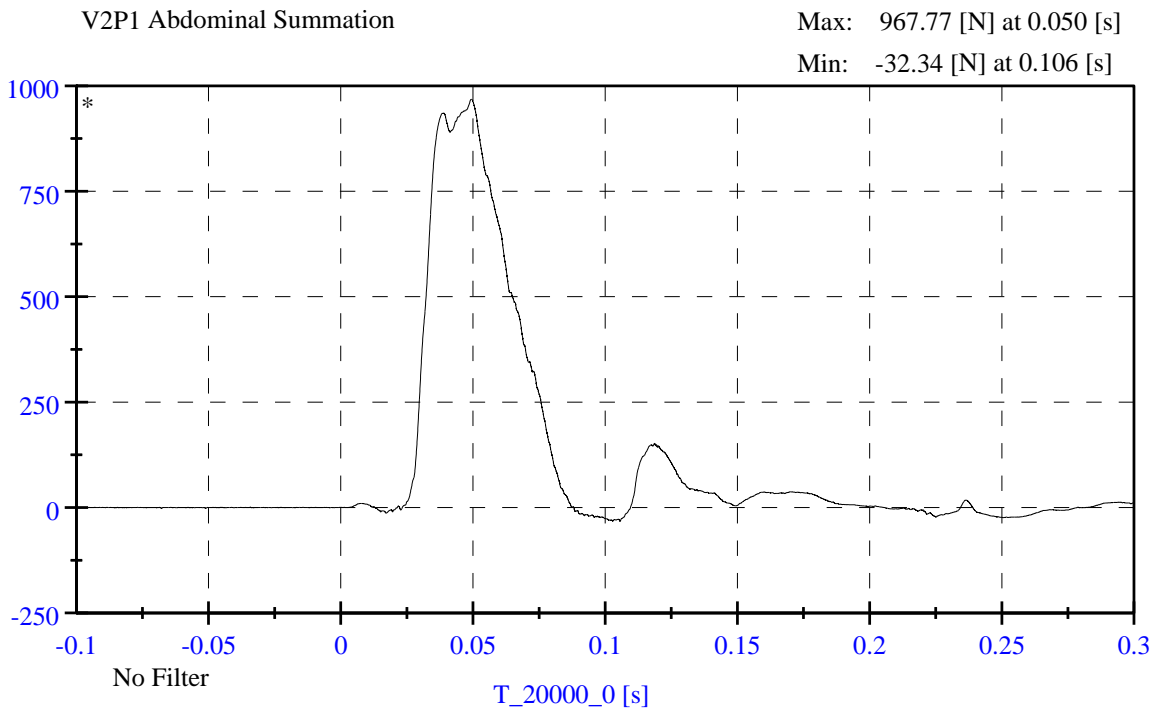
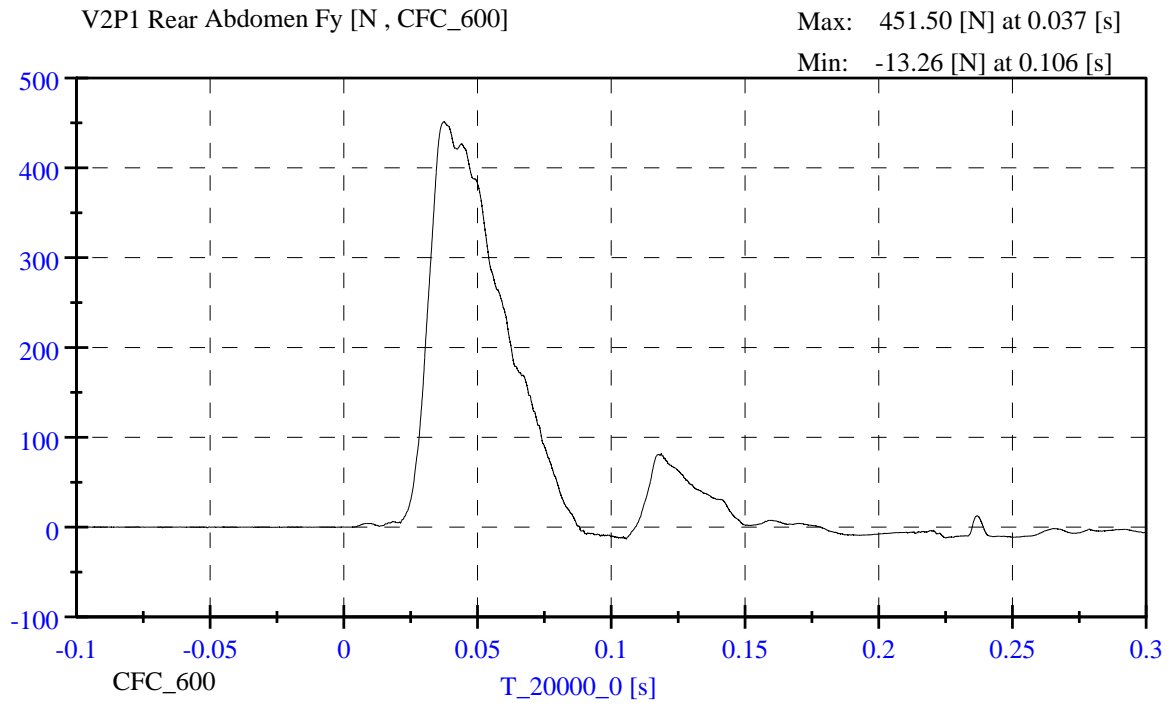


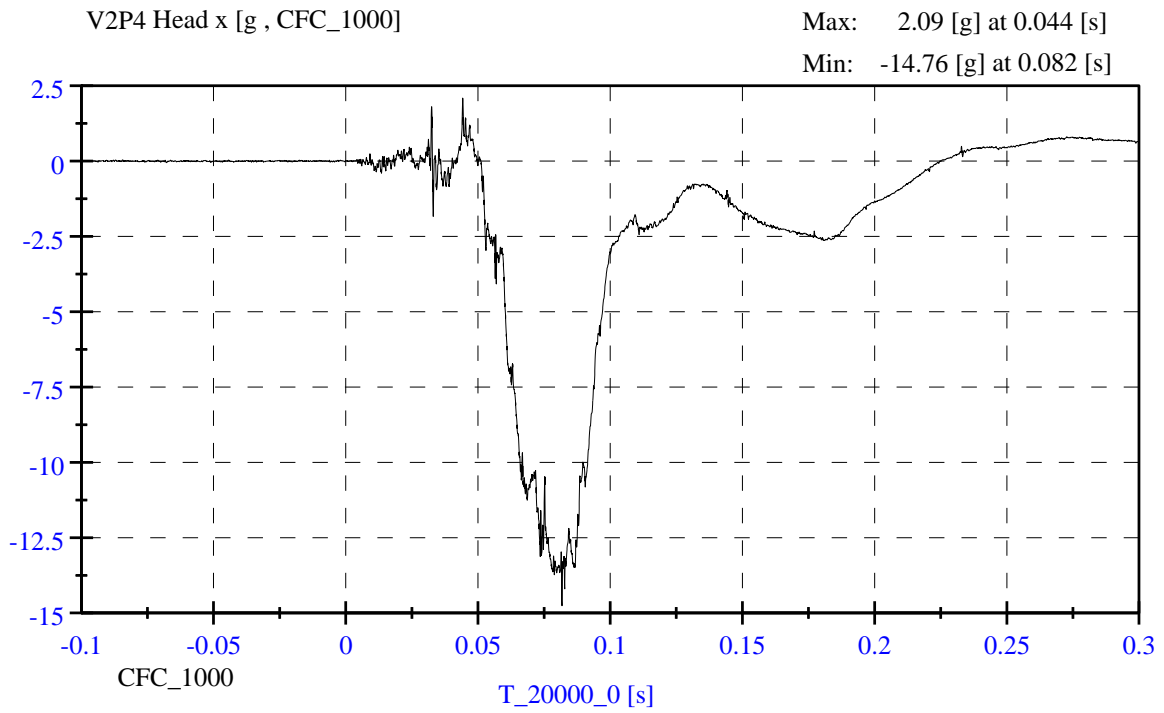
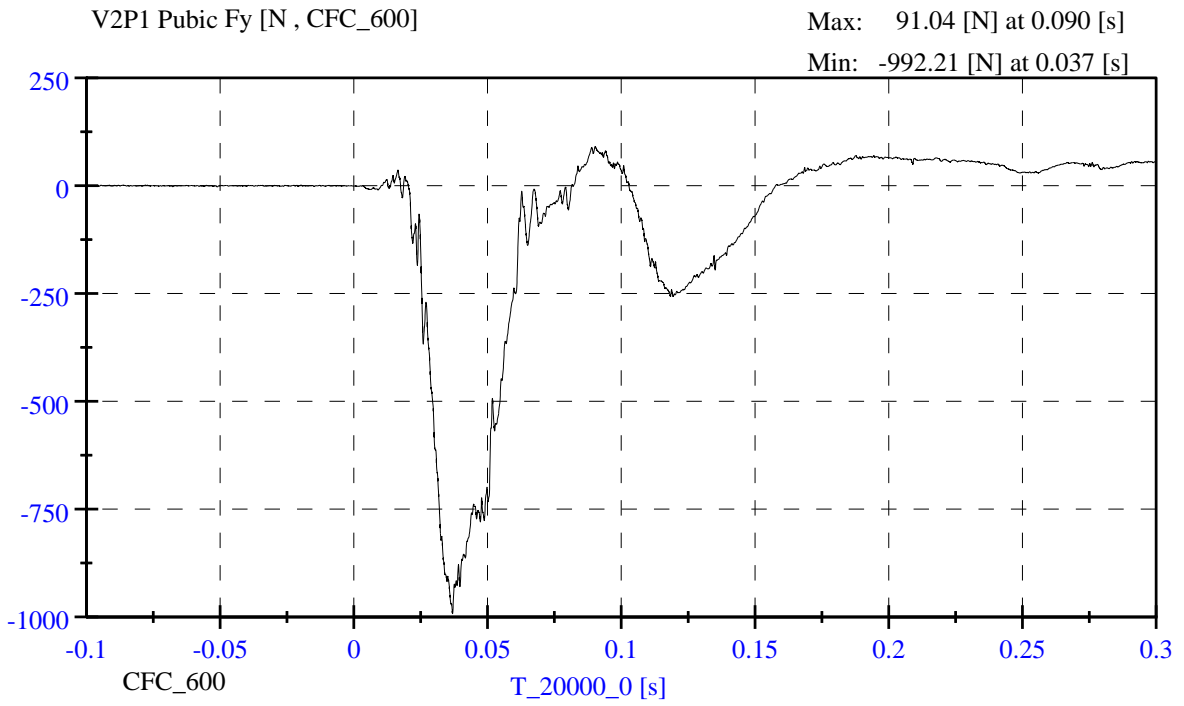


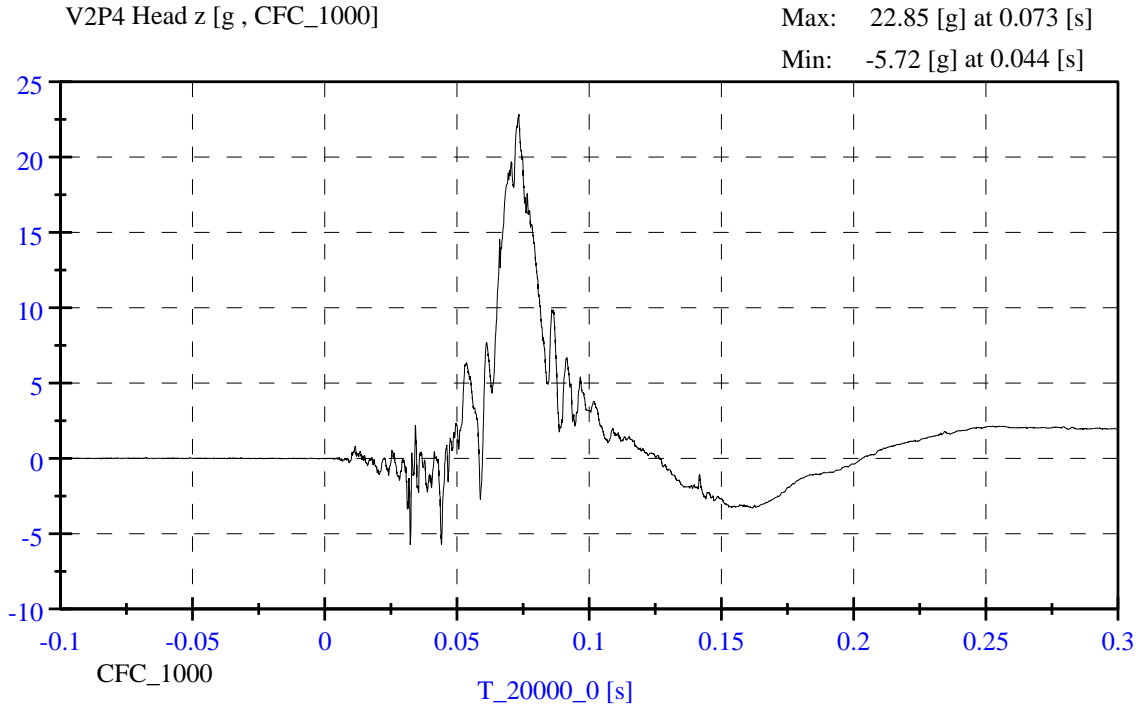
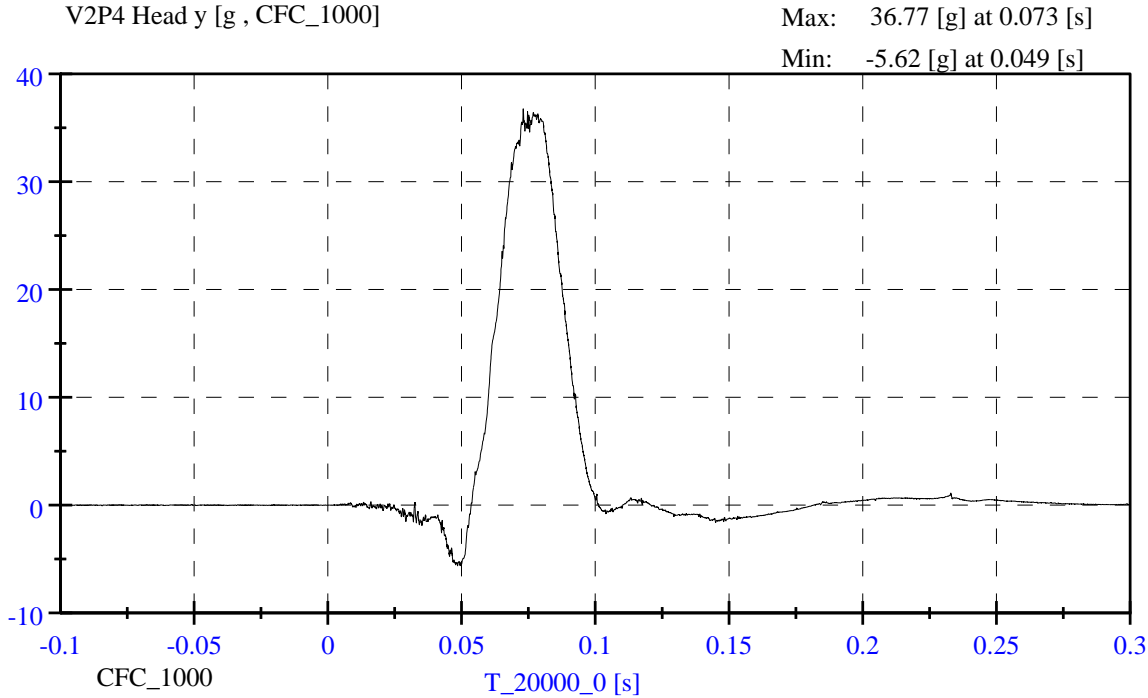


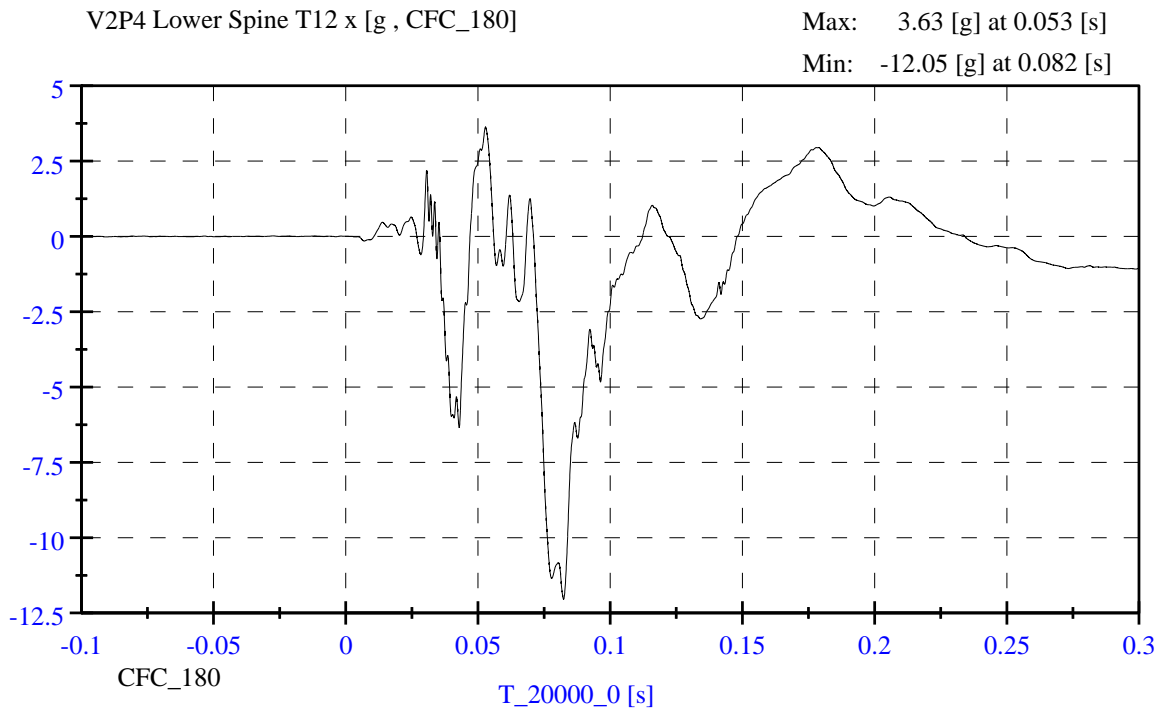
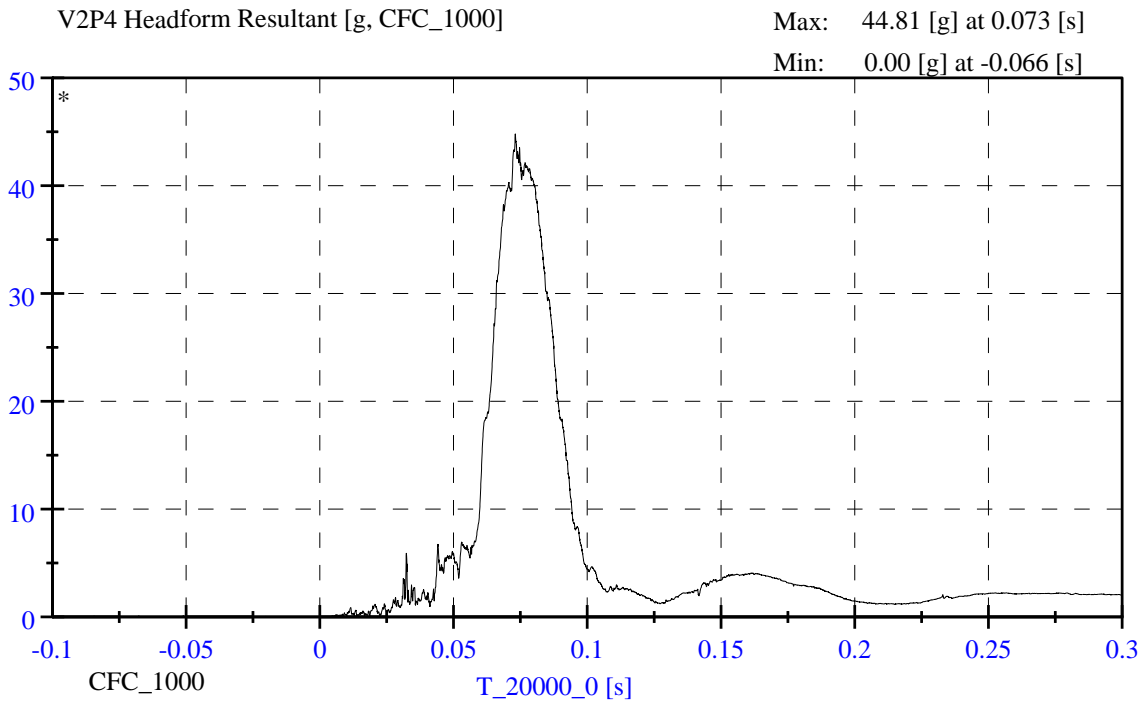


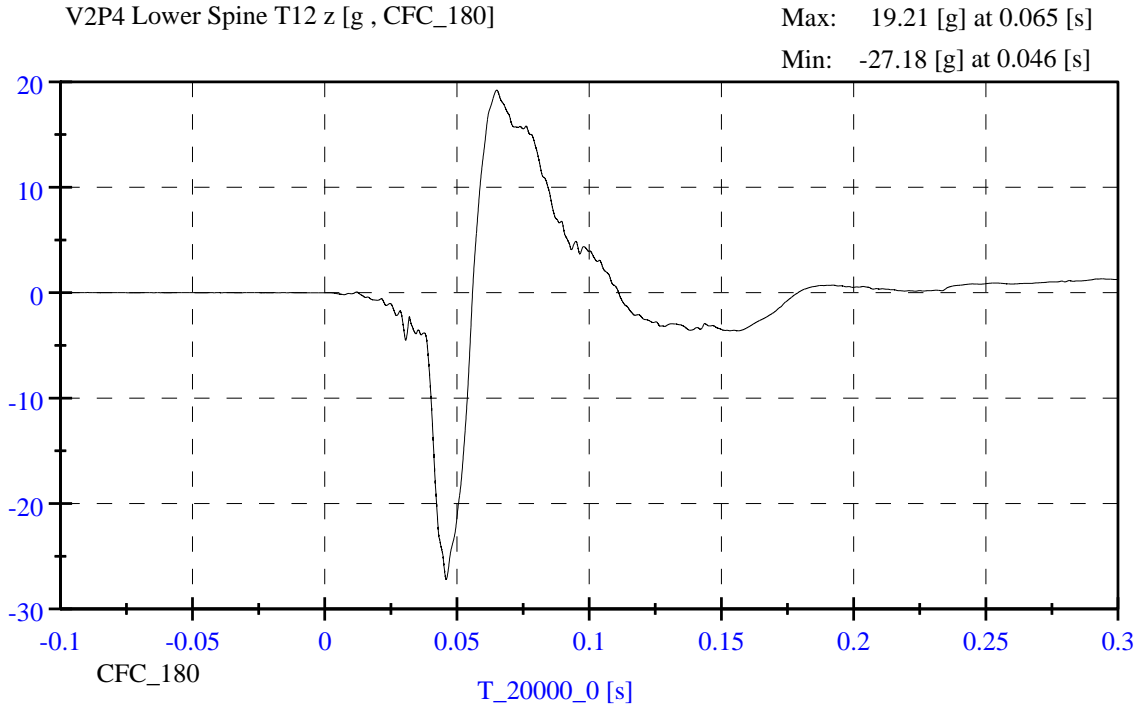
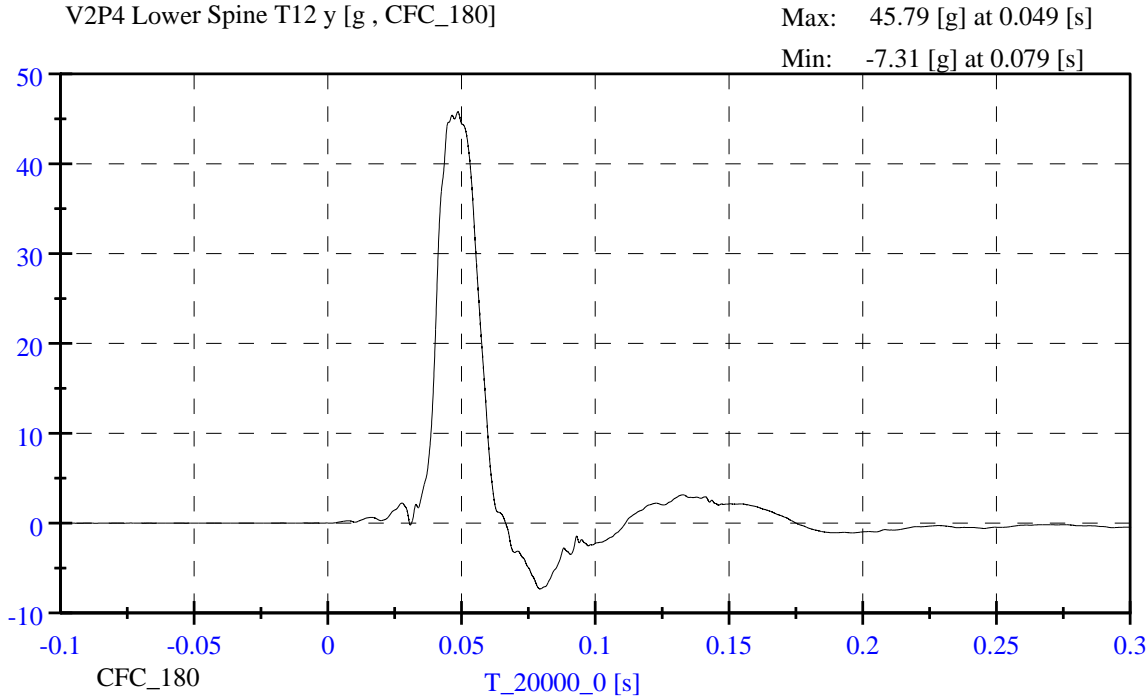


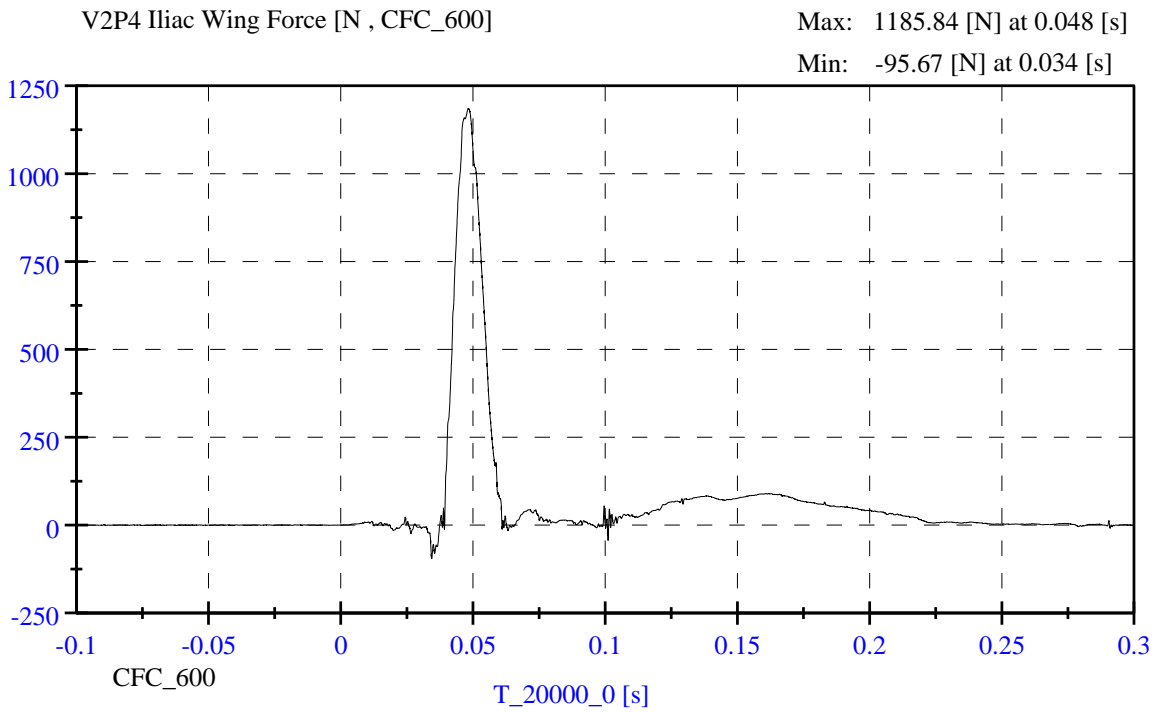
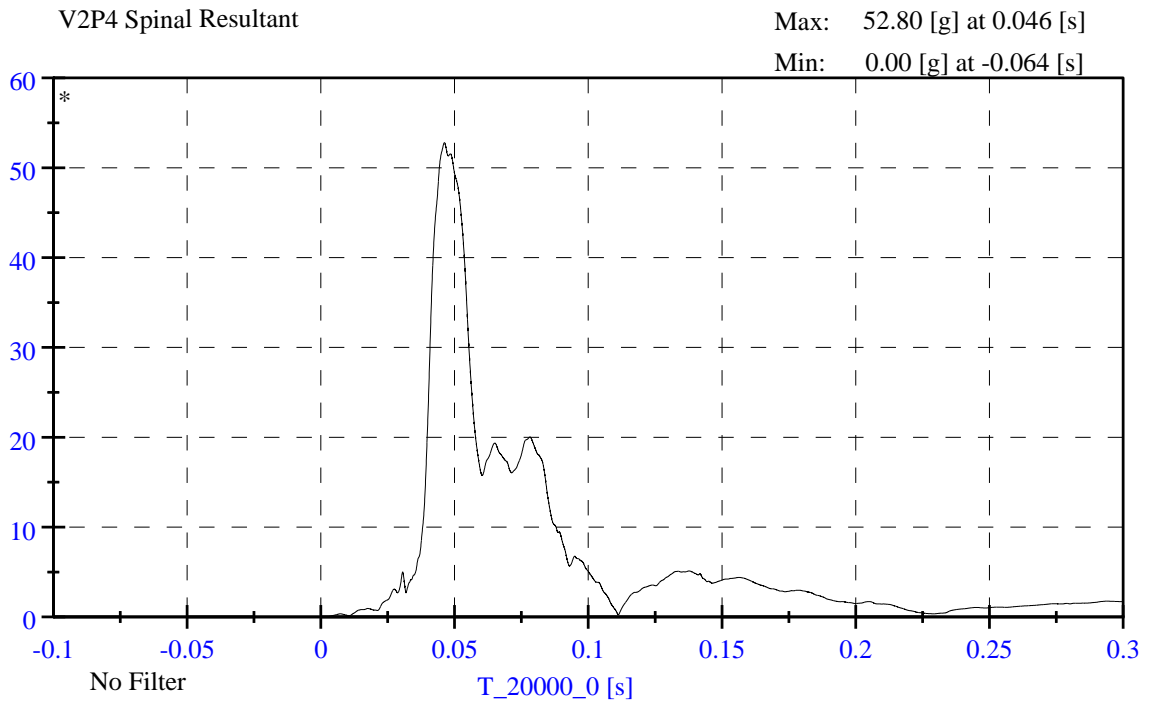


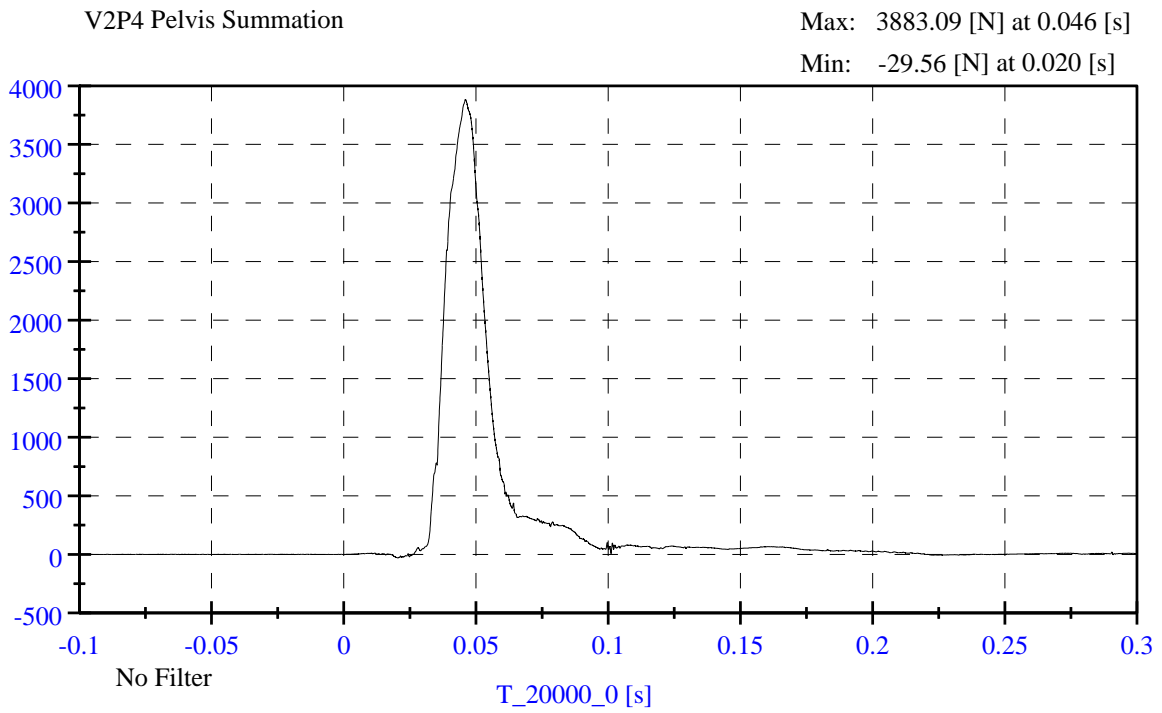
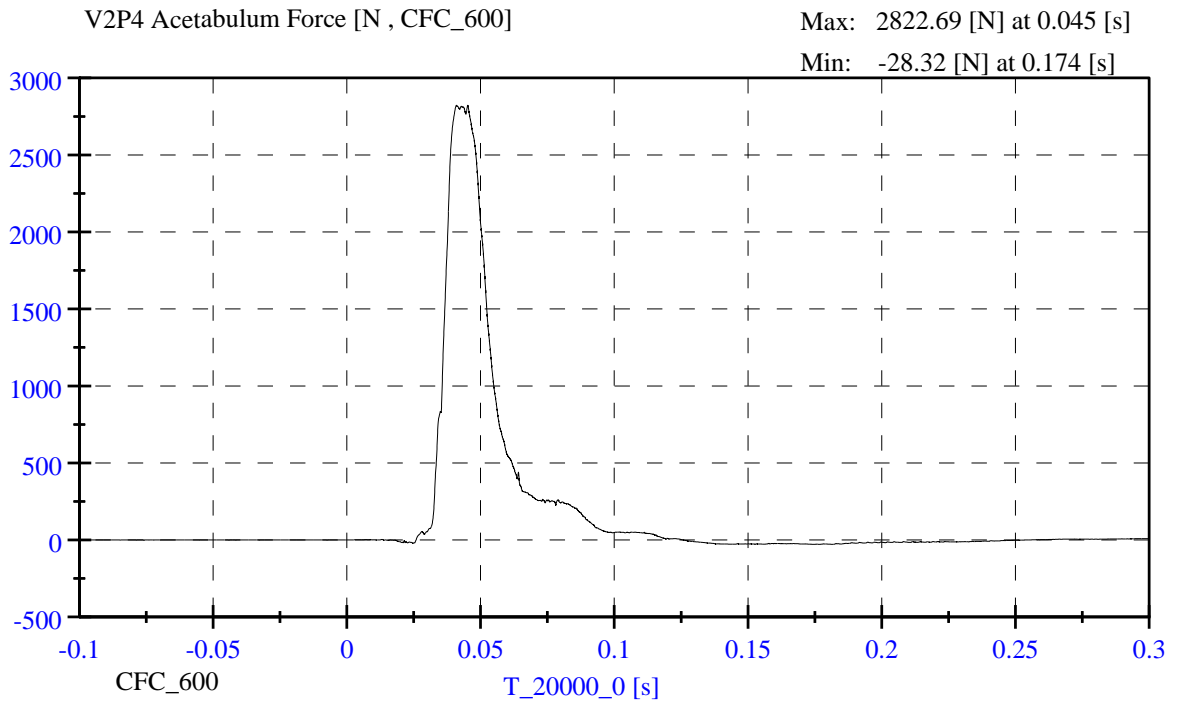












**APPENDIX C**  
**DUMMY PERFORMANCE CALIBRATION TEST DATA**

**TABLE OF CALIBRATION TEST RESULTS**

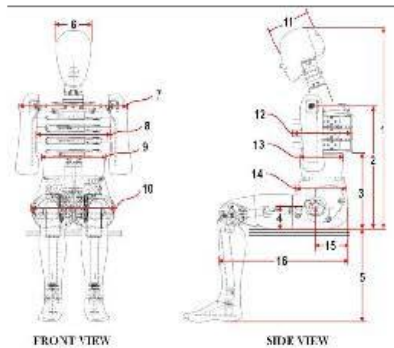
**PRE-TEST**

**Es-2re No: F034**

**CONFIGURED FOR LEFT SIDE IMPACT**

## ES-2re External Measurements

### NHTSA S/N F034



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

Technician: DS

Date: 12/8/2011



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**VERIFICATION REPORT**

Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:14:29 PM</b>

Component Part Number	Component Serial Number
<b>455-1007</b>	<b>1916409</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.9</b> deg C P
Humidity	10 -- 70	<b>23</b> %RH P
Resultant Acceleration	125 -- 155	<b>155</b> g P
Oscillation	0.0 -- 15.0	<b>2.7</b> % P
Fore-Aft Acceleration	-15.00 -- 15.00	<b>3.71</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **1:14:29 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

REFERENCE EQUIPMENT

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

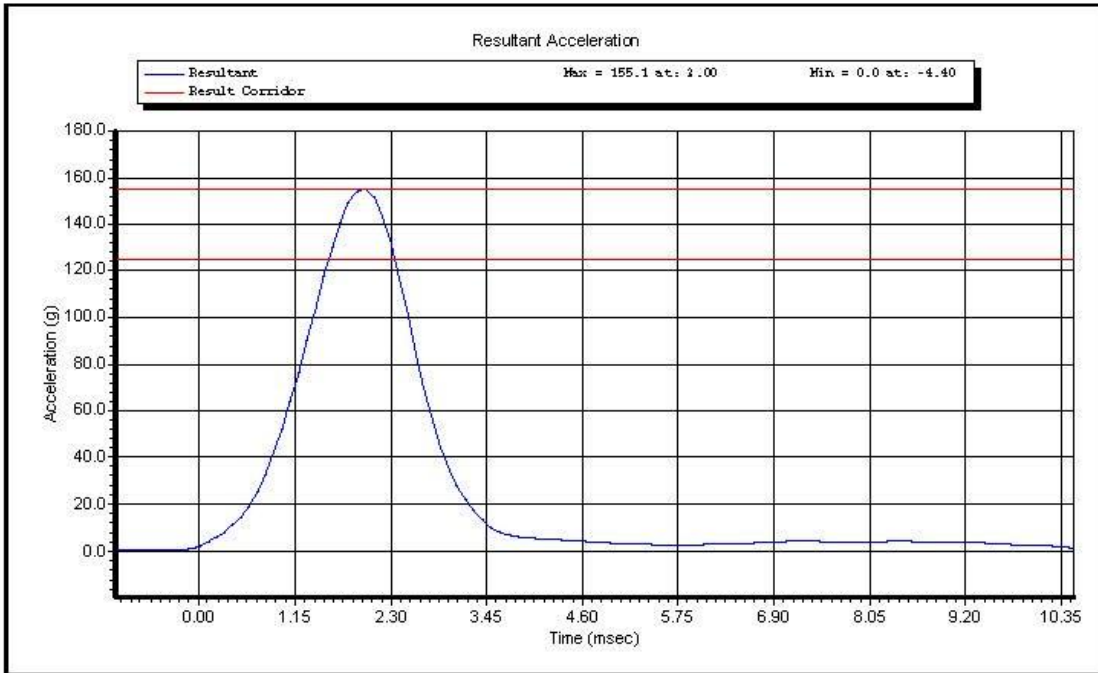
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Test Time: **1:14:29 PM**

Test Date: **12/8/2011**



Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:14:29 PM</b>



Test ID:

Test Time: **1:14:29 PM**

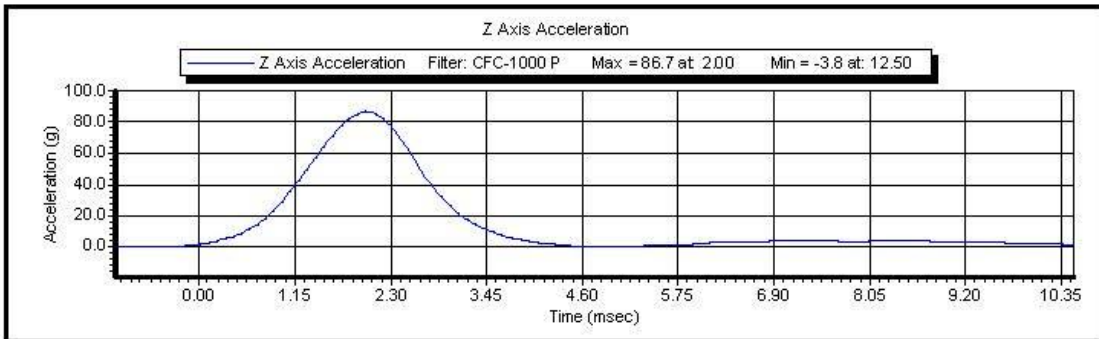
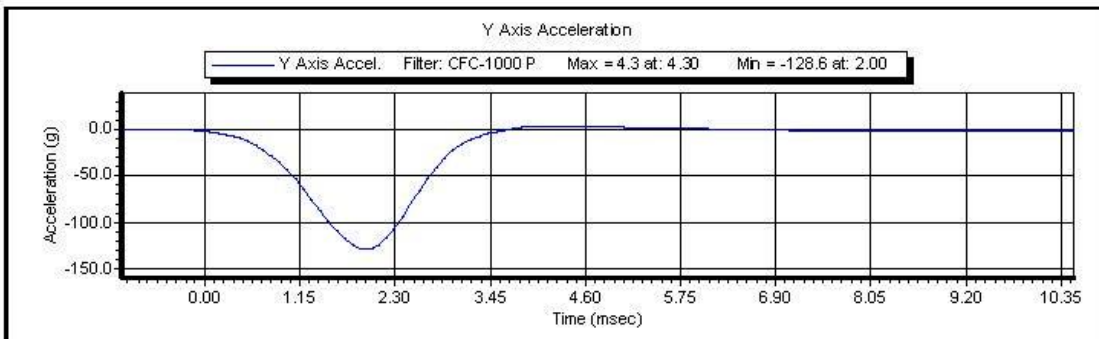
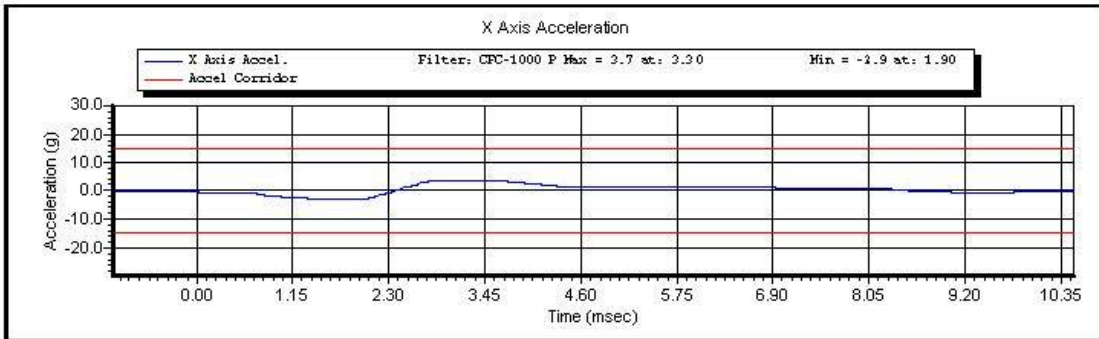
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Test ID:

Test Time: 1:14:29 PM

Test Date: 12/8/2011

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2 of 2



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**VERIFICATION REPORT**

Test Name:	<b>Neck Flexion</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:51:16 PM</b>

Component Part Number	Component Serial Number
<b>455-2002</b>	<b>07066</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>23</b> %RH P
Velocity	3.30 -- 3.50	<b>3.45</b> m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	<b>49.8</b> degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	<b>60.4</b> ms P
Decay to Zero Degrees	53.0 -- 88.0	<b>61.6</b> ms P
Velocity Corridor	--	P

All test parameters are within specifications

Technician:           **A. Rudniski**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **1:51:16 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C165 10	10/3/2011
DentonATD	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

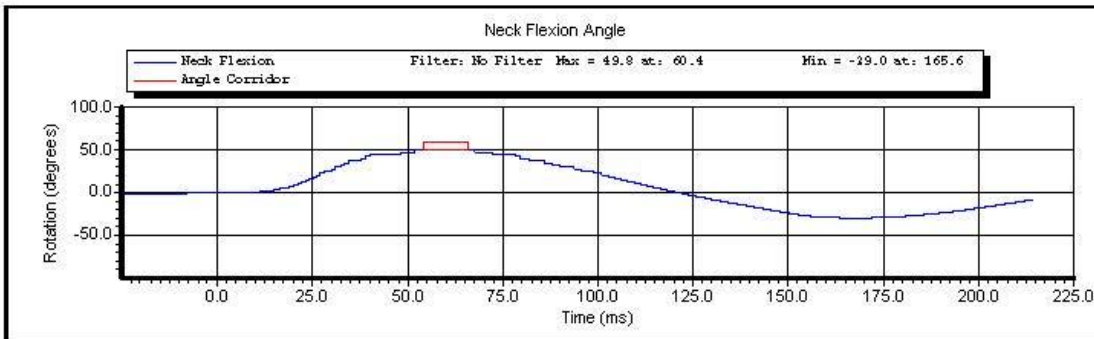
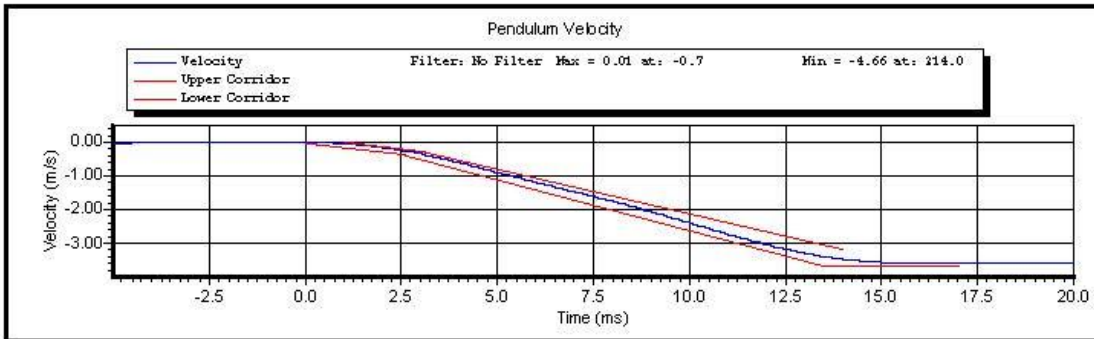
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Test Time: **1:51:16 PM**

Test Date: **12/8/2011**



Test Name:	<b>Neck Flexion</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:51:16 PM</b>



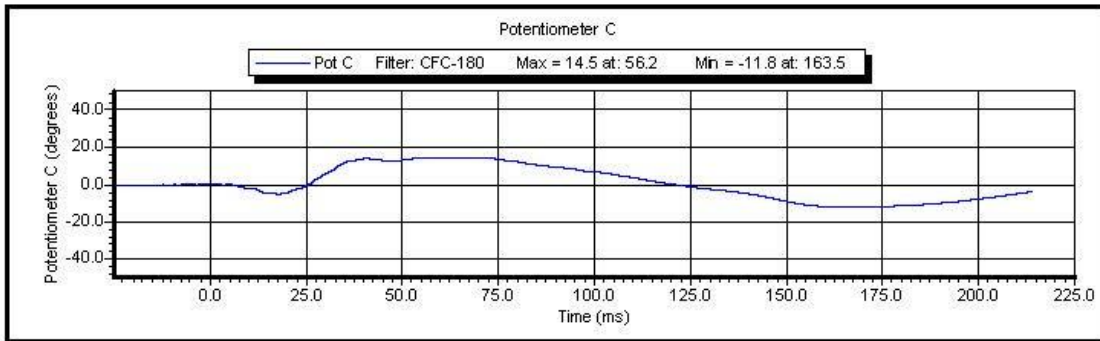
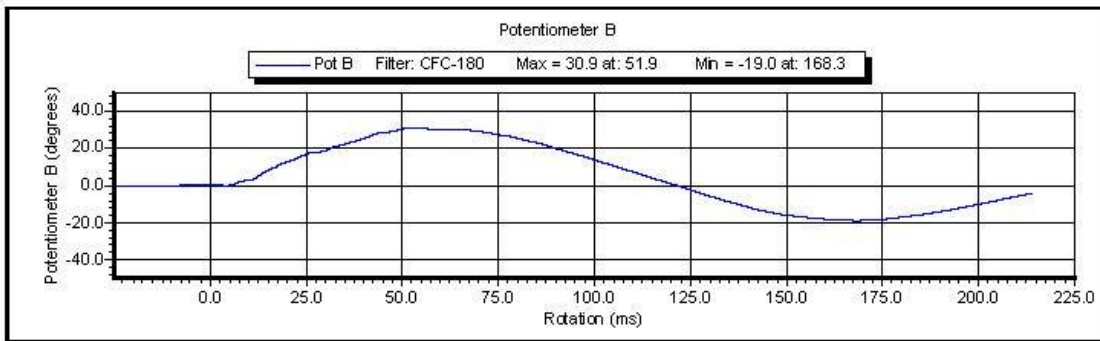
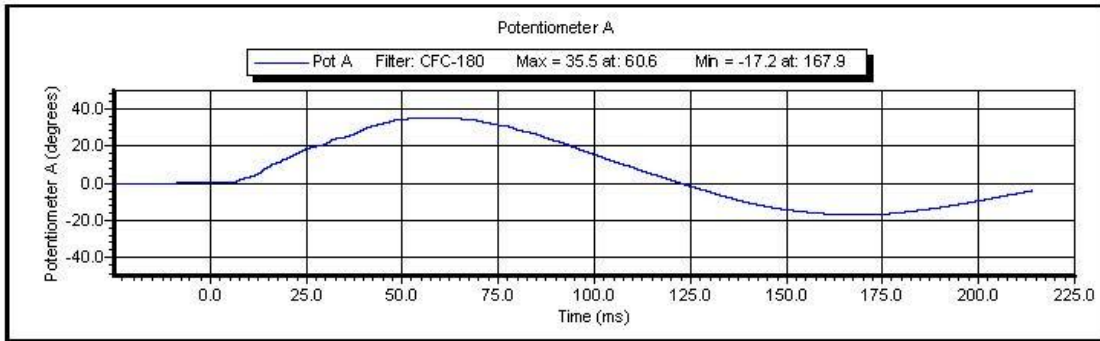
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Test Date: **12/8/2011**

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1 of 2



Test ID:

Test Time: 1:51:16 PM

Test Date: 12/8/2011

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**VERIFICATION REPORT**

Test Name:	<b>Shoulder Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:28:47 PM</b>

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>24.0</b> %RH P
Velocity	4.20 -- 4.40	<b>4.27</b> m/s P
Pendulum Acceleration	-10.50 -- -7.50	<b>-9.60</b> g P

All test parameters are within specifications

Technician:           **A. Rudniski**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **4:28:47 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011

Test ID:

Test Time: **4:28:47 PM**

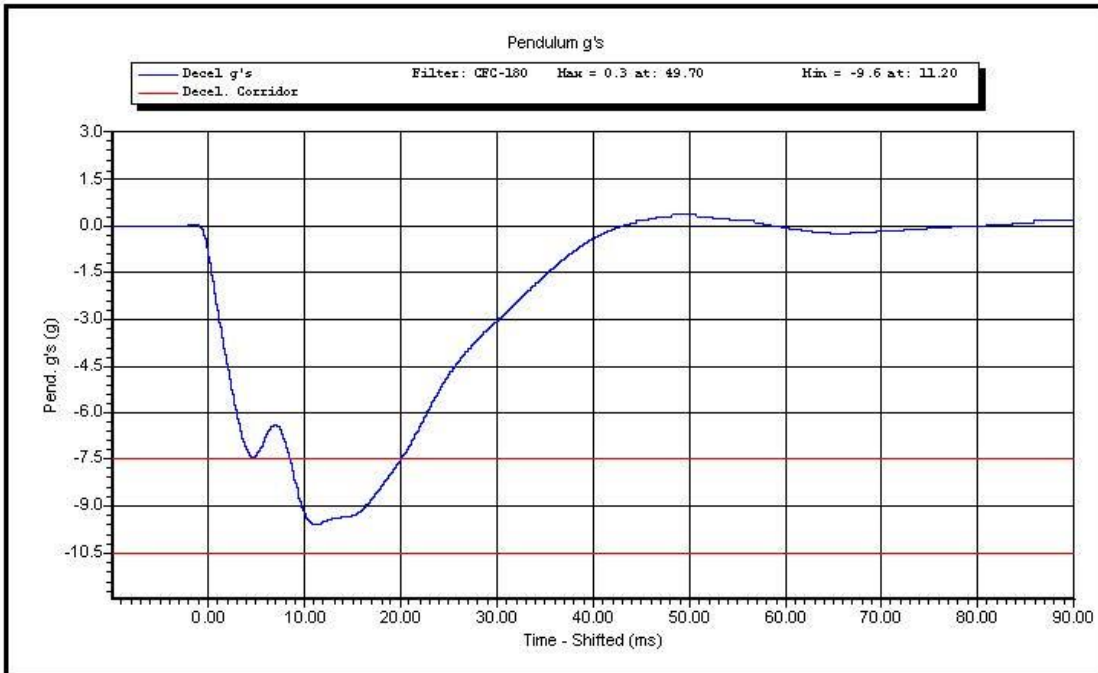
Test Date: **12/8/2011**

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2 of 2



Test Name:	<b>Shoulder Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:28:47 PM</b>



Test ID:

Test Time: **4:28:47 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 4 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:41:54 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07203</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	3.90 -- 4.10	<b>3.95</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.36</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

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

Test Time: **1:41:54 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

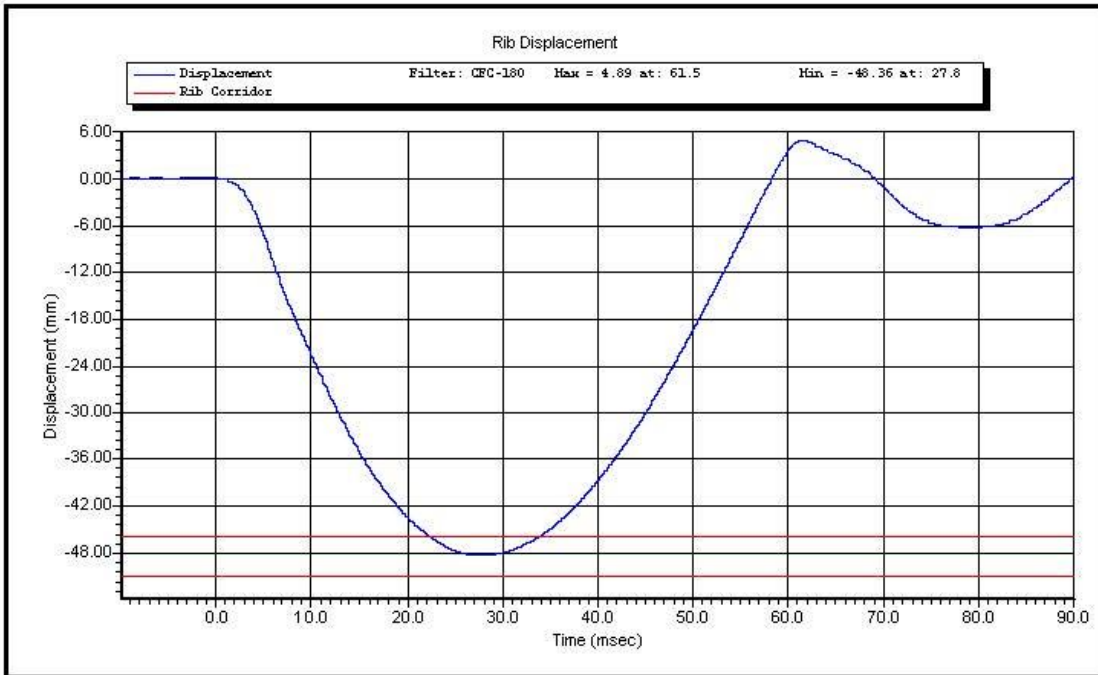
Test ID: **Upper 4 m/s**

Test Time: **1:41:54 PM**

Test Date: **12/8/2011**



Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 4 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:41:54 PM</b>



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

Test Time: **1:41:54 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 3 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:52:50 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07203</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	2.90 -- 3.10	<b>2.98</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-37.54</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

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

Test Time: **1:52:50 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **1:52:50 PM**

Test Date: **12/8/2011**



Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 3 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>1:52:50 PM</b>



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

Test Time: **1:52:50 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle 4.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:04:27 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07205</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	3.90 -- 4.10	<b>3.97</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.24</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

Test ID: **Middle 4.0 m/s**

Test Time: **2:04:27 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

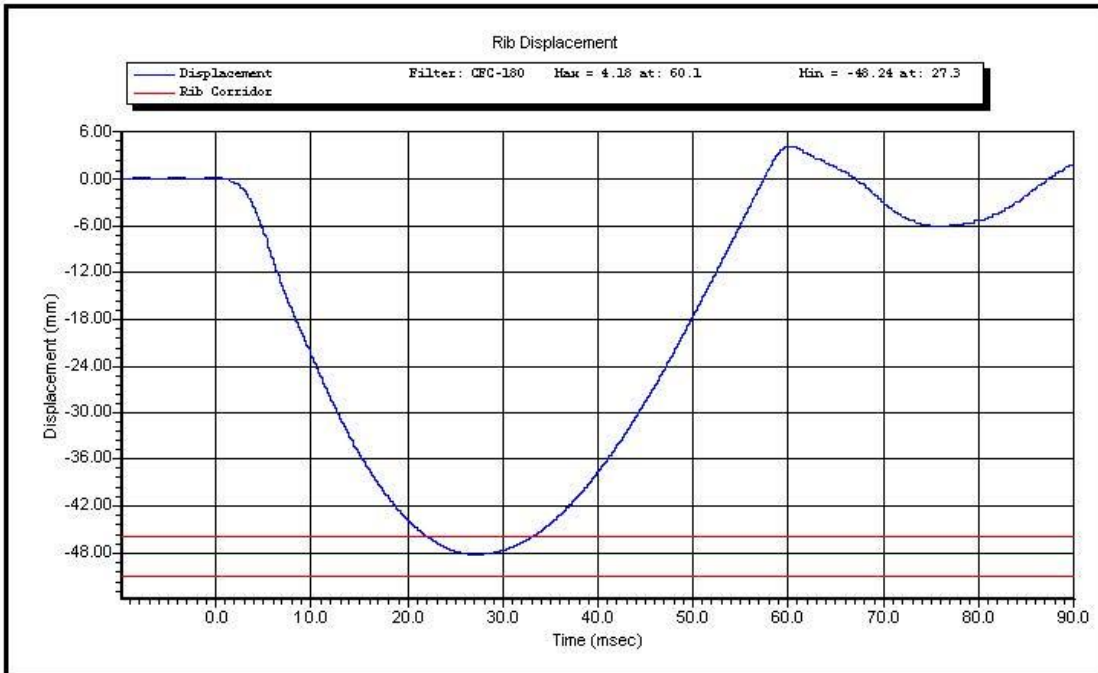
Test ID: **Middle 4.0 m/s**

Test Time: **2:04:27 PM**

Test Date: **12/8/2011**



Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle 4.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:04:27 PM</b>



Test ID: **Middle 4.0 m/s**

Test Time: **2:04:27 PM**

Test Date: **12/8/2011**



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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle 3.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:10:48 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07205</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	2.90 -- 3.10	<b>2.98</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-37.19</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID: **Middle 3.0 m/s**

Test Time: **2:10:48 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

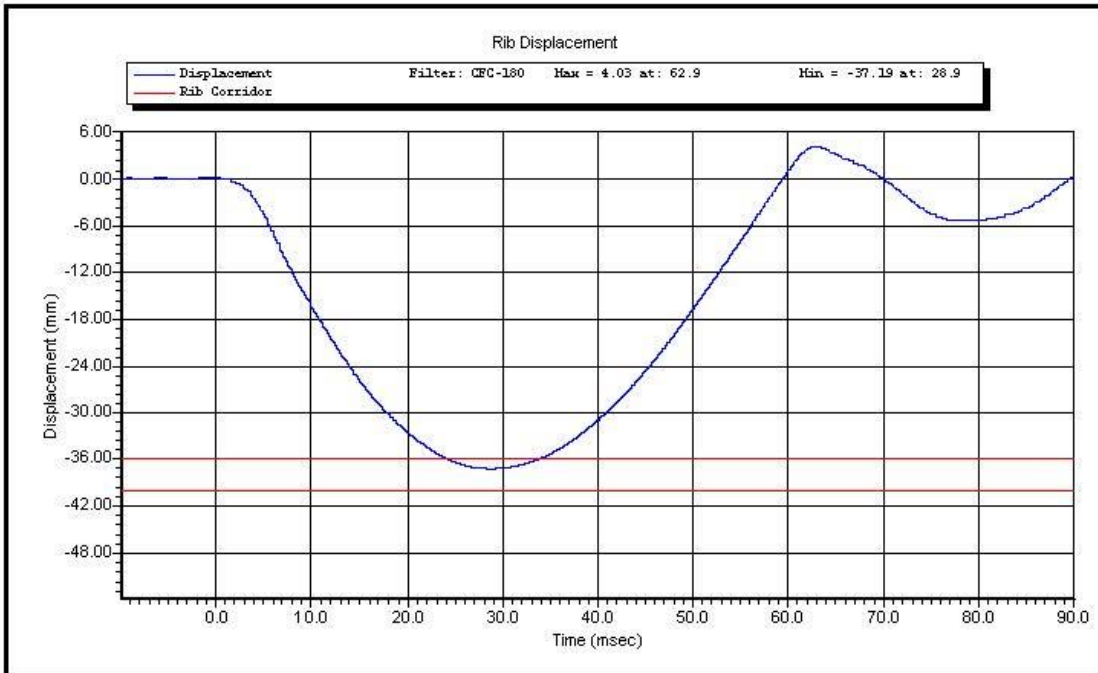
Test ID: **Middle 3.0 m/s**

Test Time: **2:10:48 PM**

Test Date: **12/8/2011**



Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle 3.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:10:48 PM</b>



Test ID: **Middle 3.0 m/s**

Test Time: **2:10:48 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 4.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:15:48 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	3.90 -- 4.10	<b>3.96</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.91</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

Test ID: **Lower 4.0 m/s**

Test Time: **2:15:48 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

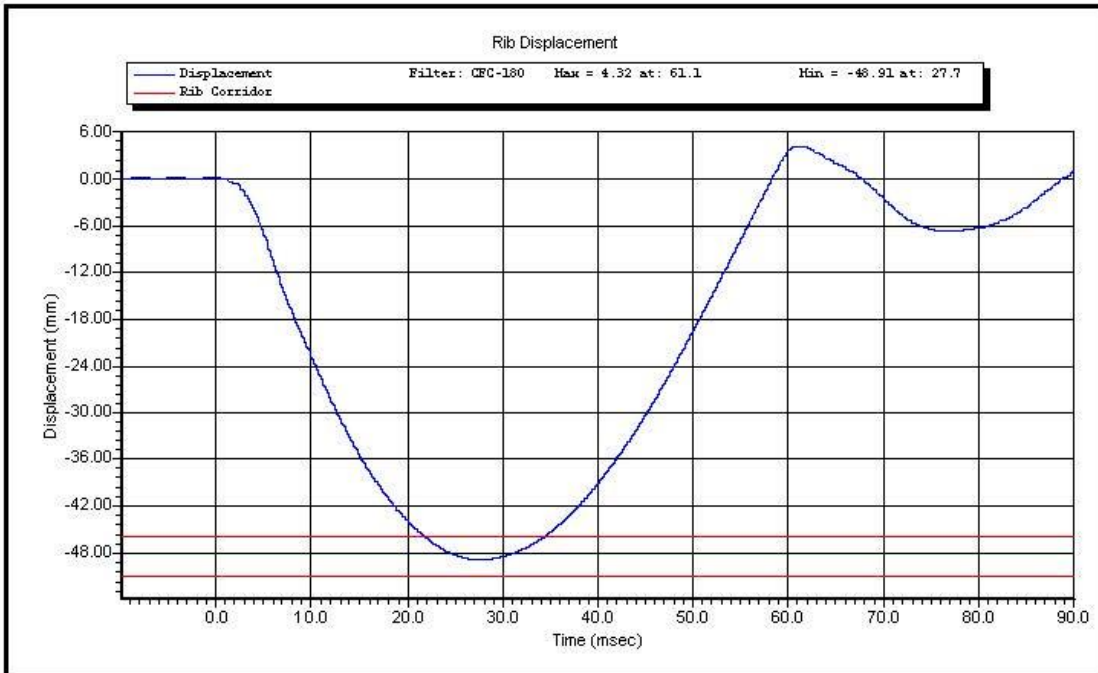
Test ID: **Lower 4.0 m/s**

Test Time: **2:15:48 PM**

Test Date: **12/8/2011**



Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 4.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:15:48 PM</b>



Test ID: **Lower 4.0 m/s**

Test Time: **2:15:48 PM**

Test Date: **12/8/2011**



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**VERIFICATION REPORT**

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 3.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:20:32 PM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>23.0</b> %RH P
Velocity	2.90 -- 3.10	<b>2.97</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-38.02</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **2:20:32 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **2:20:32 PM**

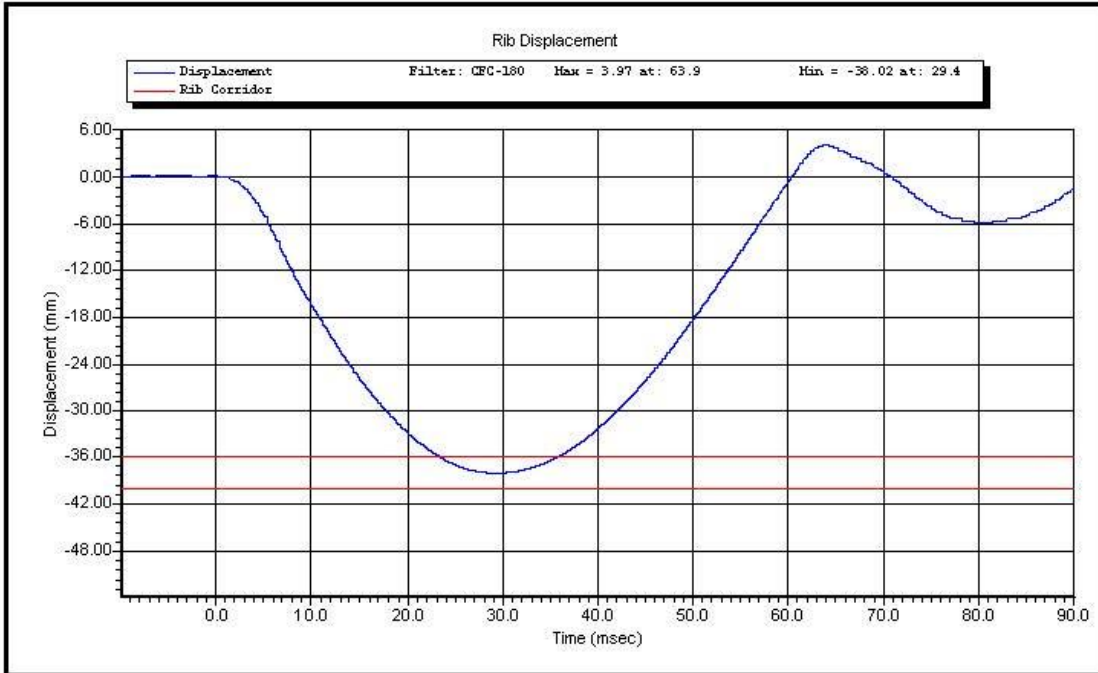
Test Date: **12/8/2011**

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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 3.0 m/s</b>	Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:20:32 PM</b>



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

Test Time: **2:20:32 PM**

Test Date: **12/8/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Thorax Impact</b>	Revision:	<b>8/15/2008</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:39:46 PM</b>

Component Part Number	Component Serial Number
<b>Upper Rib - 175-4002</b>	<b>7203</b>
<b>Middle Rib - 175-4002</b>	<b>7205</b>
<b>Lower Rib - 175-4002</b>	<b>7209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10.0 -- 70.0	<b>24.0</b> %RH P
Velocity	5.40 -- 5.60	<b>5.48</b> m/s P
Upper Rib Displacement	34.0 -- 41.0	<b>37.2</b> mm P
Middle Rib Displacement	37.0 -- 45.0	<b>41.8</b> mm P
Lower Rib Displacement	37.0 -- 44.0	<b>41.9</b> mm P
Impactor Force	5100 -- 6200	<b>5506</b> N P

All test parameters are within specifications

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

Test ID:

Test Time: **4:39:46 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Honeywell	MLT 38000	DS-183	8/31/2011
Honeywell	MLT 38000	DS-184	8/31/2011
Honeywell	MLT 38000	DS-182	8/31/2011

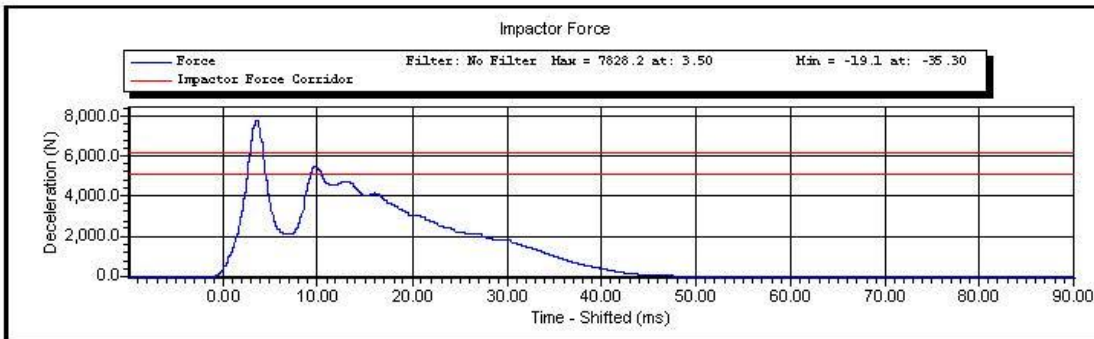
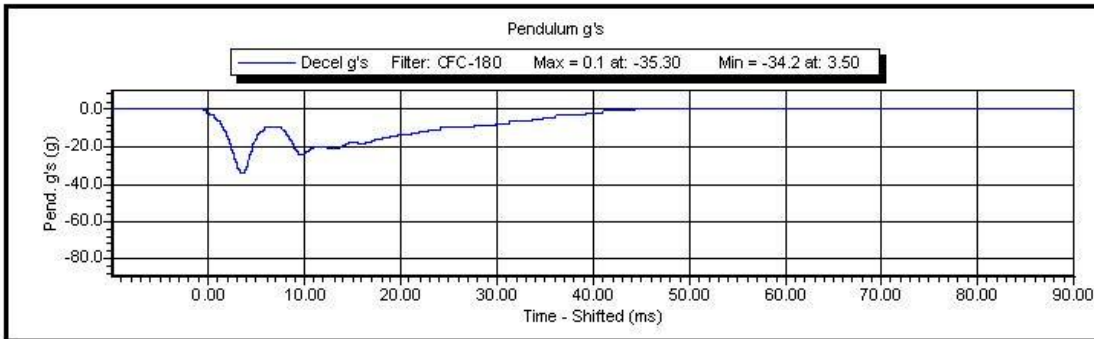
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Test Date: 12/8/2011



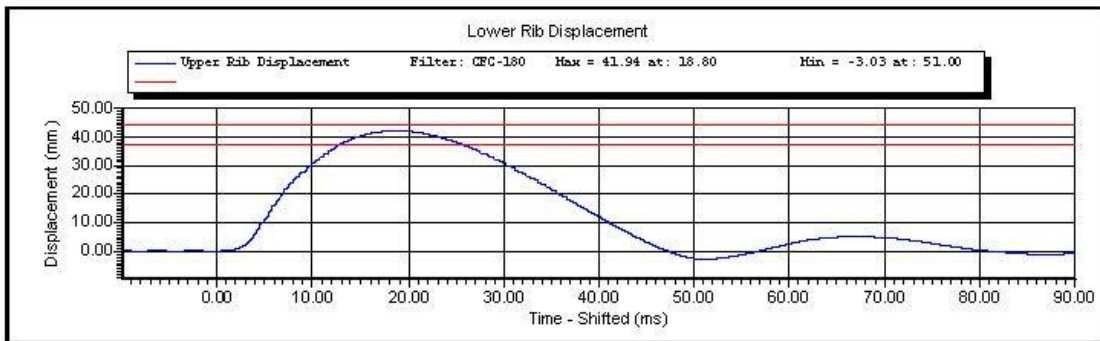
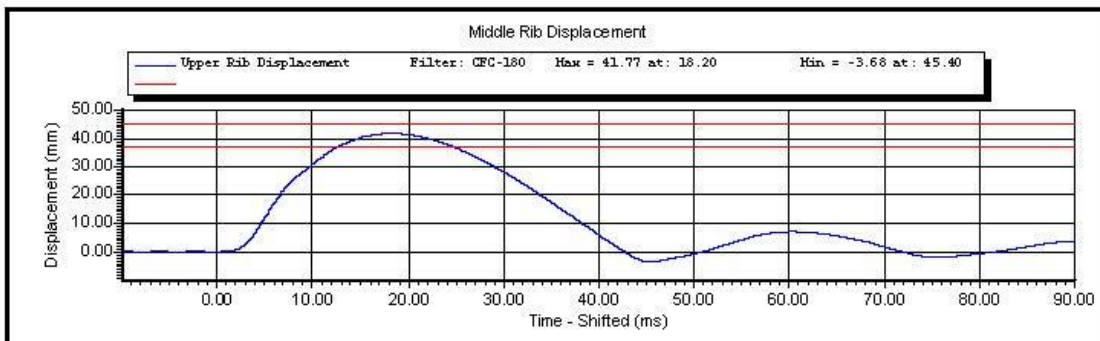
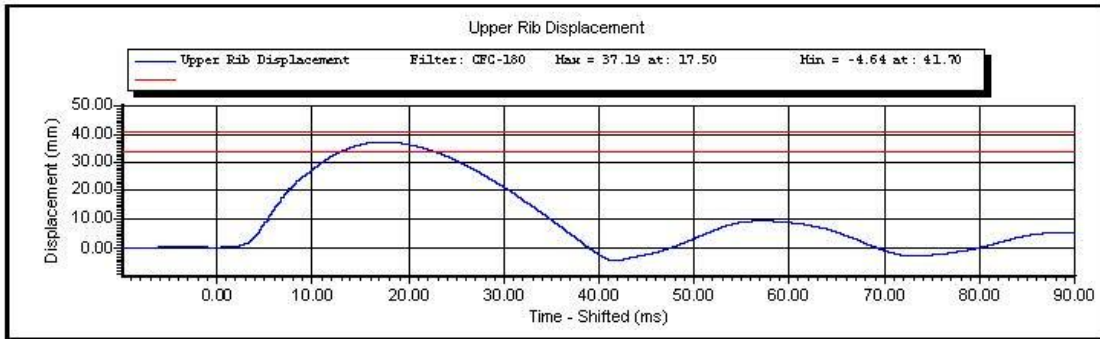
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Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:39:46 PM</b>



Test ID:

Test Time: **4:39:46 PM**

Test Date: **12/8/2011**



Test ID:

Test Time: 4:39:46 PM

Test Date: 12/8/2011

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**VERIFICATION REPORT**

Test Name:	<b>Abdominal Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:58:33 PM</b>

Component Part Number	Component Serial Number
<b>455-4001</b>	<b>0791</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Velocity	3.90 -- 4.10	<b>4.04</b> m/s P
Peak Abdominal Force	-2.70 -- -2.20	<b>-2.45</b> kN P
Time At Peak Abdominal Force	10.0 -- 12.3	<b>10.1</b> ms P
Maximum Pendulum Force	-4.80 -- -4.00	<b>-4.13</b> kN P
Time at Peak Pendulum Force	10.6 -- 13.0	<b>10.8</b> ms P

All test parameters are within specifications

Technician:           **A. Rudniski**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **4:58:33 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Denton	2631	LC-1512	3/25/2011
Denton	2631	LC-1526	3/25/2011
Denton	2631	LC-1516	3/25/2011

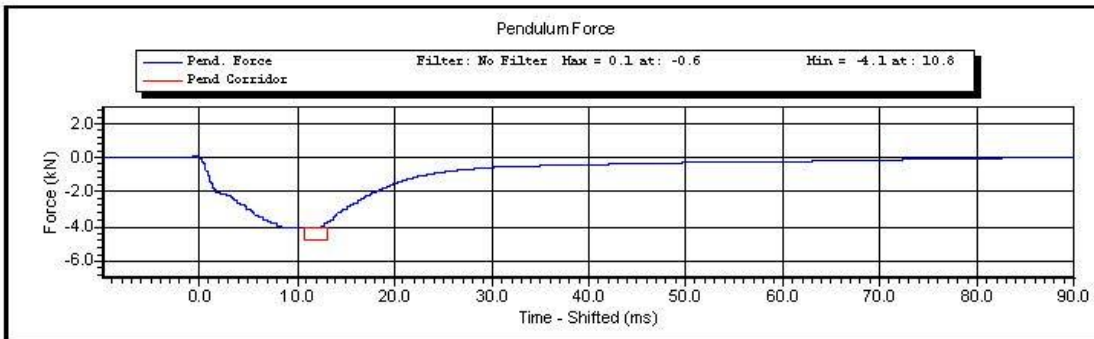
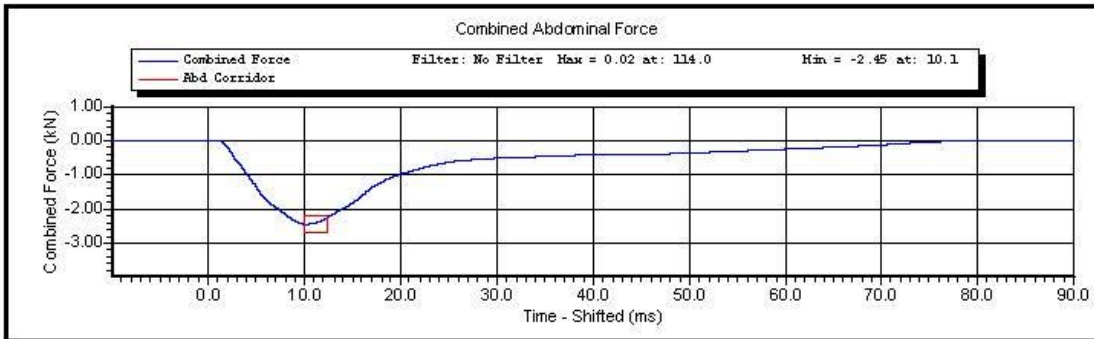
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Test Time: 4:58:33 PM

Test Date: 12/8/2011



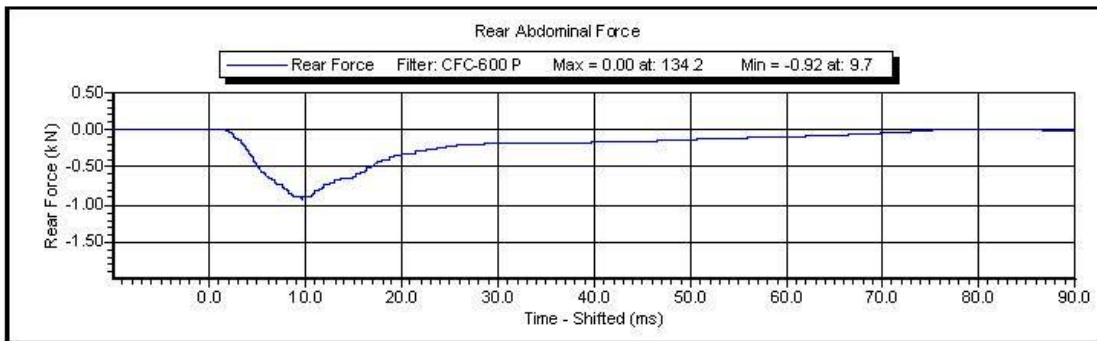
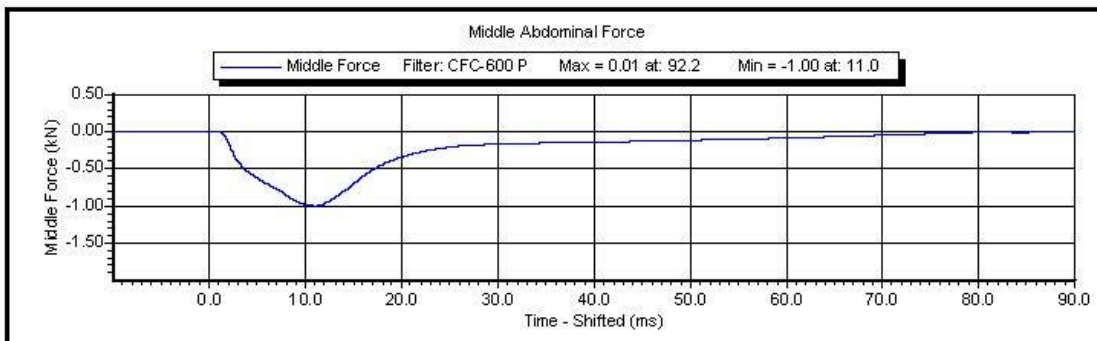
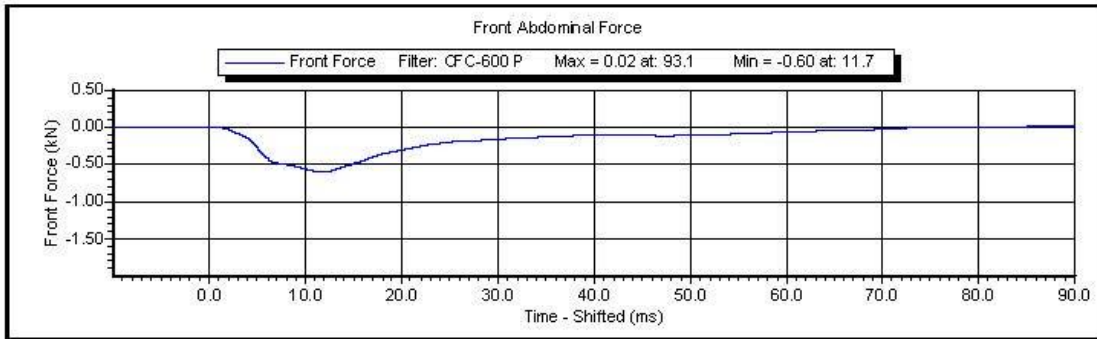
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Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:58:33 PM</b>



Test ID:

Test Time: **4:58:33 PM**

Test Date: **12/8/2011**



Test ID:

Test Time: 4:58:33 PM

Test Date: 12/8/2011

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**VERIFICATION REPORT**

Test Name:	<b>Lumbar Spine</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>3:03:46 PM</b>

Component Part Number	Component Serial Number
<b>175-5501</b>	<b>15050329A</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10 -- 70	<b>23</b> %RH P
Velocity	5.95 -- 6.15	<b>6.14</b> m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	<b>46.0</b> degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	<b>45.1</b> ms P
Decay to Zero Degrees	37.0 -- 57.0	<b>37.2</b> ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **3:03:46 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C165 10	10/3/2011
DentonATD	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

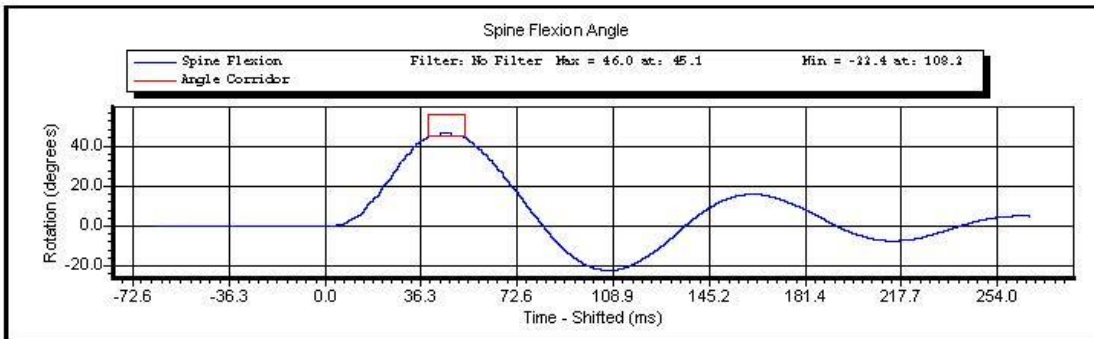
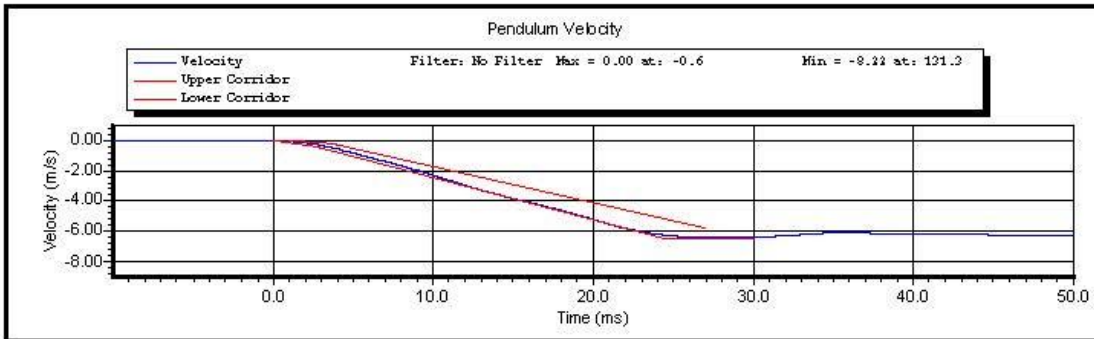
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Test Time: **3:03:46 PM**

Test Date: **12/8/2011**



Test Name:	<b>Lumbar Spine</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>3:03:46 PM</b>



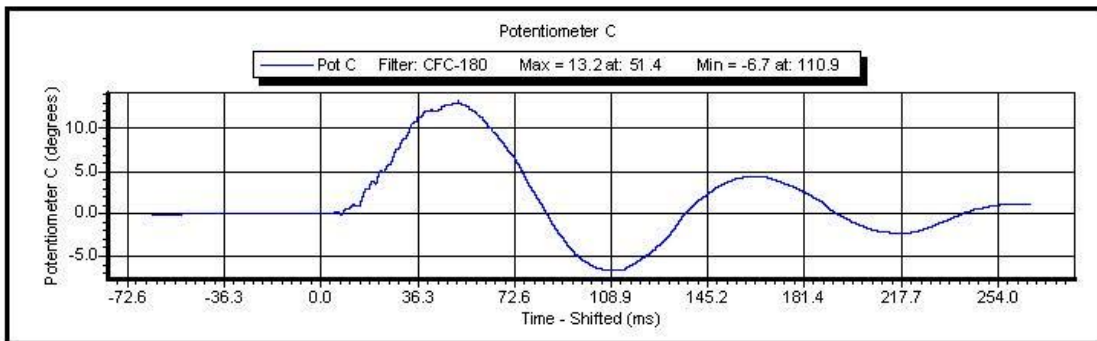
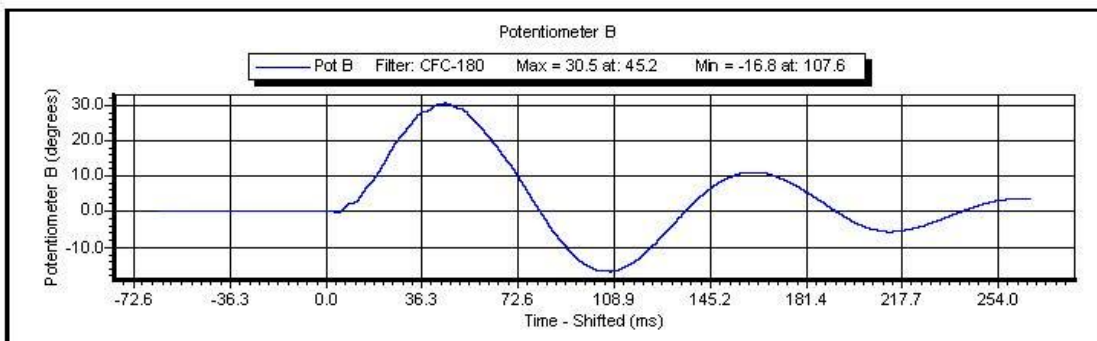
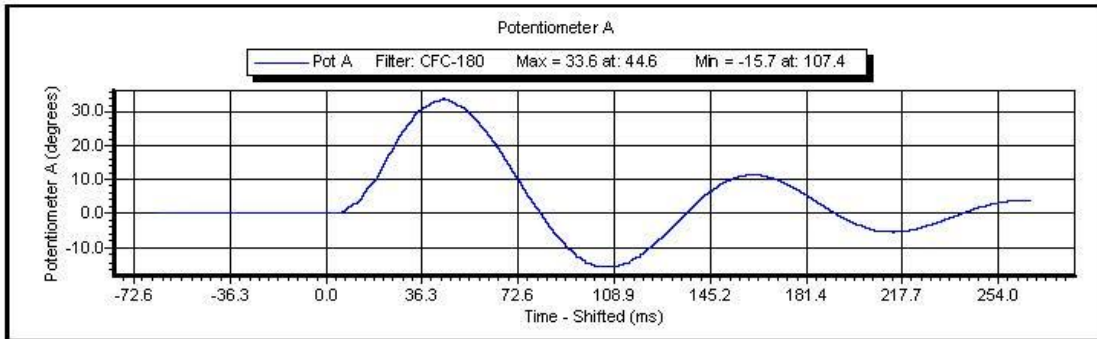
Test ID:

Test Time: **3:03:46 PM**

Test Date: **12/8/2011**

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1 of 2



Test ID:

Test Time: 3:03:46 PM

Test Date: 12/8/2011

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**VERIFICATION REPORT**

Test Name:	<b>Pelvis Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>5:26:07 PM</b>

Component Part Number	Component Serial Number
<b>455-4003</b>	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Velocity	4.20 -- 4.40	<b>4.39</b> m/s P
Peak Pendulum Force	-5.40 -- -4.70	<b>-4.97</b> kN P
Time at Peak Pendulum Force	11.80 -- 16.10	<b>13.20</b> ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	<b>-1.41</b> kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	<b>14.10</b> ms P

All test parameters are within specifications

Technician:           **A. Rudniski**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **5:26:07 PM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Denton	3096	LC-465Fy	8/31/2011

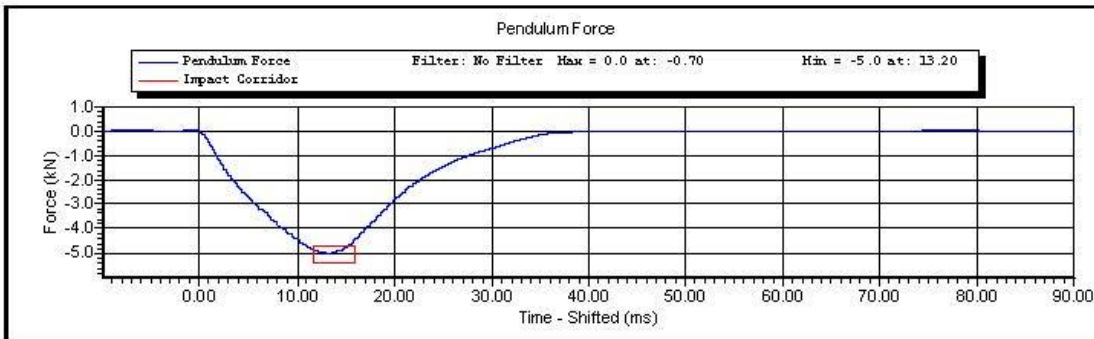
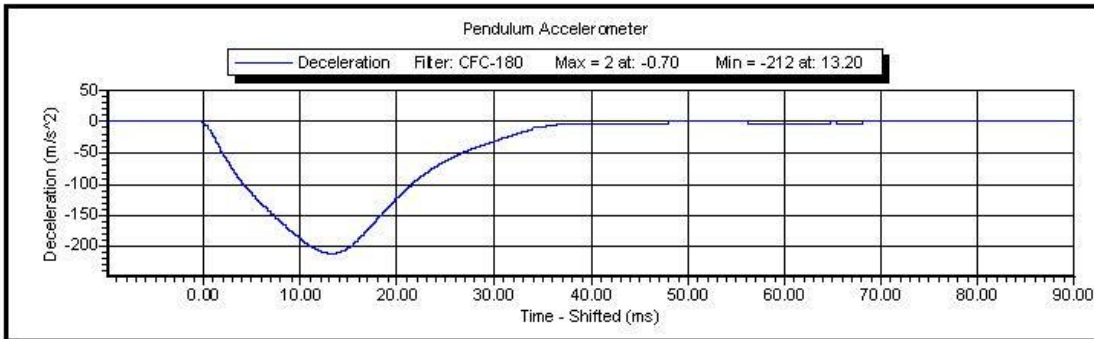
Test ID:

Test Time: 5:26:07 PM

Test Date: 12/8/2011



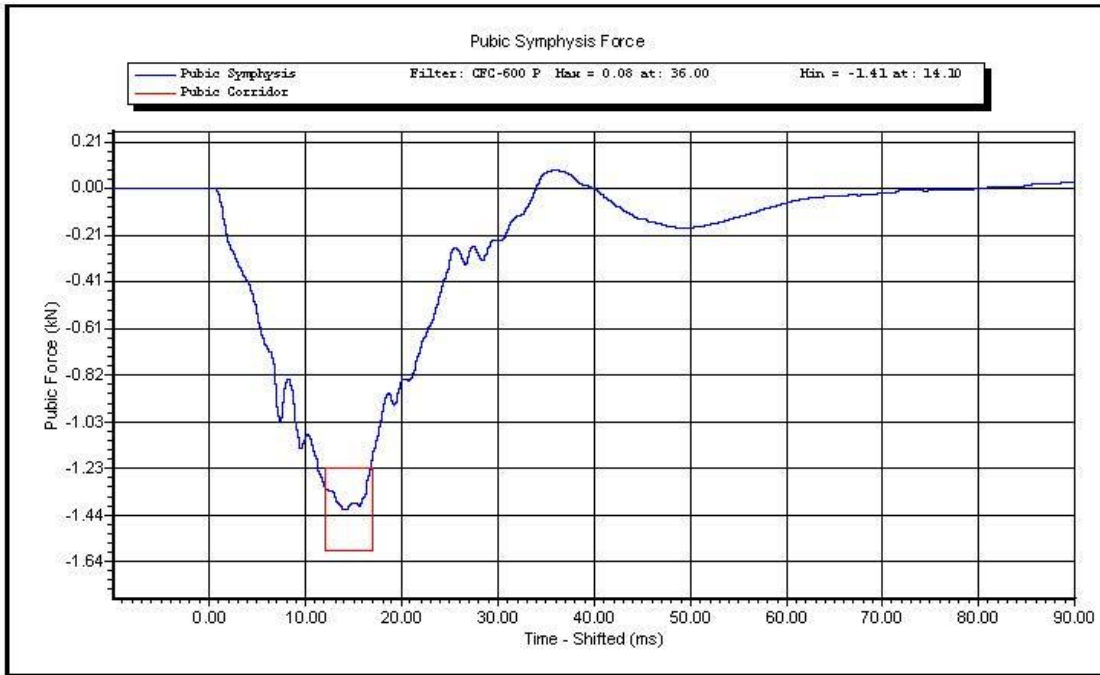
Test Name:	<b>Pelvis Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>5:26:07 PM</b>



Test ID:

Test Time: **5:26:07 PM**

Test Date: **12/8/2011**



Test ID:

Test Time: 5:26:07 PM

Test Date: 12/8/2011

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2 of 2

**CALIBRATION TEST RESULTS**

**PRE-TEST**

**SID-IIs No: 300**

**CONFIGURED FOR LEFT SIDE IMPACT**



### SID-IIsD External Measurements

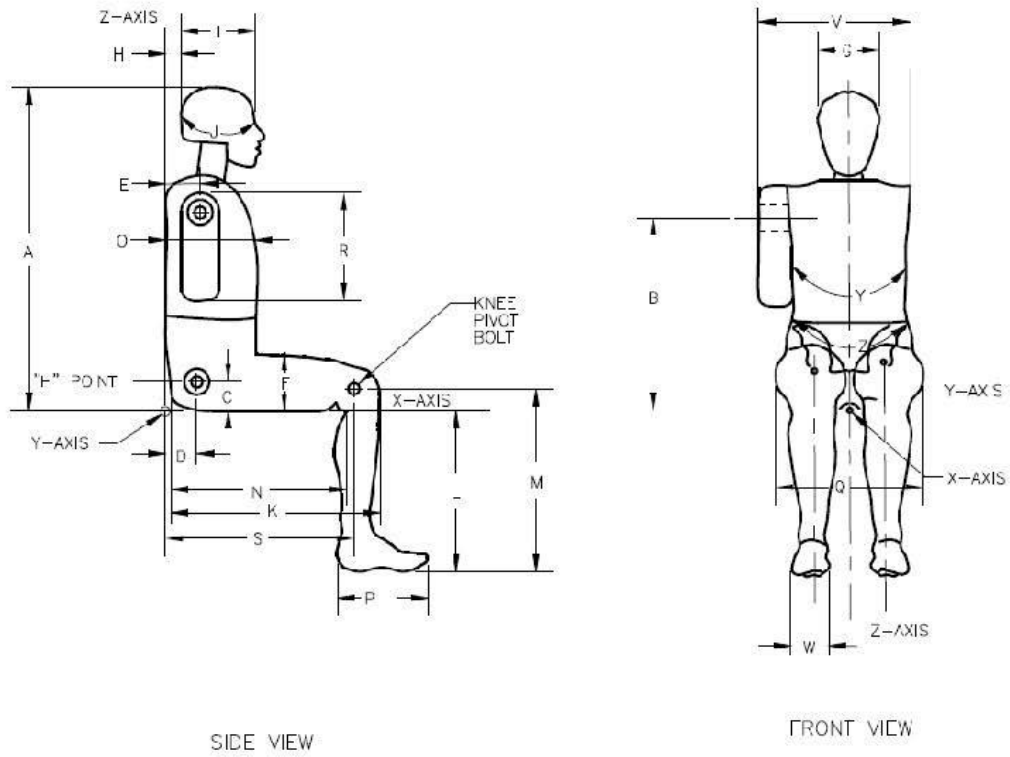
### NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	440	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	122	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	181	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	525	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	433	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	315	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to Seat back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	349	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	777	Yes

Technician: AR

Date: 12/7/2011

## SID-III External Dimension Reference Diagram





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#### VERIFICATION REPORT

Test Name:	<b>Head Drop</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:			
Test ID:		Test Date:	<b>12/7/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>1:02:13 PM</b>

Component Part Number	Component Serial Number
<b>Head Skin - 180-1002</b>	<b>1355</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>27</b> %RH P
Resultant Acceleration	115.0 -- 137.0	<b>136.7</b> g P
Oscillation	0.0 -- 15.0	<b>13.6</b> % P
Fore-Aft Acceleration	-15.0 -- 15.0	<b>-5.9</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **1:02:13 PM**

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



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**VERIFICATION REPORT**

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P51885	10/17/2011
Endevco	7264-2000	P58839	10/17/2011
Endevco	7264-2000	P51991	10/17/2011

Test ID:

Test Time: **1:02:13 PM**

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

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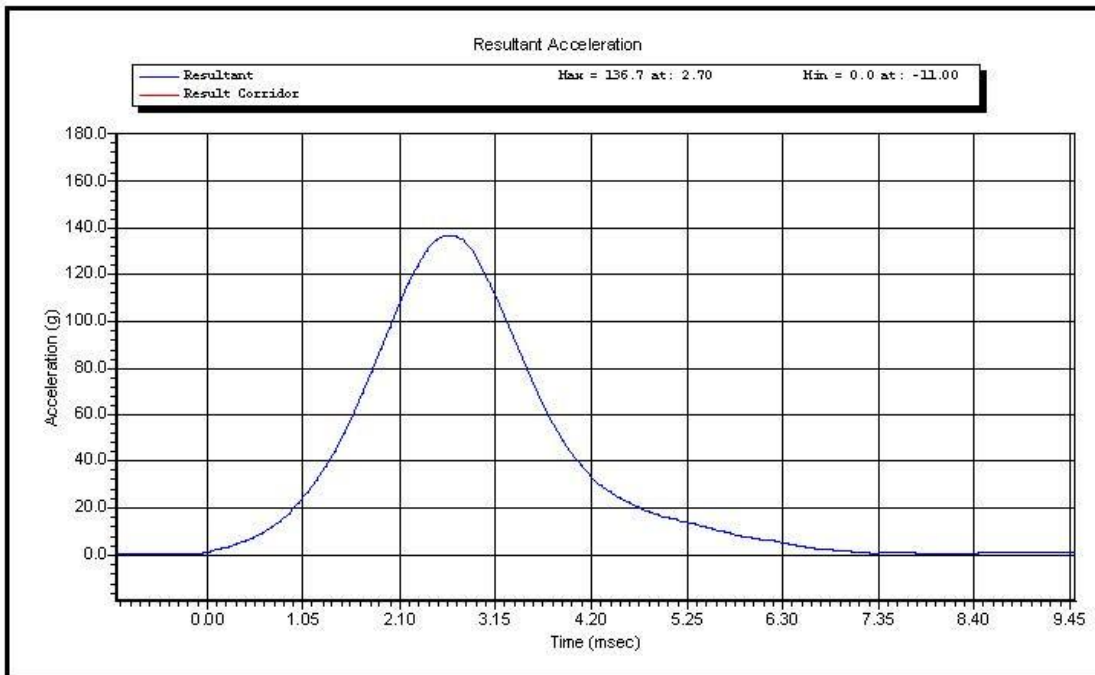


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Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:			
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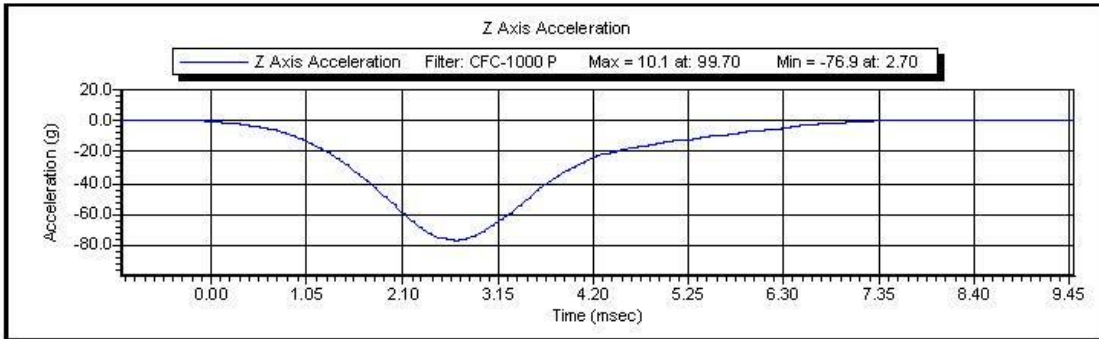
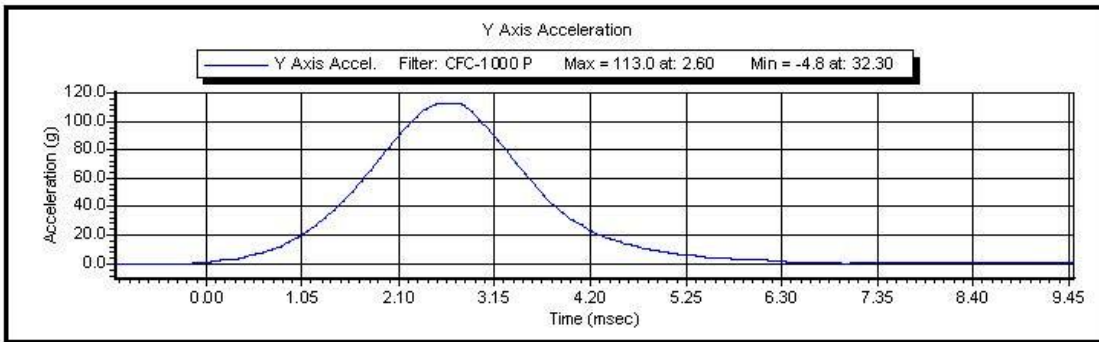
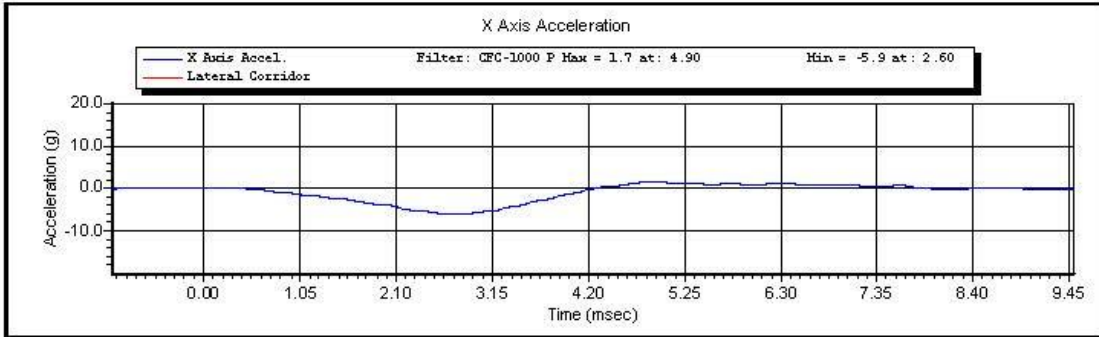
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Test Time: **1:02:13 PM**

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

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Test ID:

Test Time: 1:02:13 PM

Test Date: 12/7/2011

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**VERIFICATION REPORT**

Test Name:	<b>Neck Pendulum</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Left Side</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/7/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:05:06 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 180-2000</b>	<b>787</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	5.51 -- 5.63	<b>5.59</b> m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	<b>2.39</b> m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	<b>3.54</b> m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	<b>4.73</b> m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	<b>5.67</b> m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	<b>5.80</b> m/s P
Max D Plane Rotation	71.0 -- 81.0	<b>71.8</b> degrees P
Time at Max Rotation	50.0 -- 70.0	<b>60.3</b> ms P
Moment about OC	-44.0 -- -36.0	<b>-42.7</b> Nm P
Moment Decay to Zero	102.0 -- 126.0	<b>111.9</b> ms P

All test parameters are within specifications

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

Test ID:

Test Time: **2:05:06 PM**

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



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
Denton	1716A	LC-1591 Fy	6/20/2011
Denton	1716A	LC-1591 Mx	6/20/2011
DentonATD	78051-342	184	5/8/2011
DentonATD	78051-342	174	5/8/2011
DentonATD	78051-342	185	5/8/2011

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Test Time: **2:05:06 PM**

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

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2 of 2

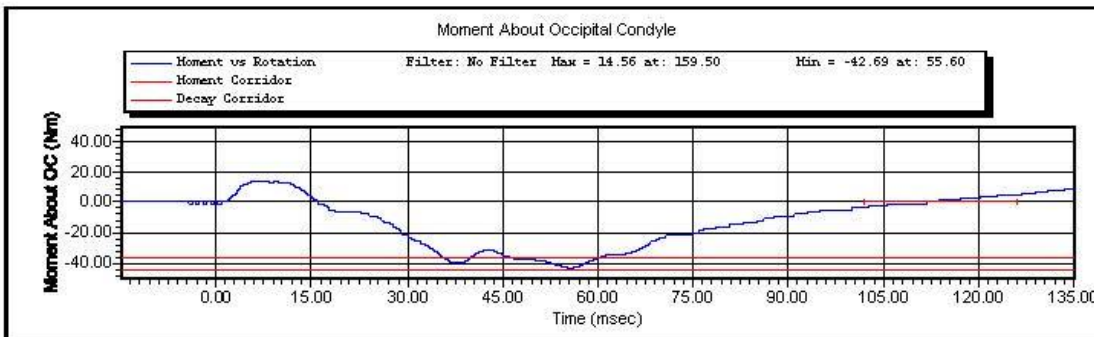
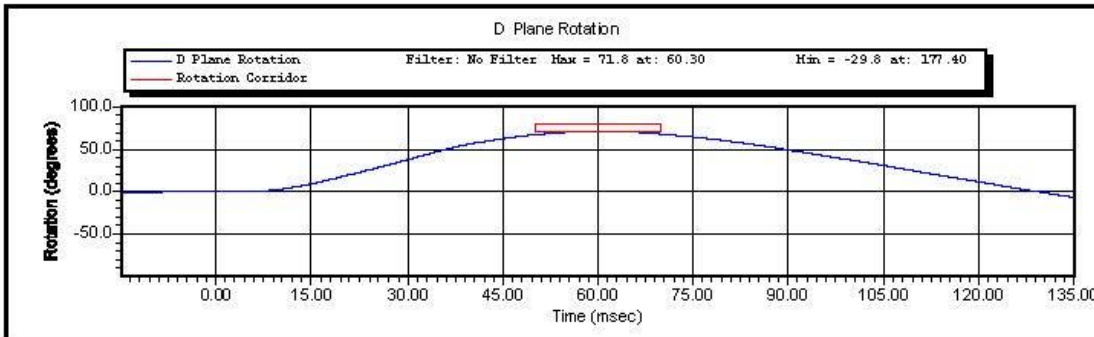


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Test Name:	<b>Neck Pendulum</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Left Side</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/7/2011</b>
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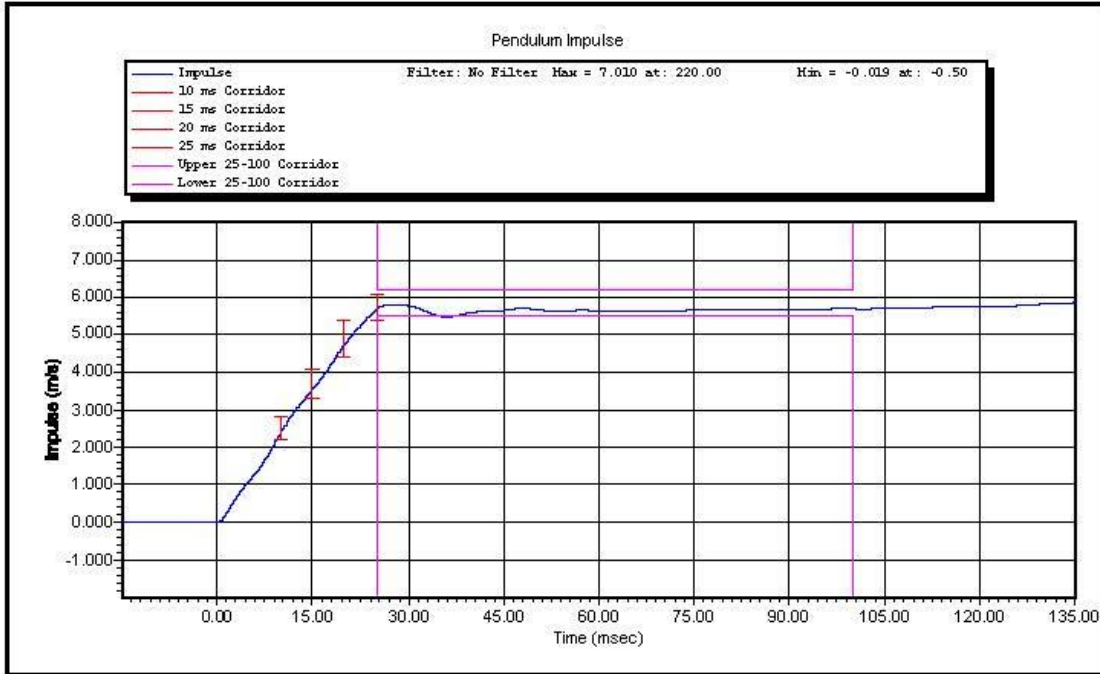
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Test Date: **12/7/2011**

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1 of 2



Test ID:

Test Time: 2:05:06 PM

Test Date: 12/7/2011

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#### VERIFICATION REPORT

Test Name:	<b>Shoulder Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>8:24:07 AM</b>

Component Part Number	Component Serial Number
<b>Shoulder Rib 180-3355</b>	<b>168</b>
<b>Left Arm 180-6011-1</b>	<b>822</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.60</b> deg C P
Humidity	10.0 -- 70.0	<b>25.0</b> %RH P
Velocity	4.20 -- 4.40	<b>4.26</b> m/s P
Probe Acceleration	13.0 -- 18.0	<b>15.7</b> g P
Shoulder Deflection	28.0 -- 37.0	<b>29.2</b> mm P
T1 Acceleration	17.0 -- 22.0	<b>20.7</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **8:24:07 AM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Servo	180-3885	DS-1063	10/31/2011
Endevco	7264-2000	P58806	11/3/2011

Test ID:

Test Time: **8:24:07 AM**

Test Date: **12/8/2011**

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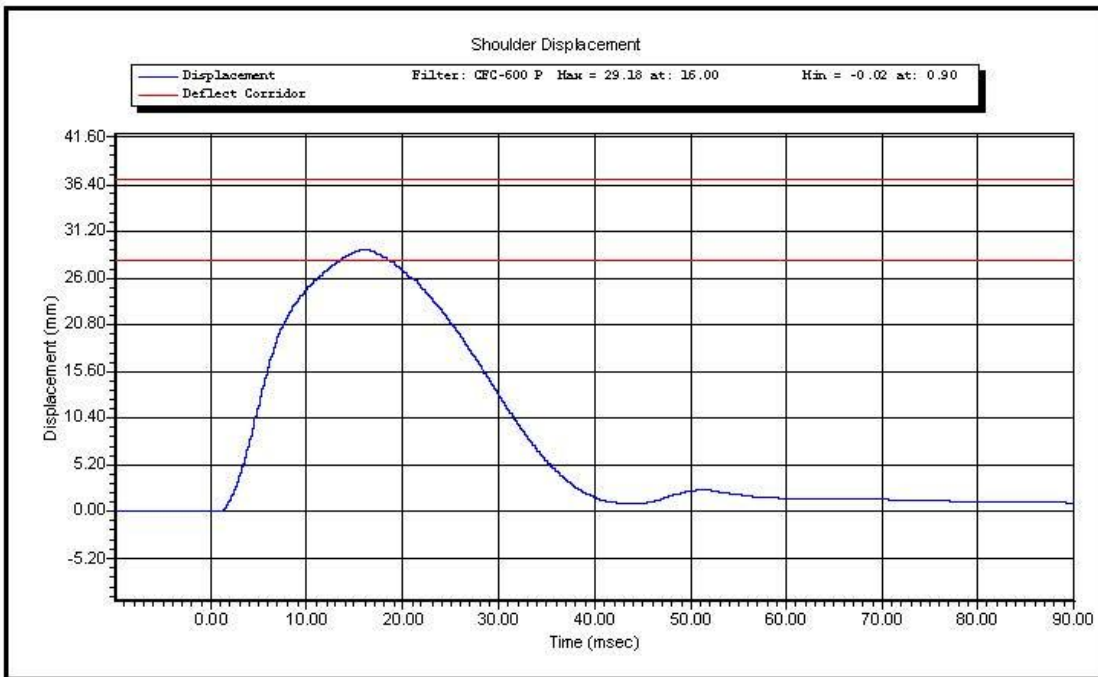


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Test Name:	<b>Shoulder Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>8:24:07 AM</b>



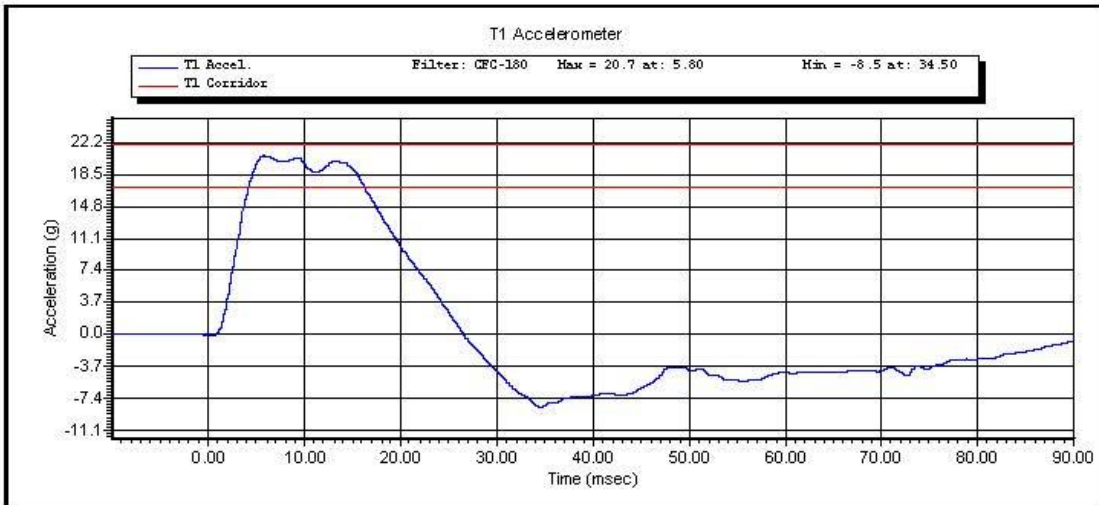
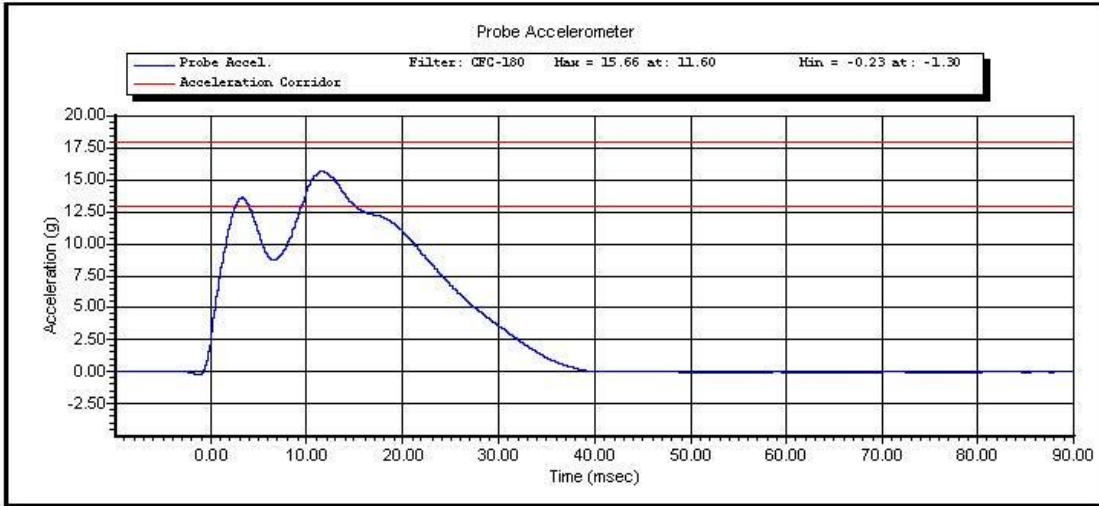
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Test Date: **12/8/2011**

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1 of 2



Test ID:

Test Time: 8:24:07 AM

Test Date: 12/8/2011

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#### VERIFICATION REPORT

Test Name:	<b>Thorax Impact with Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>9:36:03 AM</b>

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Velocity	6.60 -- 6.80	<b>6.73</b> m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	<b>33.0</b> g P
Upper Thorax Rib Deflection	25.0 -- 32.0	<b>26.4</b> mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	<b>31.9</b> mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	<b>33.1</b> mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	<b>40.4</b> g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	<b>34.0</b> g P
Shoulder Deflection	31.0 -- 40.0	<b>33.8</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **9:36:03 AM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011
Servo	180-3885	DS-1063	10/31/2011

Test ID:

Test Time: 9:36:03 AM

Test Date: 12/8/2011

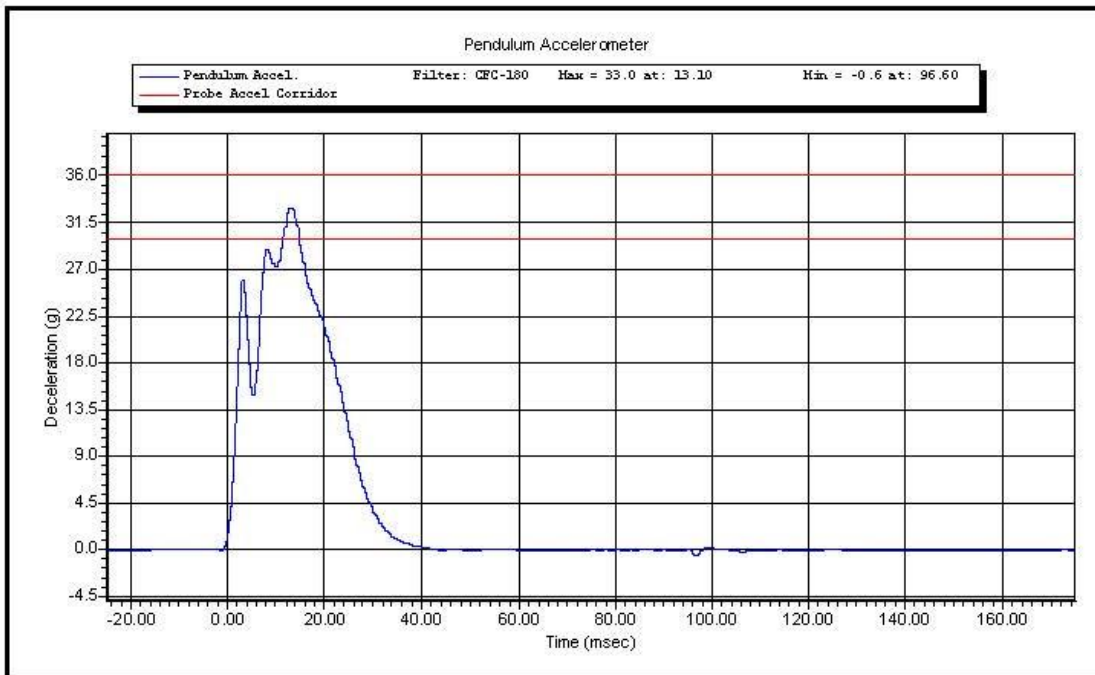


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Test Name:	<b>Thorax Impact with Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>9:36:03 AM</b>



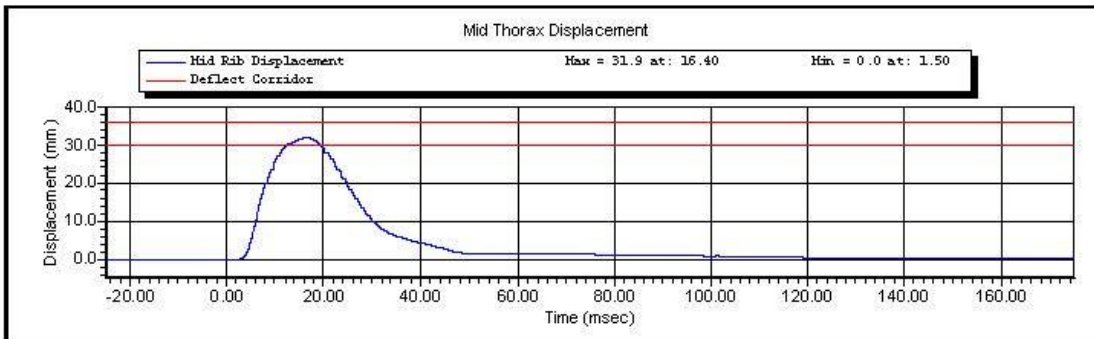
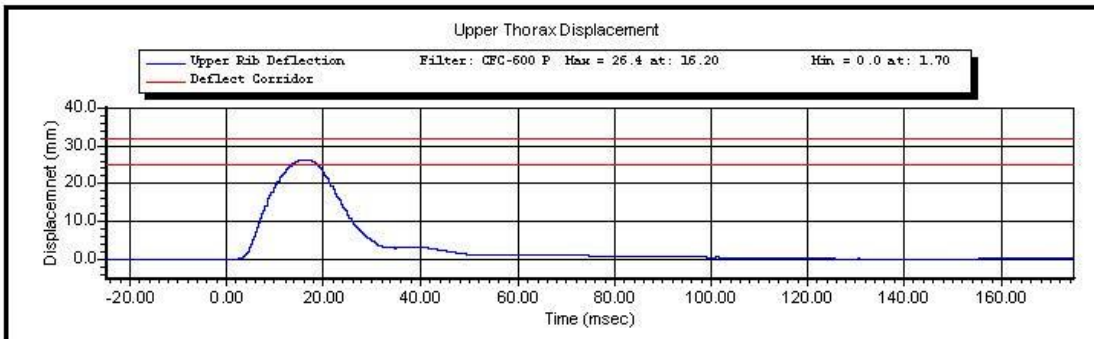
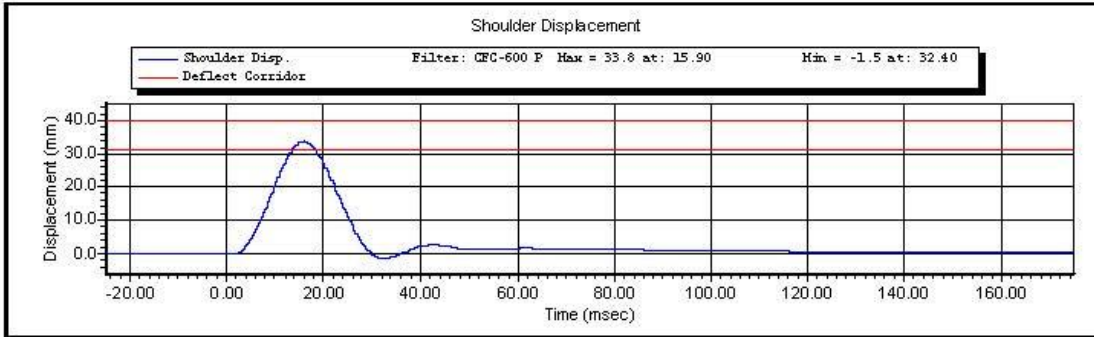
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Test Date: **12/8/2011**

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1 of 3



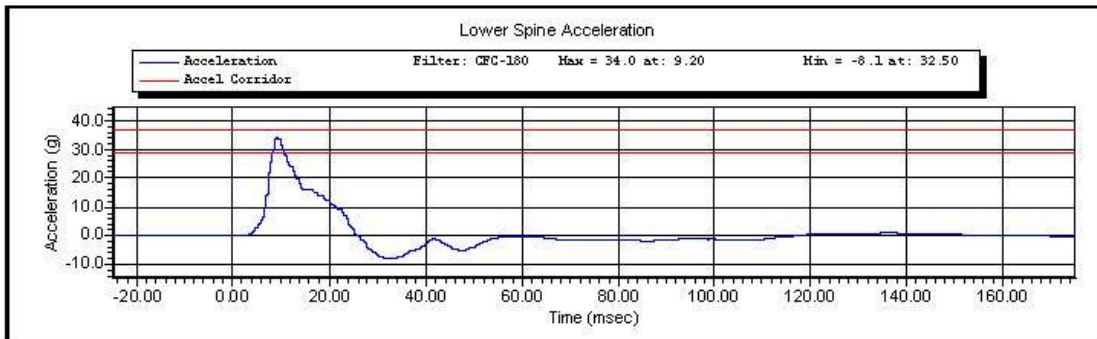
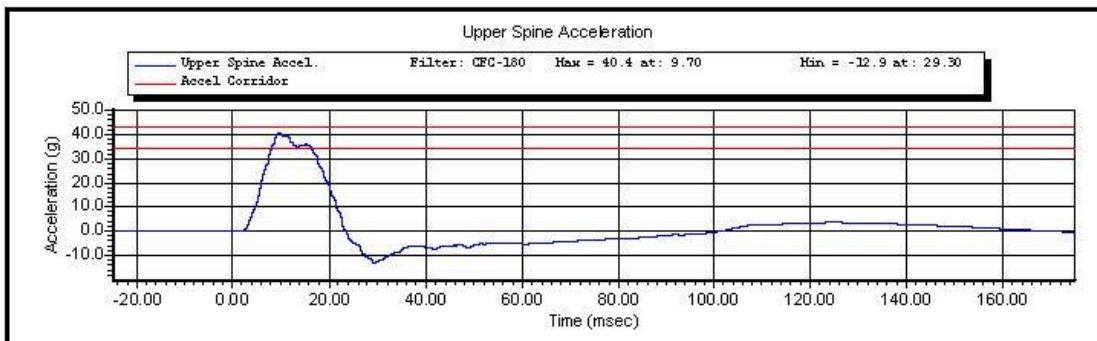
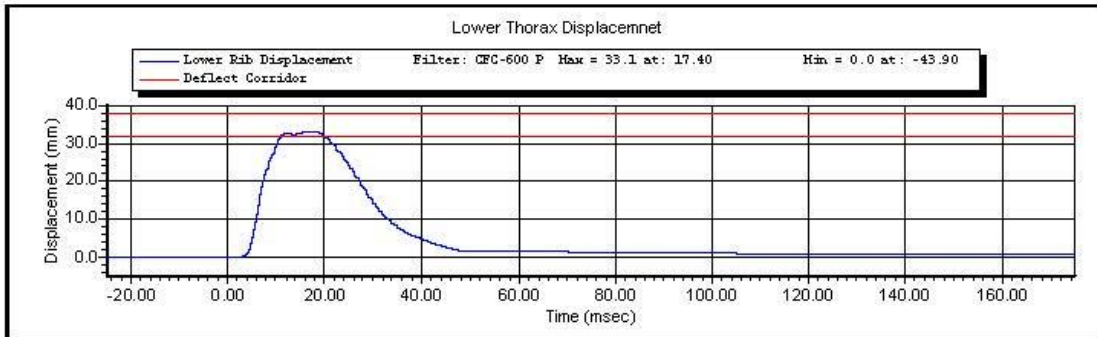
Test ID:

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2 of 3



Test ID:

Test Time: 9:36:03 AM

Test Date: 12/8/2011

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#### VERIFICATION REPORT

Test Name:	<b>Thorax Impact without Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>7:27:34 AM</b>

Component Part Number	Component Serial Number
<b>Thorax Ribs 1, 2, 3</b>	<b>2024, 2061, 2062</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>20.8</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	4.20 -- 4.40	<b>4.32</b> m/s P
Probe Acceleration	14.0 -- 18.0	<b>15.6</b> g P
Upper Thorax Rib Deflection	32.0 -- 40.0	<b>36.3</b> mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	<b>41.1</b> mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	<b>36.3</b> mm P
Upper Spine Acceleration T1	13.0 -- 17.0	<b>16.3</b> g P
Lower Spine Acceleration T12	7.0 -- 11.0	<b>9.0</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **7:27:34 AM**

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: 7:27:34 AM

Test Date: 12/8/2011

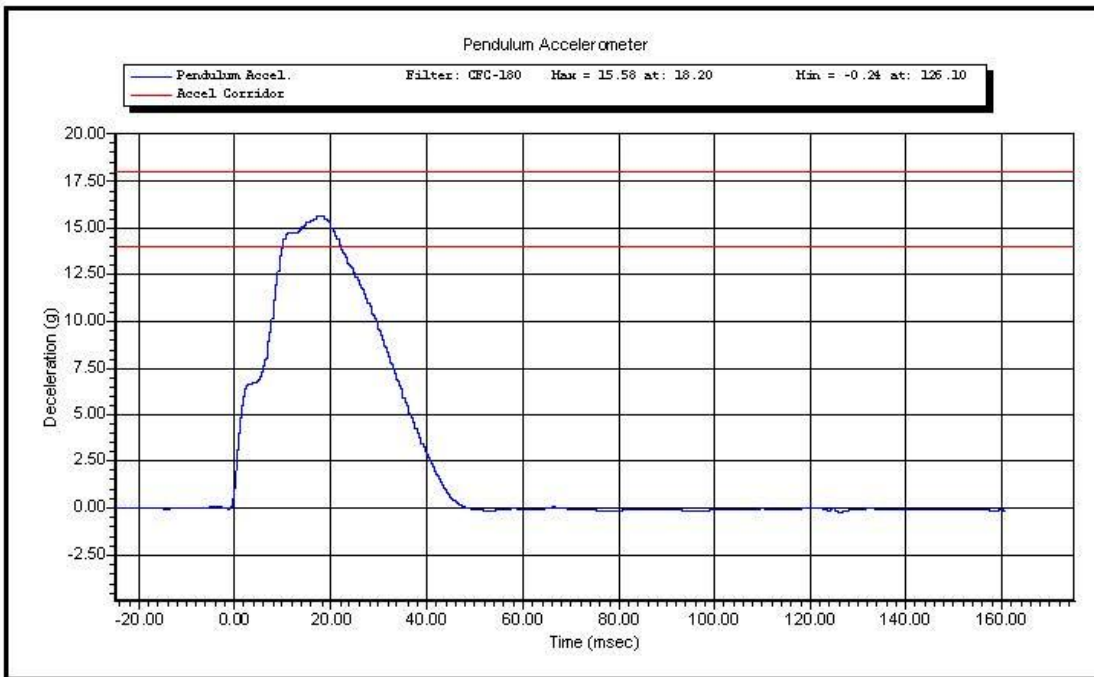


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Test Name:	<b>Thorax Impact without Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>7:27:34 AM</b>



Test ID:

Test Time: **7:27:34 AM**

Test Date: **12/8/2011**

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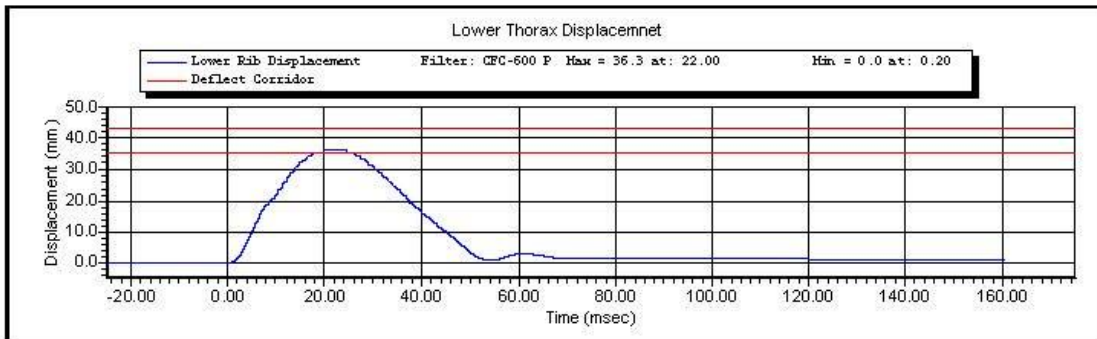
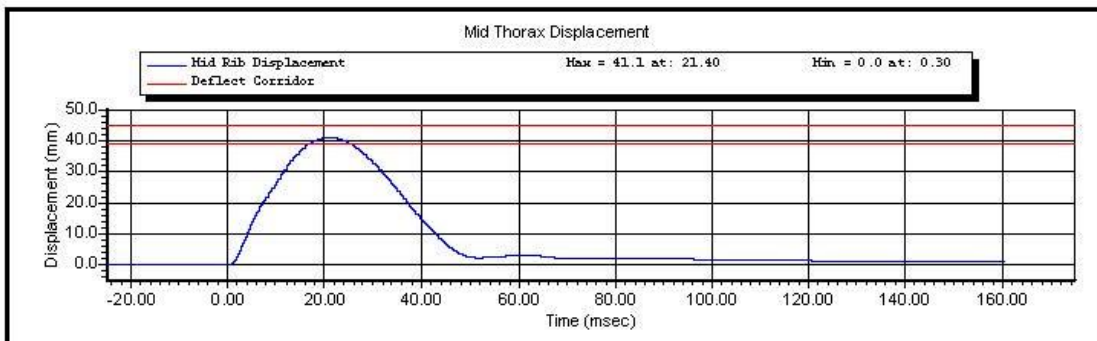
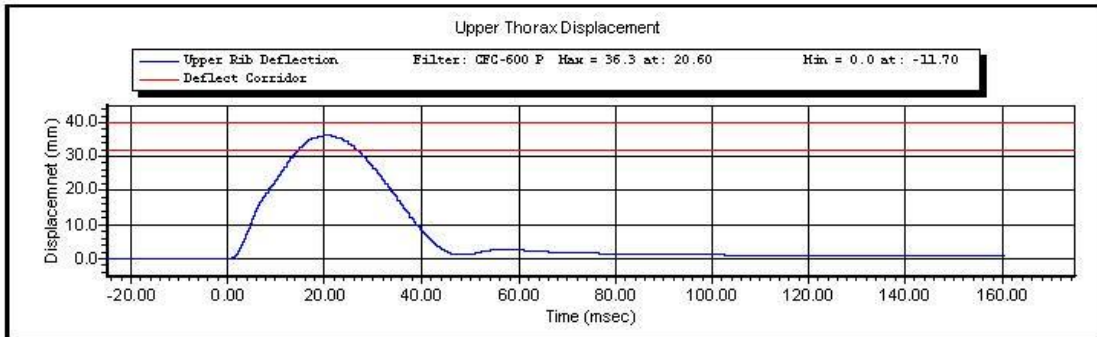
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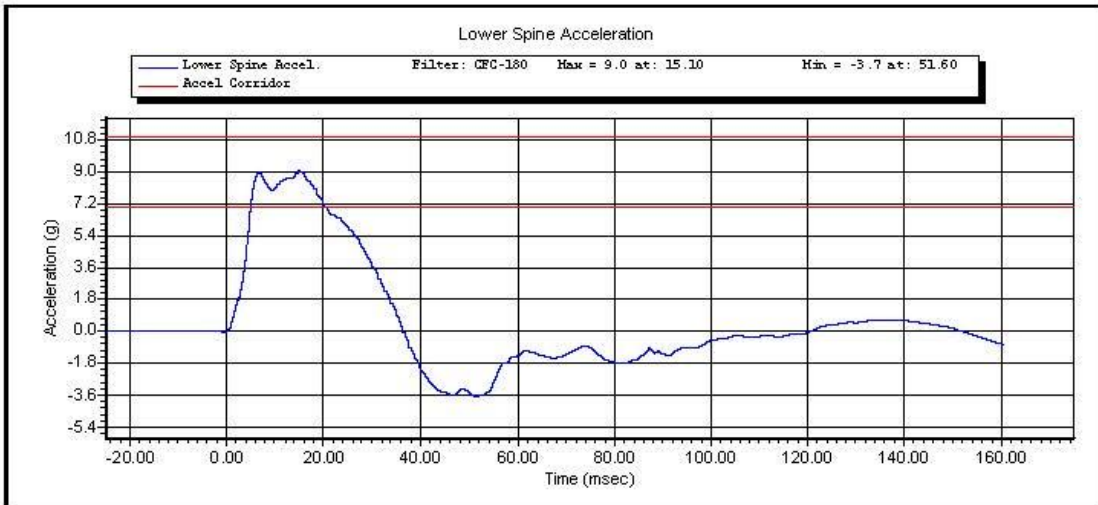
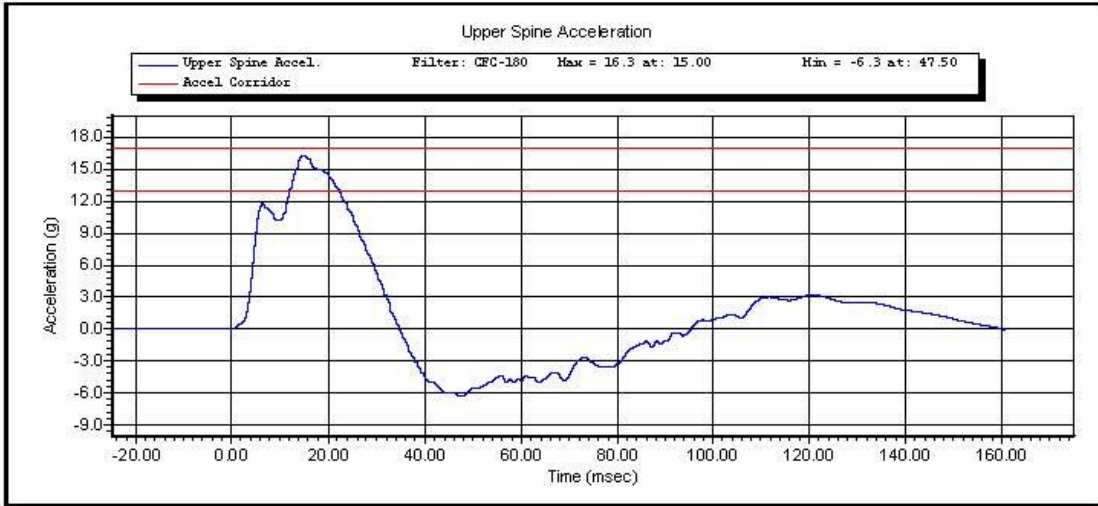
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Test Time: 7:27:34 AM

Test Date: 12/8/2011

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2 of 3



Test ID:

Test Time: 7:27:34 AM

Test Date: 12/8/2011

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#### VERIFICATION REPORT

Test Name:	<b>Abdominal Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/7/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:46:30 PM</b>

Component Part Number	Component Serial Number
<b>Abdomen Ribs 4, 5</b>	<b>2024, 2061</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	4.20 -- 4.40	<b>4.35</b> m/s P
Probe Acceleration	12.0 -- 16.0	<b>14.5</b> g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	<b>40.8</b> mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	<b>35.9</b> mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	<b>12.7</b> g P

All test parameters are within specifications

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

Test ID:

Test Time: **4:46:30 PM**

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



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Servo	180-3885	DS-1162	11/3/2011
Servo	180-3885	DS-1622	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: **4:46:30 PM**

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

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2 of 2

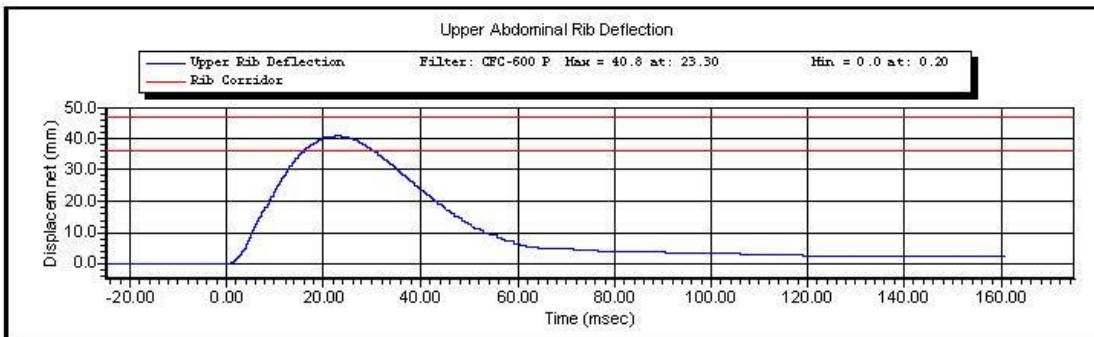
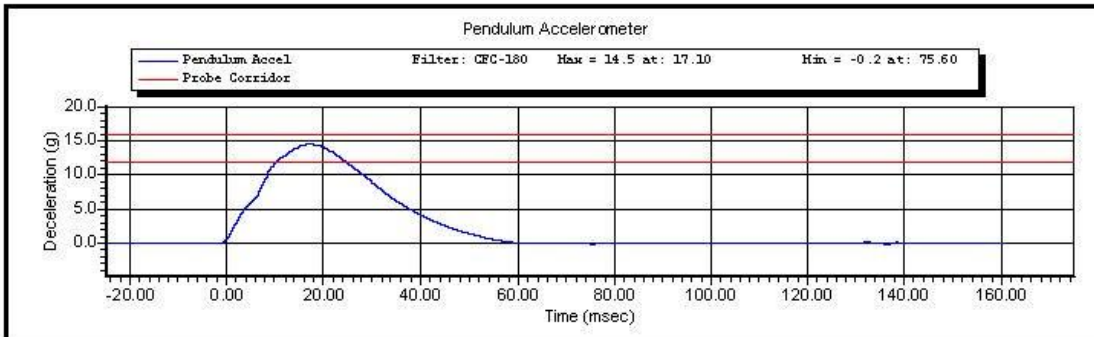


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Test Name:	<b>Abdominal Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/7/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:46:30 PM</b>



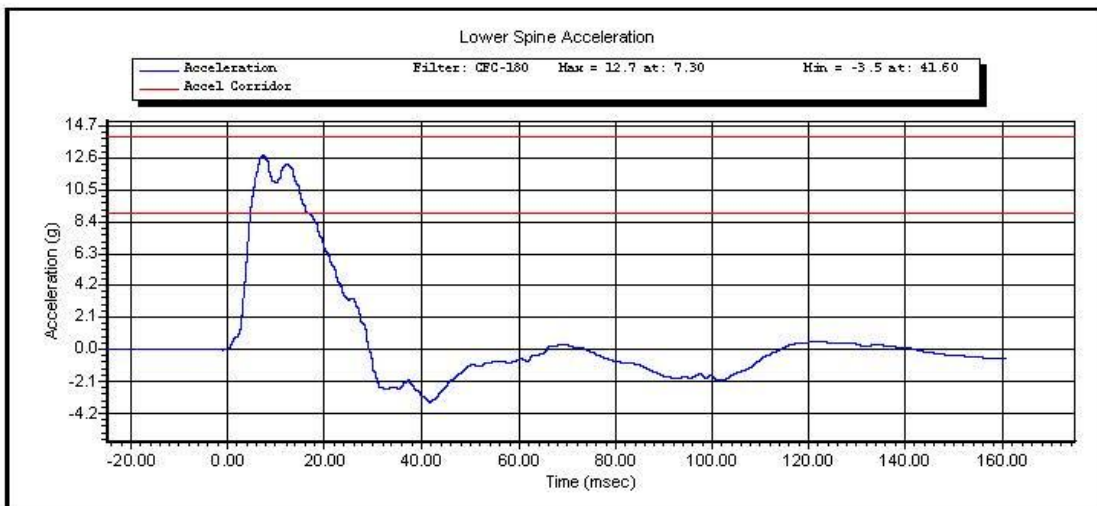
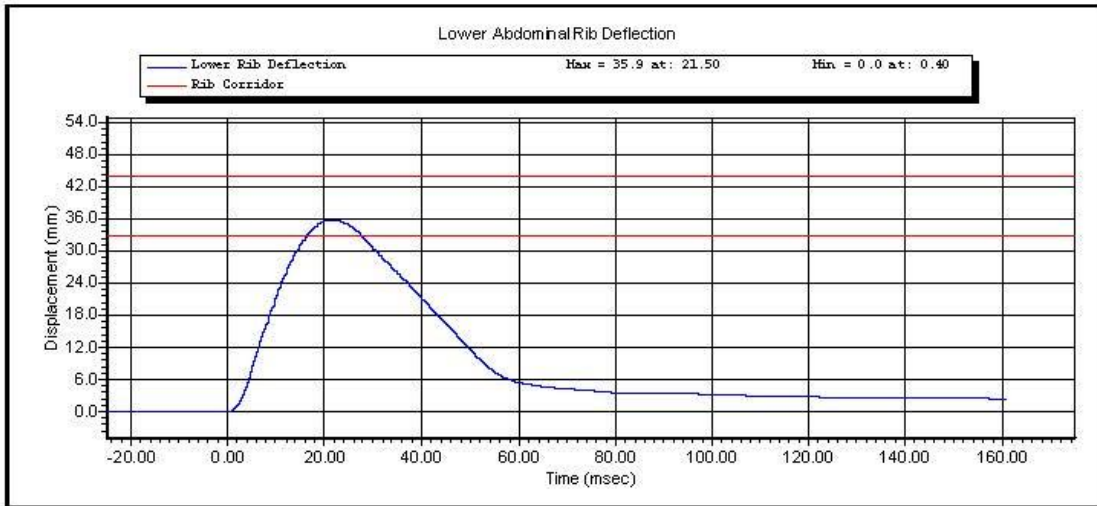
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Test Date: **12/7/2011**

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1 of 2



Test ID:

Test Time: 4:46:30 PM

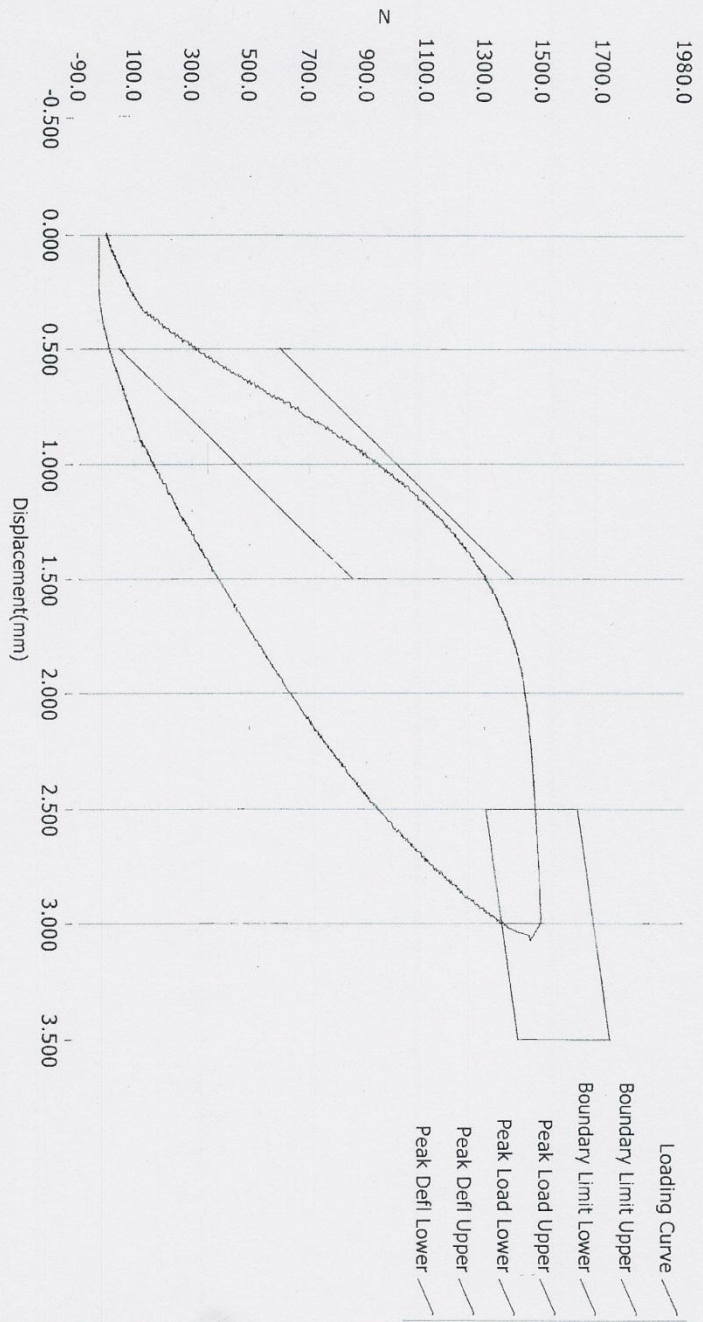
Test Date: 12/7/2011

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2 of 2

CERT

### Resultant Data - SIDIS Plug Compression

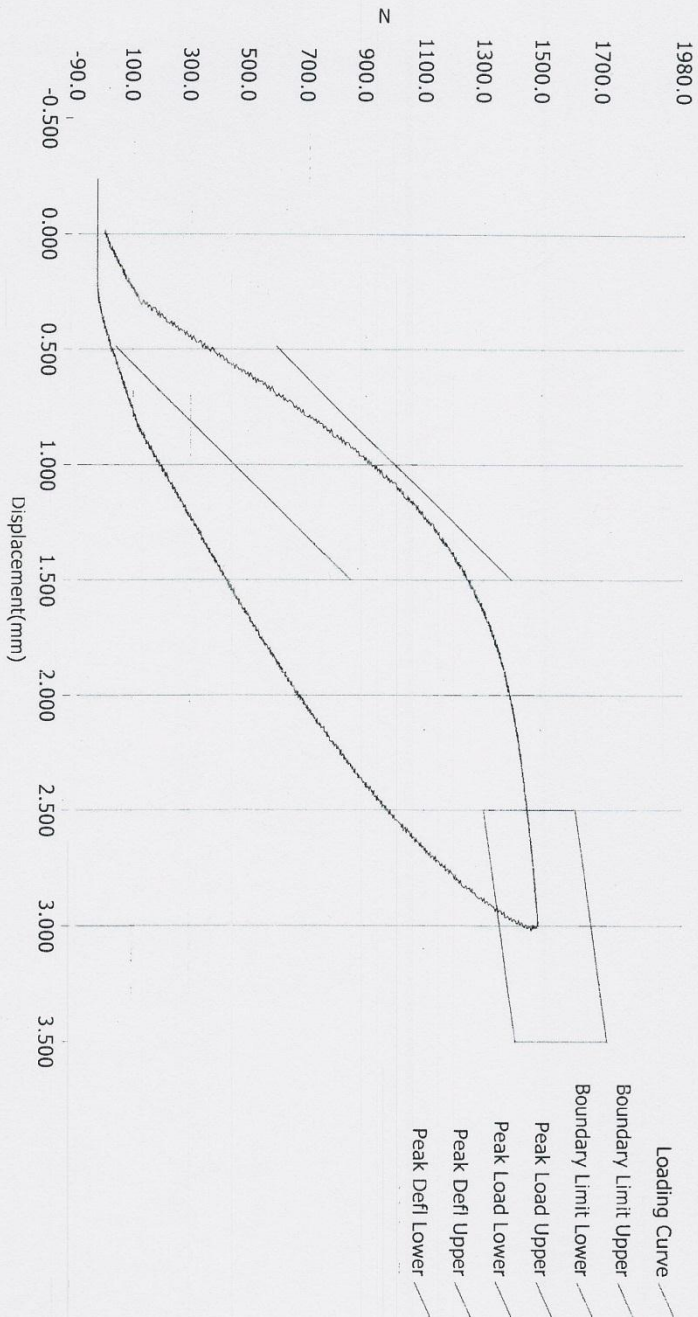


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
36290	SIDIS	9/22/2010	11:56 AM

Current Date : 9/22/2010      Current Time : 11:58:18

### Resultant Data - SIDIIS Plug Compression



ATD Calibration Lab

<u>Test ID</u>	<u>Part Serial Number</u>	<u>Test Date</u>	<u>Test Time</u>
		10/5/2010	8:02 PM
<u>Cert ID</u>	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	36780	SIDIIS	

Current Date : 10/5/2010

Current Time : 20:02:50



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**VERIFICATION REPORT**

Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Acetabulum Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:19:29 AM</b>

Component Part Number	Component Serial Number
<b>180-4343 Pelvis Flesh</b>	<b>D13396</b>
<b>FTSS Certification Plug -1494N</b>	<b>36290</b>
<b>FTSS Full Scale Test Plug -1490N</b>	<b>36780</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>24</b> %RH P
Velocity	6.60 -- 6.80	<b>6.64</b> m/s P
Peak Probe Acceleration	38.0 -- 47.0	<b>43.5</b> g P
Peak Pelvis Acceleration	34.0 -- 42.0	<b>41.6</b> g P
Peak Acetabulum Force	3.60 -- 4.30	<b>3.75</b> kN P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

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

Test Date: **12/8/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3249J	LC-275a	11/3/2011

Test ID:

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

Test Date: **12/8/2011**

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2 of 2

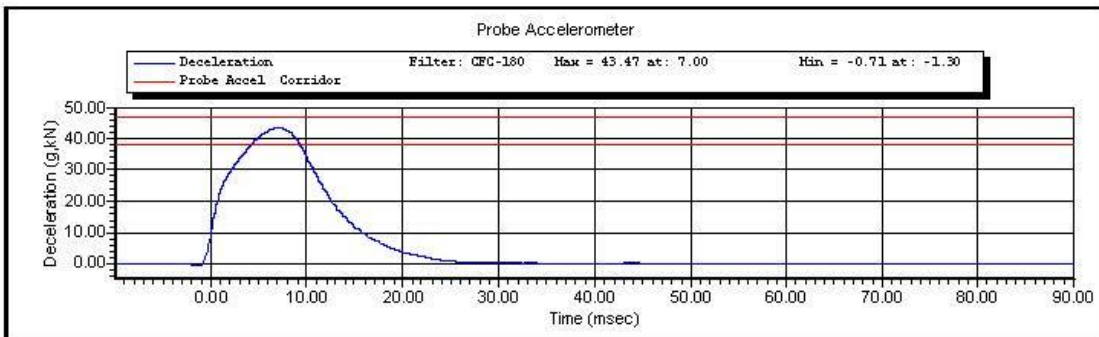
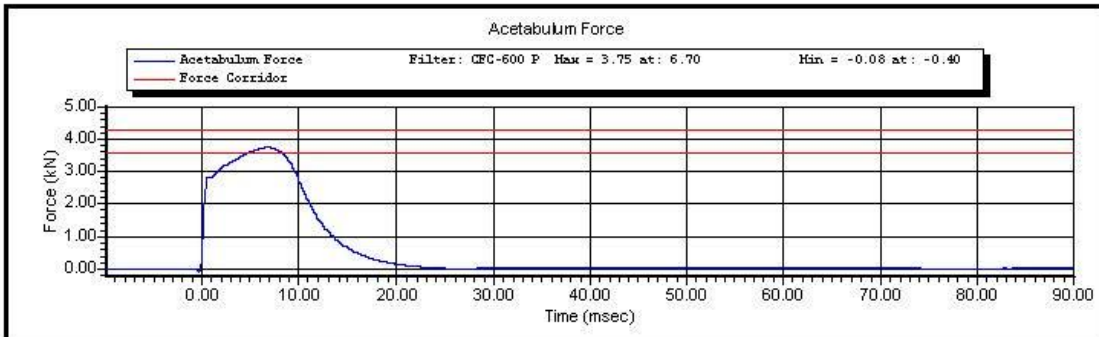


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Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Acetabulum Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/8/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:19:29 AM</b>



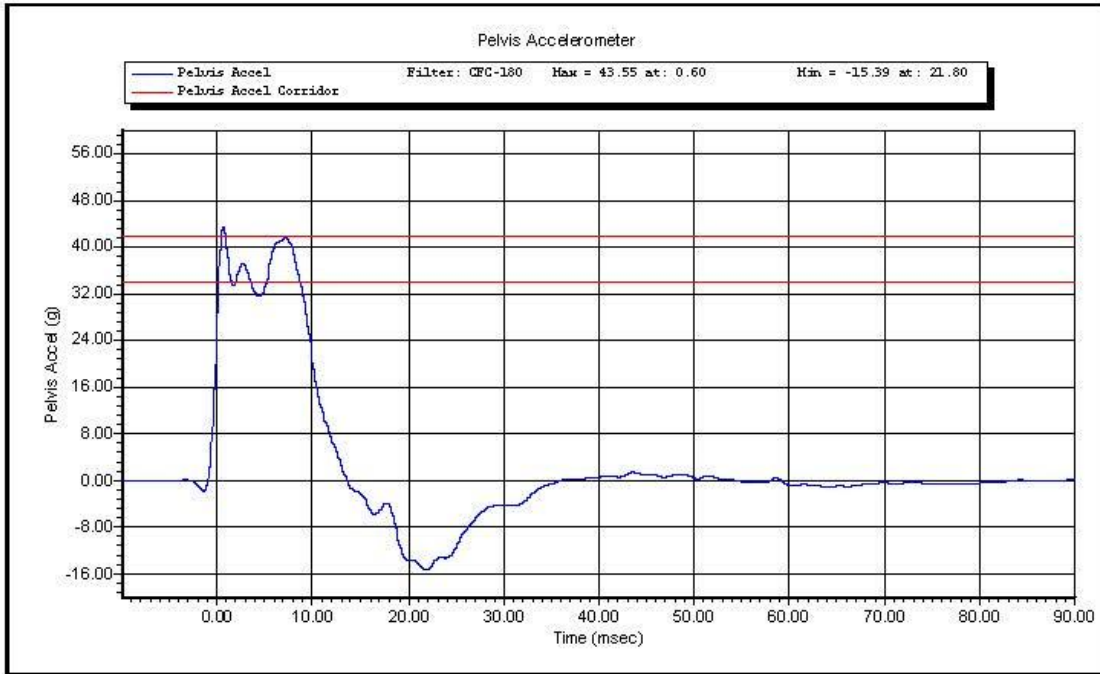
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Test Date: **12/8/2011**

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1 of 2



Test ID:

Test Time: 10:19:29 AM

Test Date: 12/8/2011

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**VERIFICATION REPORT**

Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Iliac Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/7/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>3:52:00 PM</b>

Component Part Number	Component Serial Number
<b>180-4343 Pelvis Flesh</b>	<b>D13396</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	4.20 -- 4.40	<b>4.33</b> m/s P
Peak Probe Acceleration	36.0 -- 45.0	<b>40.9</b> g P
Peak Pelvis Acceleration	28.0 -- 39.0	<b>33.0</b> g P
Peak Iliac Force	4.10 -- 5.10	<b>4.76</b> kN P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **3:52:00 PM**

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



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AH5M8	11/8/2011
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3228J	LC-279 Fy	11/3/2011

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Test Date: 12/7/2011

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2 of 2

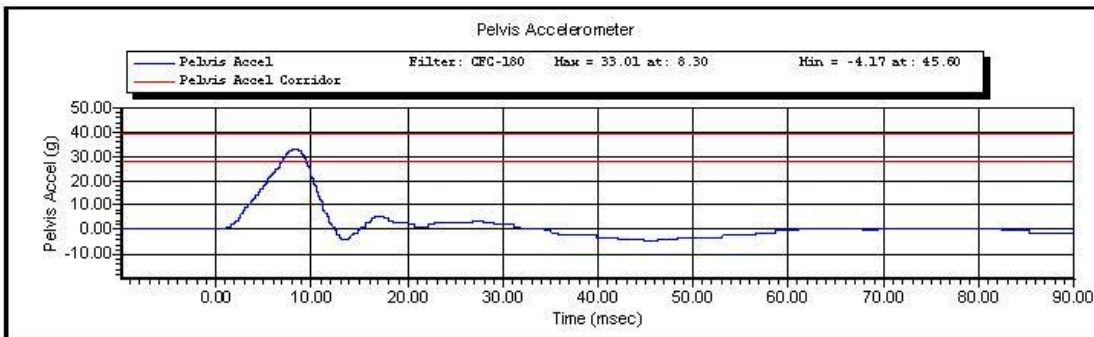
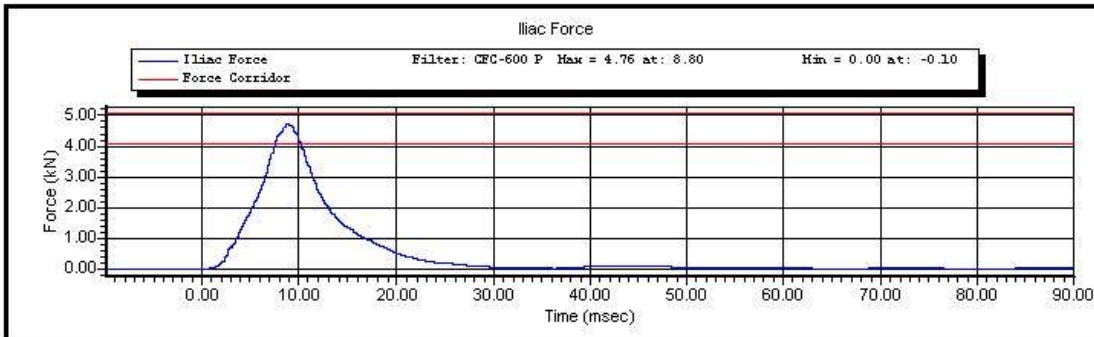


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Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Iliac Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
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Test Number:	<b>1</b>	Test Time:	<b>3:52:00 PM</b>



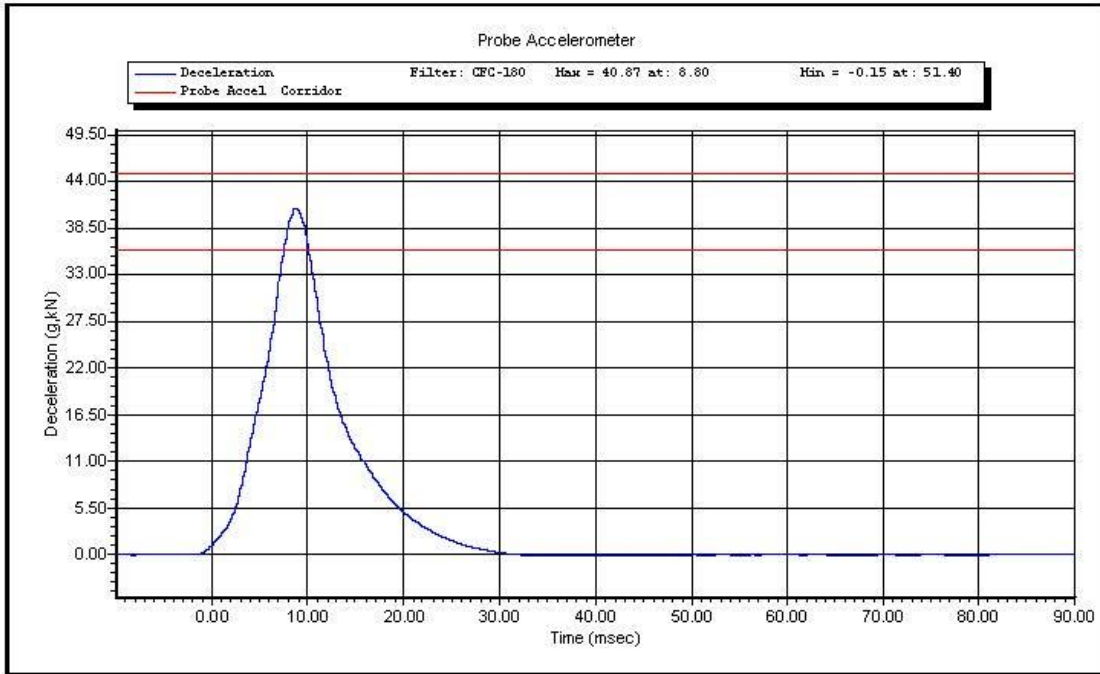
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1 of 2



Test ID:

Test Time: 3:52:00 PM

Test Date: 12/7/2011

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2 of 2

**CALIBRATION TEST RESULTS**

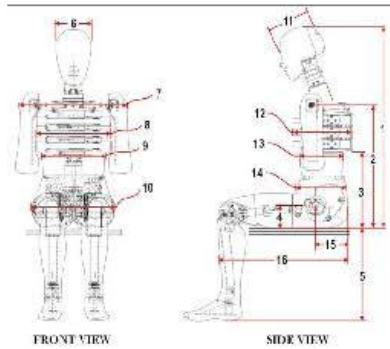
**POST-TEST**

**ES2-re No: F034**

**CONFIGURED FOR LEFT SIDE IMPACT**

## ES-2re External Measurements

### NHTSA S/N F034



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

Technician: AR

Date: 12/13/2011



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#### VERIFICATION REPORT

Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:14:32 AM</b>

Component Part Number	Component Serial Number
<b>455-1007</b>	<b>1916409</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.6</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Resultant Acceleration	125 -- 155	<b>145</b> g P
Oscillation	0.0 -- 15.0	<b>2.7</b> % P
Fore-Aft Acceleration	-15.00 -- 15.00	<b>3.78</b> g P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

Test ID:

Test Time: **10:14:32 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P51681	11/5/2011
Endevco	7264-2000	P51949	11/5/2011
Endevco	7264-2000	P51695	11/5/2011

Test ID:

Test Time: **10:14:32 AM**

Test Date: **12/14/2011**

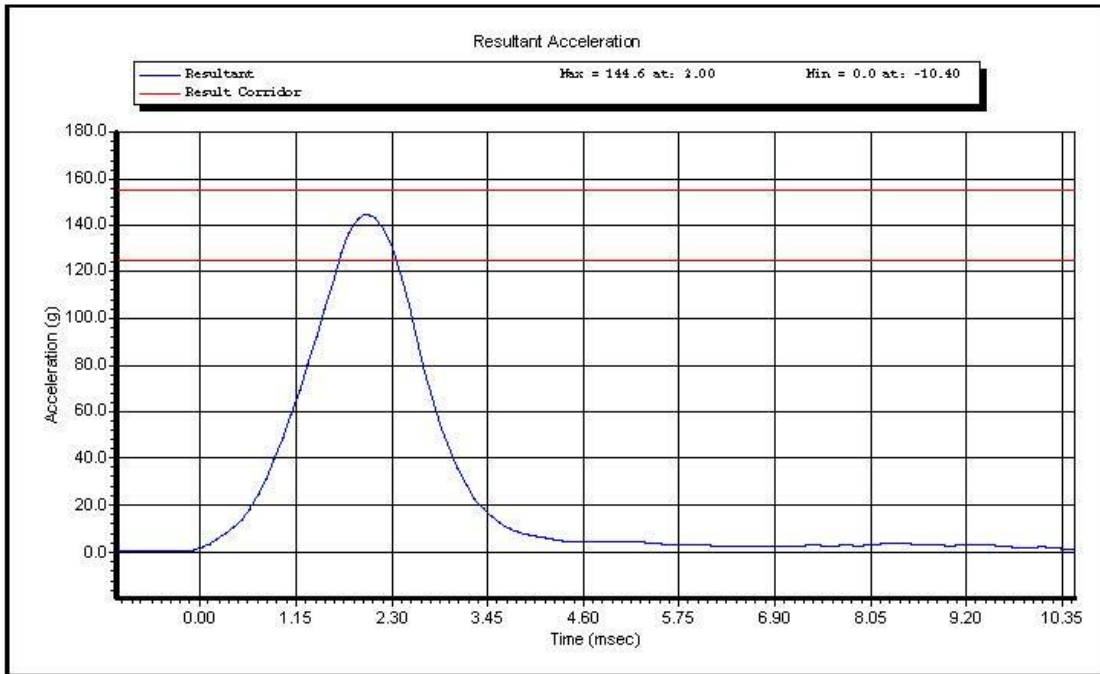


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Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:14:32 AM</b>



Test ID:

Test Time: **10:14:32 AM**

Test Date: **12/14/2011**

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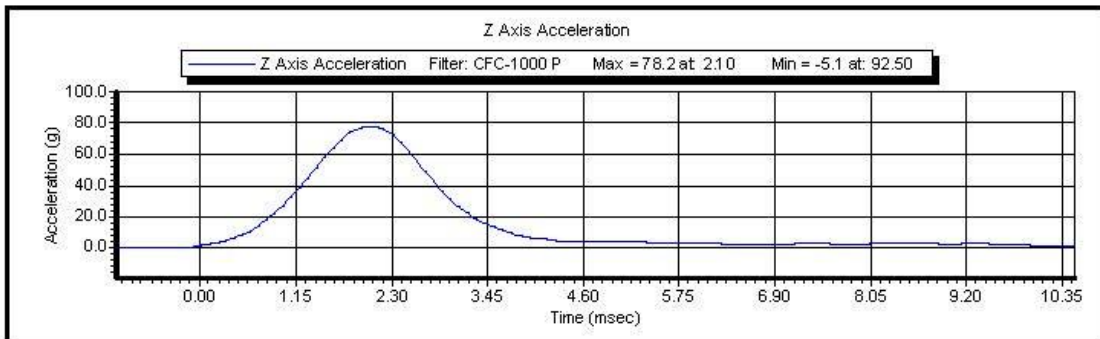
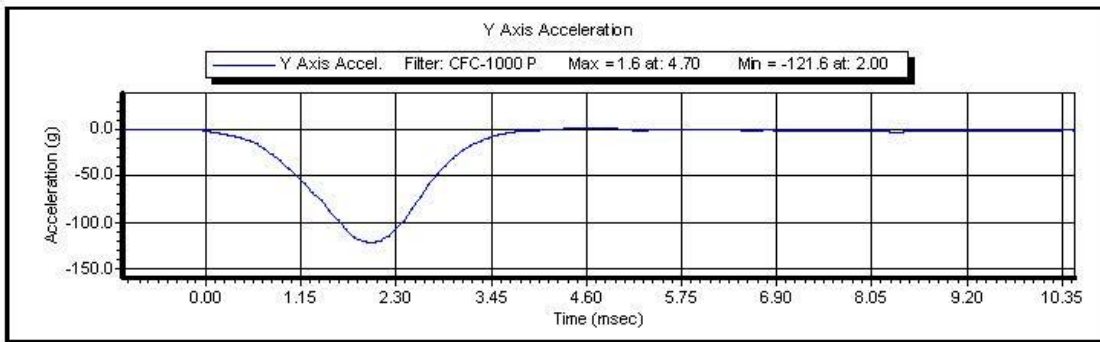
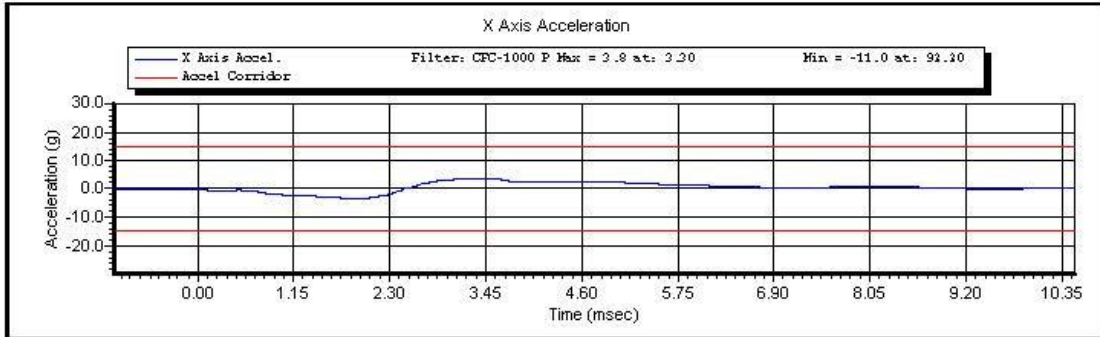
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Test ID:

Test Time: 10:14:32 AM

Test Date: 12/14/2011

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#### VERIFICATION REPORT

Test Name:	<b>Neck Flexion</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>12:03:31 PM</b>

Component Part Number	Component Serial Number
<b>455-2002</b>	<b>07066</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>25</b> %RH P
Velocity	3.30 -- 3.50	<b>3.47</b> m/s P
Maximum Neck Flexion Angle	49.0 -- 59.0	<b>49.4</b> degrees P
Time At Maximum Neck Flexion	54.0 -- 66.0	<b>59.7</b> ms P
Decay to Zero Degrees	53.0 -- 88.0	<b>61.2</b> ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **12:03:31 PM**

Test Date: **12/14/2011**

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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

Test ID:

Test Time: **12:03:31 PM**

Test Date: **12/14/2011**

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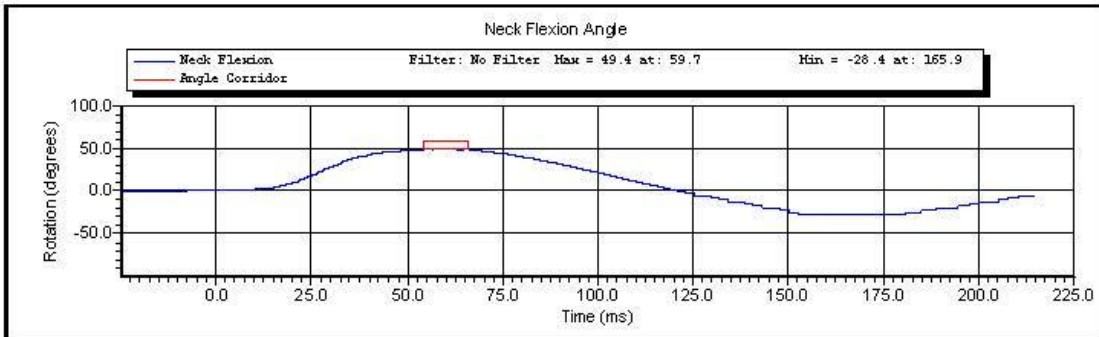
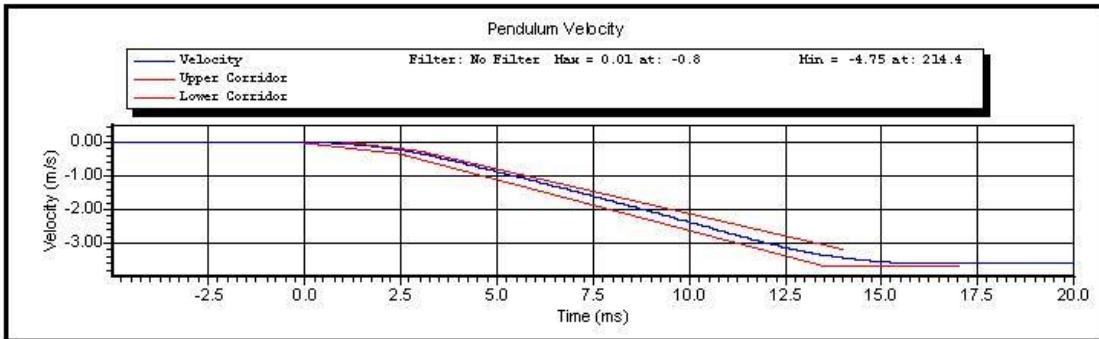


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Test Name:	<b>Neck Flexion</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
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Test ID:

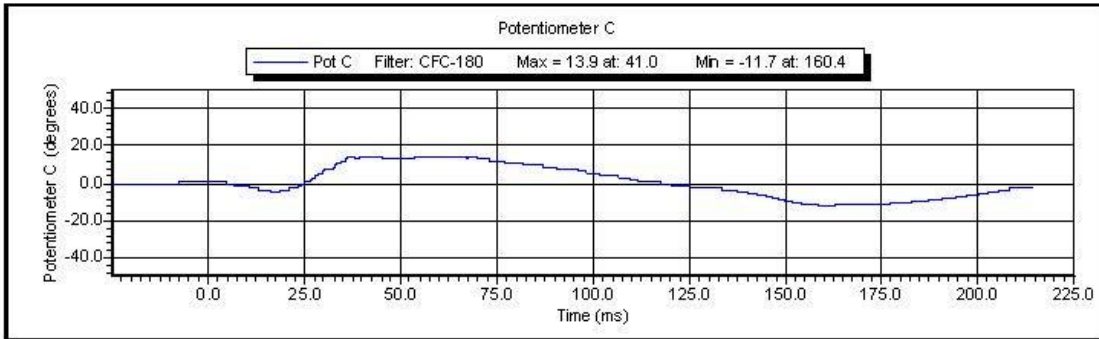
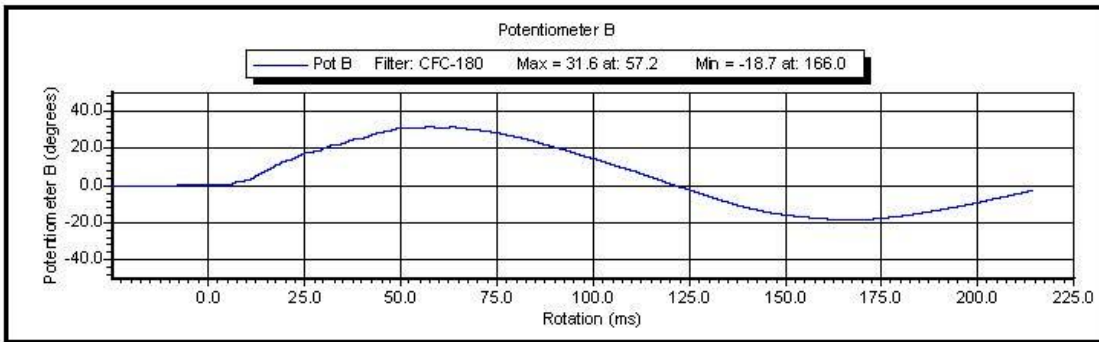
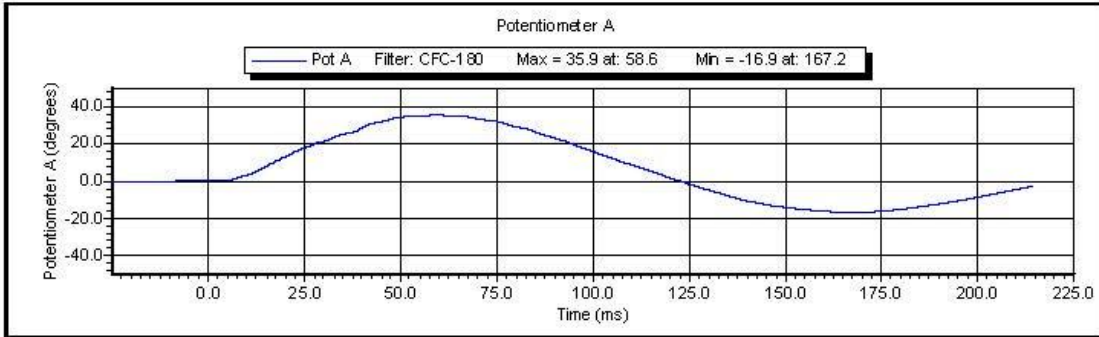
Test Time: **12:03:31 PM**

Test Date: **12/14/2011**

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1 of 2

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Test ID:

Test Time: 12:03:31 PM

Test Date: 12/14/2011

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**VERIFICATION REPORT**

Test Name:	<b>Shoulder Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>5:13:37 PM</b>

Component Part Number	Component Serial Number
<b>960715-313</b>	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>30.0</b> %RH P
Velocity	4.20 -- 4.40	<b>4.24</b> m/s P
Pendulum Acceleration	-10.50 -- -7.50	<b>-10.44</b> g P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID:

Test Time: **5:13:37 PM**

Test Date: **12/14/2011**



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**VERIFICATION REPORT**

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
<b>DentonATD</b>	<b>Velocity Trap</b>	<b>1</b>	<b>1/11/2011</b>
<b>Endevco</b>	<b>7264-2000</b>	<b>P66927</b>	<b>12/10/2011</b>

Test ID:

Test Time: **5:13:37 PM**

Test Date: **12/14/2011**

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2 of 2

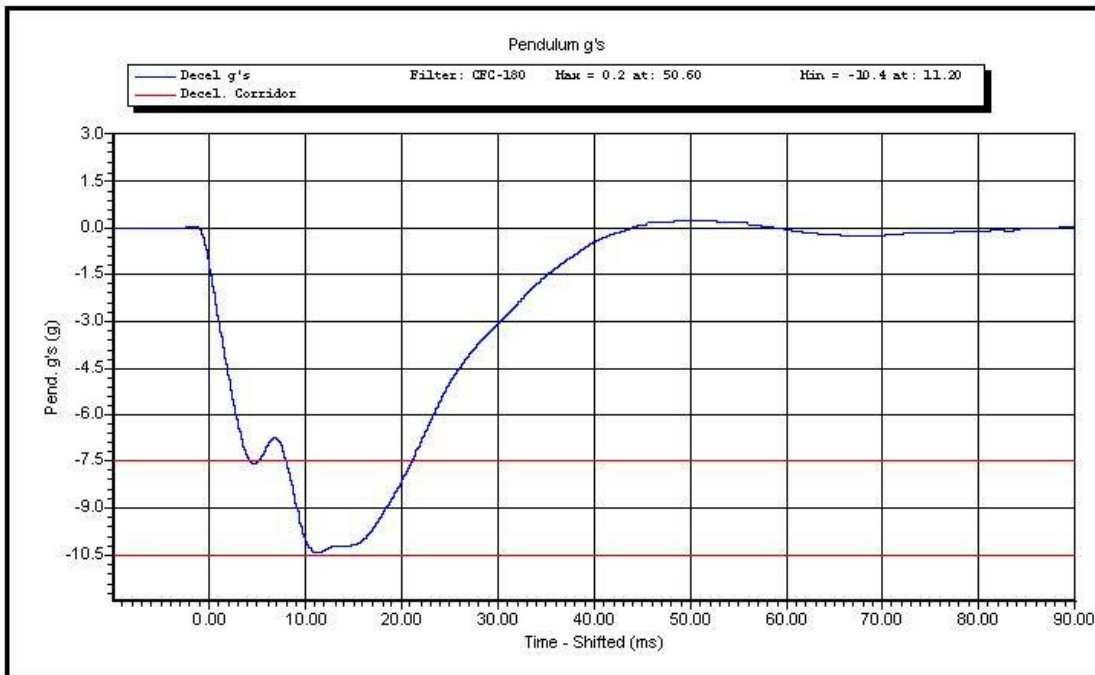


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Test Name:	<b>Shoulder Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>5:13:37 PM</b>



Test ID:

Test Time: **5:13:37 PM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:24:58 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07203</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.3</b> deg C P
Humidity	10.0 -- 70.0	<b>26.0</b> %RH P
Velocity	3.90 -- 4.10	<b>3.96</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.50</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **11:24:58 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:24:58 AM**

Test Date: **12/14/2011**

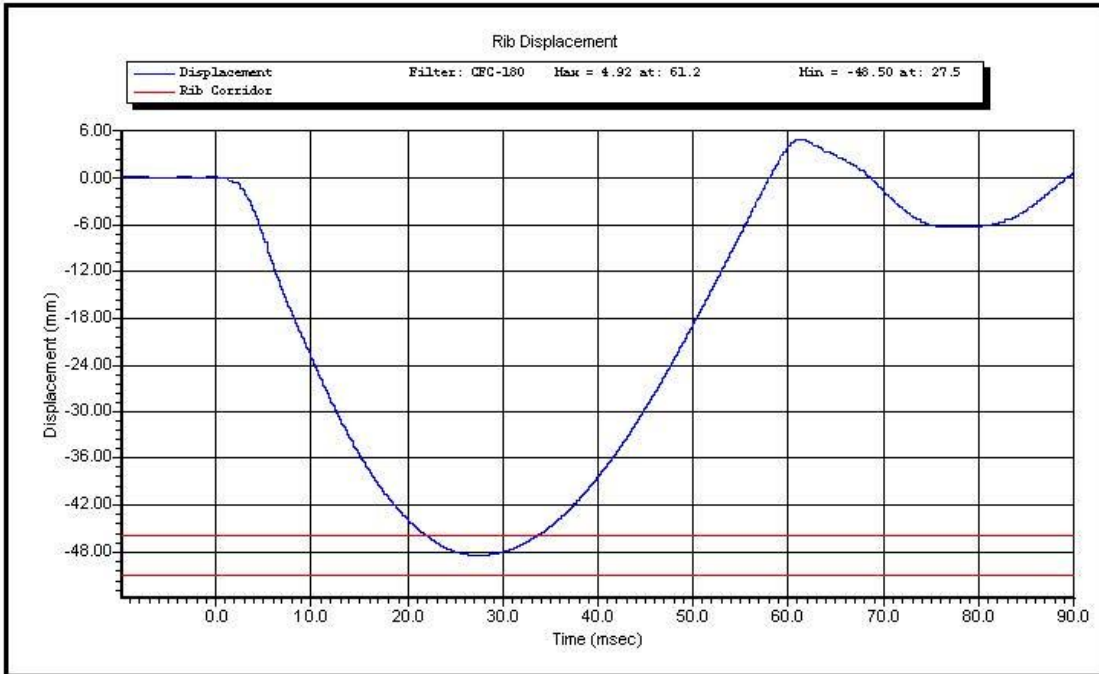


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:24:58 AM</b>



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

Test Time: **11:24:58 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:34:19 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07203</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>26.0</b> %RH P
Velocity	2.90 -- 3.10	<b>2.94</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-37.56</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Travale**    

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

Test Time: **11:34:19 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:34:19 AM**

Test Date: **12/14/2011**

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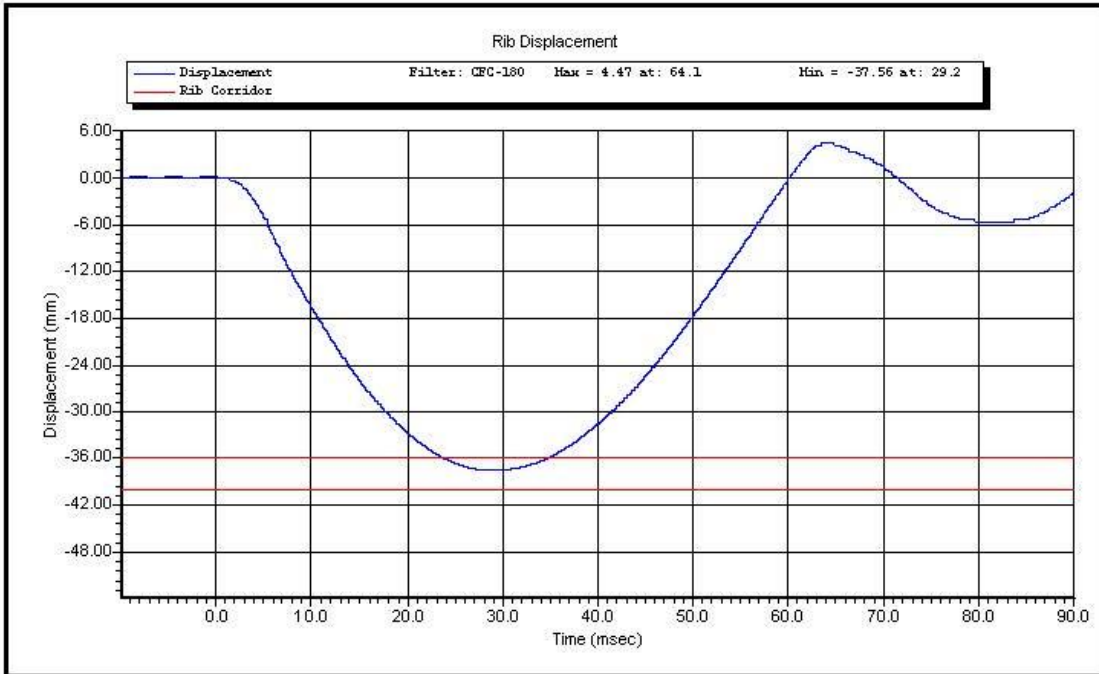


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Upper 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:34:19 AM</b>



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

Test Time: **11:34:19 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle Rib 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:40:42 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07205</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>26.0</b> %RH P
Velocity	3.90 -- 4.10	<b>3.95</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.09</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **11:40:42 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:40:42 AM**

Test Date: **12/14/2011**

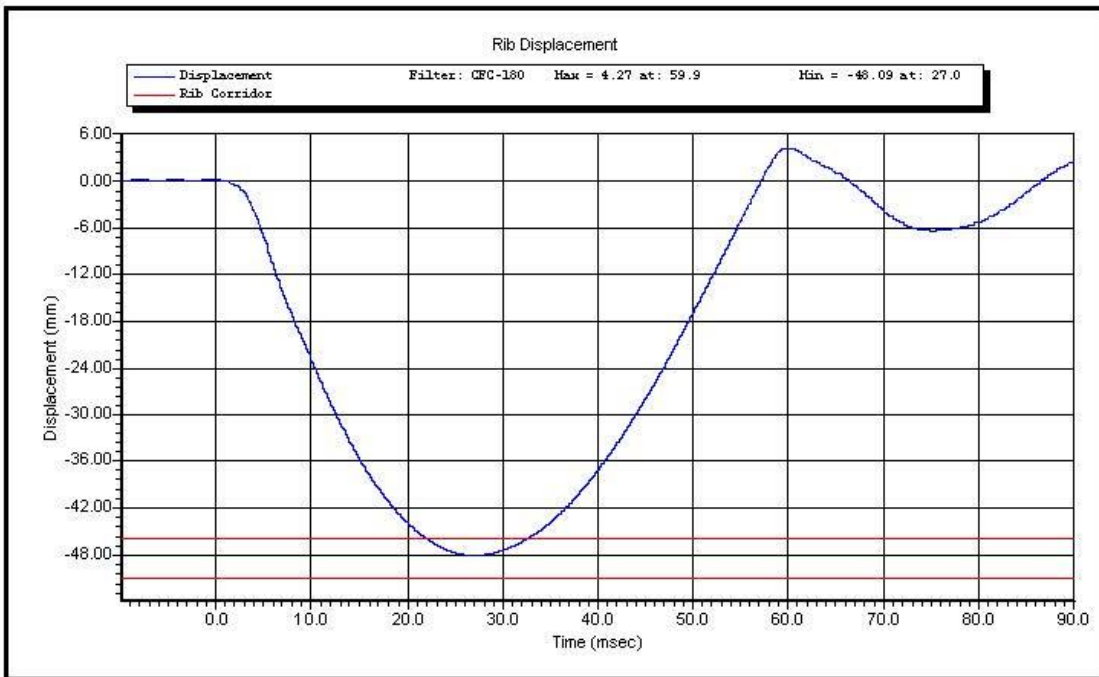


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle Rib 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:40:42 AM</b>



Test ID: **Middle Rib 4 m/s** Test Time: **11:40:42 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle Rib 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:46:29 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07205</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>26.0</b> %RH P
Velocity	2.90 -- 3.10	<b>2.98</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-37.76</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **11:46:29 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:46:29 AM**

Test Date: **12/14/2011**

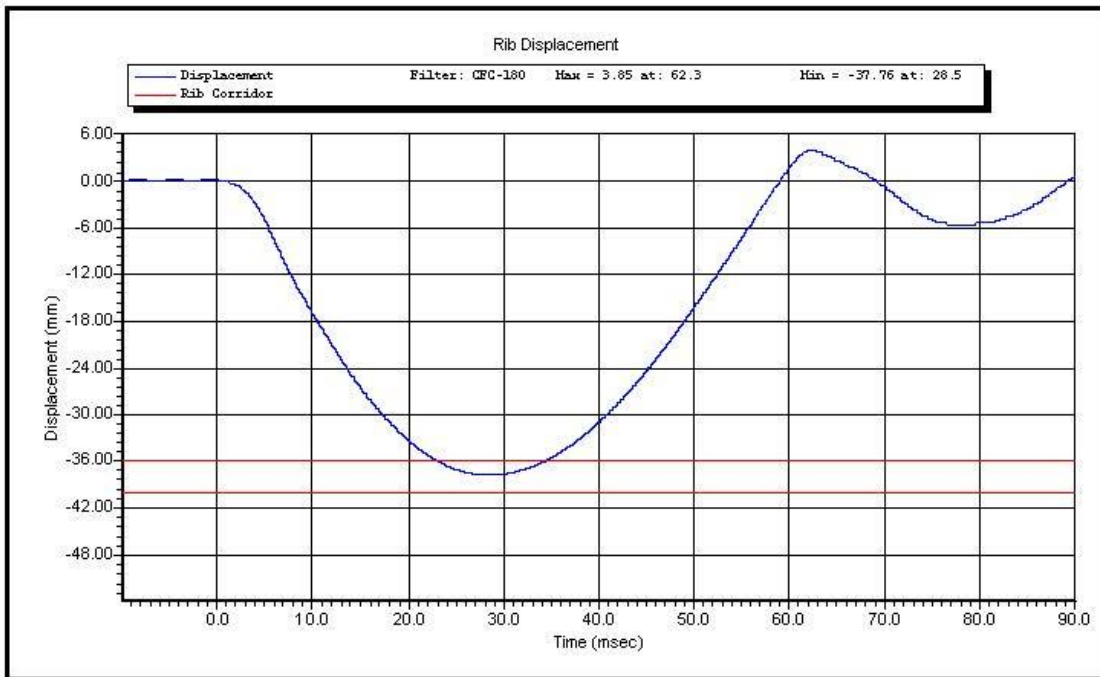


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Middle Rib 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:46:29 AM</b>



Test ID: **Middle Rib 3 m/s** Test Time: **11:46:29 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:52:40 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>25.9</b> %RH P
Velocity	3.90 -- 4.10	<b>3.96</b> m/s P
Rib Displacement	-51.00 -- -46.00	<b>-48.79</b> mm P
Drop Height	807.0 -- 823.0	<b>815.0</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **11:52:40 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:52:40 AM**

Test Date: **12/14/2011**

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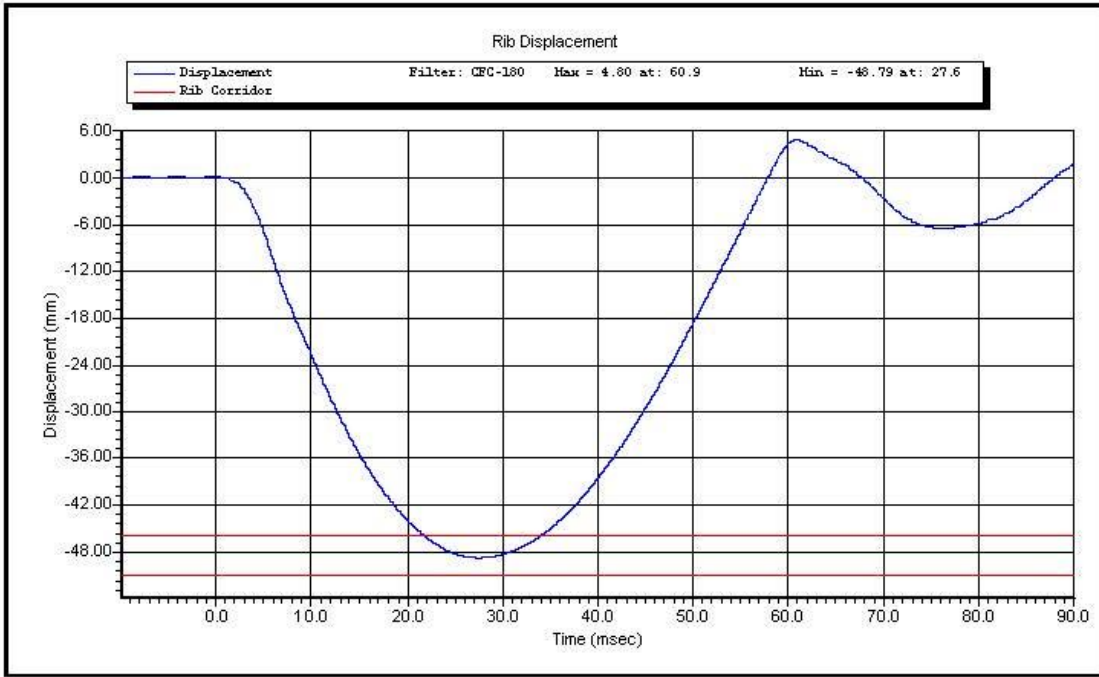


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>4.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 4 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:52:40 AM</b>



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

Test Time: **11:52:40 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:57:52 AM</b>

Component Part Number	Component Serial Number
<b>455-3100</b>	<b>07209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.4</b> deg C P
Humidity	10.0 -- 70.0	<b>25.9</b> %RH P
Velocity	2.90 -- 3.10	<b>2.91</b> m/s P
Rib Displacement	-40.00 -- -36.00	<b>-37.99</b> mm P
Drop Height	454 -- 464	<b>459</b> mm P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

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

Test Time: **11:57:52 AM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

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

Test Time: **11:57:52 AM**

Test Date: **12/14/2011**

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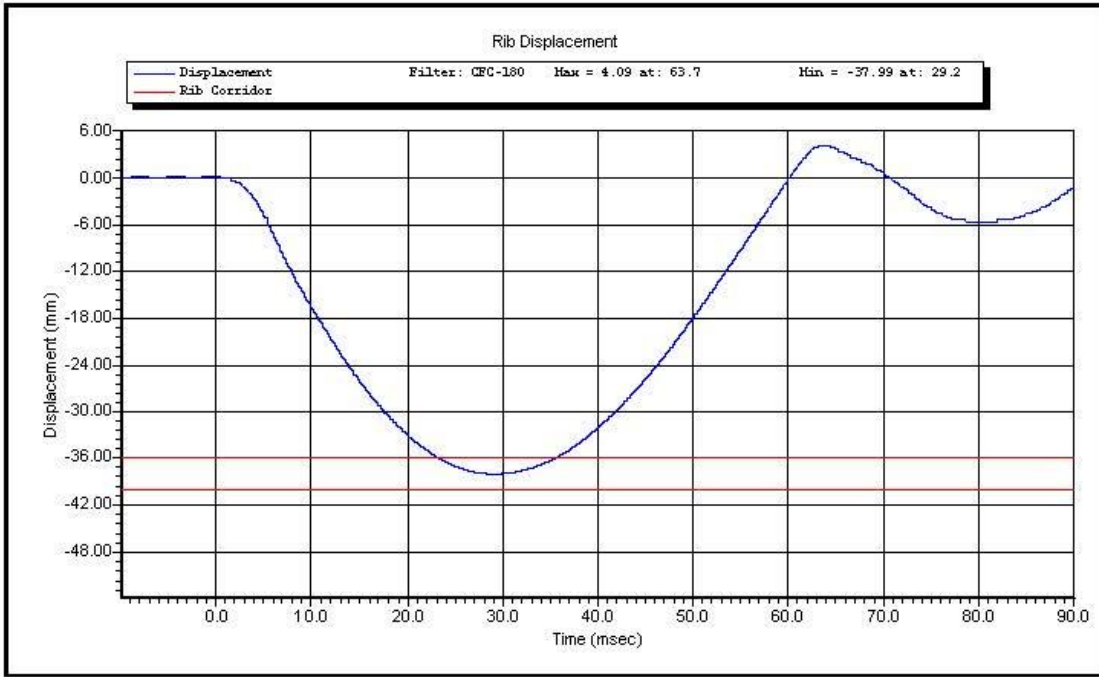


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Test Name:	<b>Full Rib Module Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:	<b>3.0 Meters/Second</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:	<b>Lower 3 m/s</b>	Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>11:57:52 AM</b>



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

Test Time: **11:57:52 AM**

Test Date: **12/14/2011**

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#### VERIFICATION REPORT

Test Name:	<b>Thorax Impact</b>	Revision:	<b>8/15/2008</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:28:06 PM</b>

Component Part Number	Component Serial Number
<b>Upper Rib - 175-4002</b>	<b>7203</b>
<b>Middle Rib - 175-4002</b>	<b>7205</b>
<b>Lower Rib - 175-4002</b>	<b>7209</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.2</b> deg C P
Humidity	10.0 -- 70.0	<b>29.0</b> %RH P
Velocity	5.40 -- 5.60	<b>5.49</b> m/s P
Upper Rib Displacement	34.0 -- 41.0	<b>38.0</b> mm P
Middle Rib Displacement	37.0 -- 45.0	<b>41.7</b> mm P
Lower Rib Displacement	37.0 -- 44.0	<b>40.9</b> mm P
Impactor Force	5100 -- 6200	<b>5631</b> N P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **4:28:06 PM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P66927	12/10/2011
Honeywell	MLT 38000	DS-183	8/31/2011
Honeywell	MLT 38000	DS-184	8/31/2011
Honeywell	MLT 38000	DS-182	8/31/2011

Test ID:

Test Time: **4:28:06 PM**

Test Date: **12/14/2011**

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2 of 2

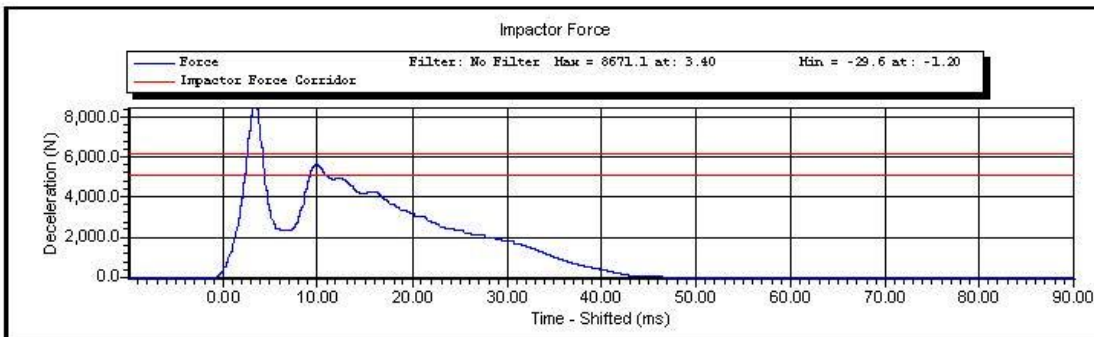
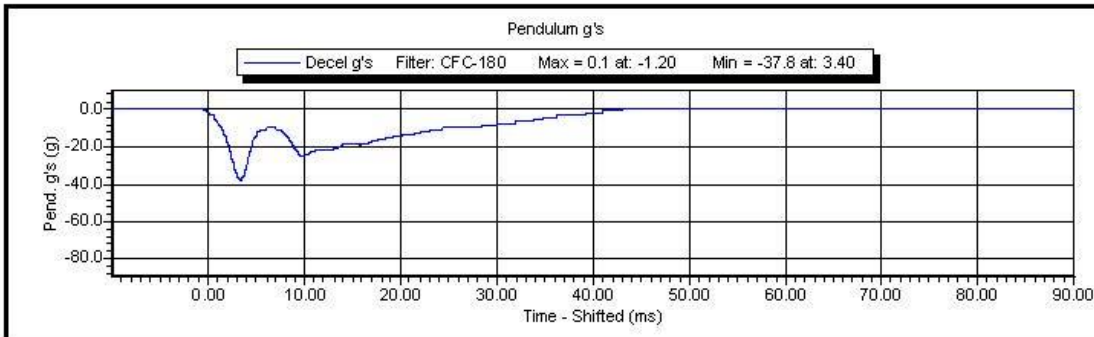


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Test Name:	<b>Thorax Impact</b>	Revision:	<b>8/15/2008</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:28:06 PM</b>



Test ID:

Test Time: **4:28:06 PM**

Test Date: **12/14/2011**

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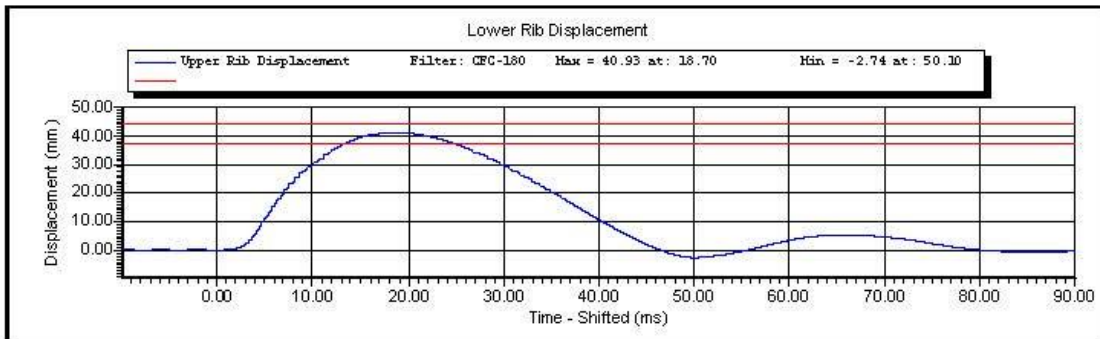
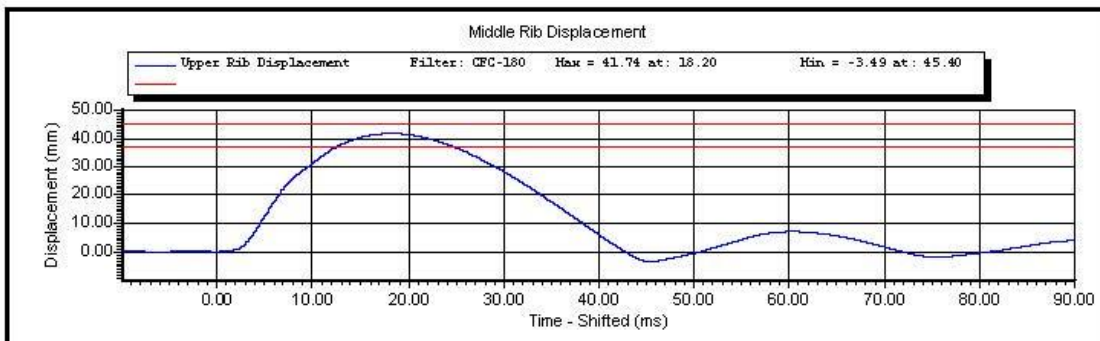
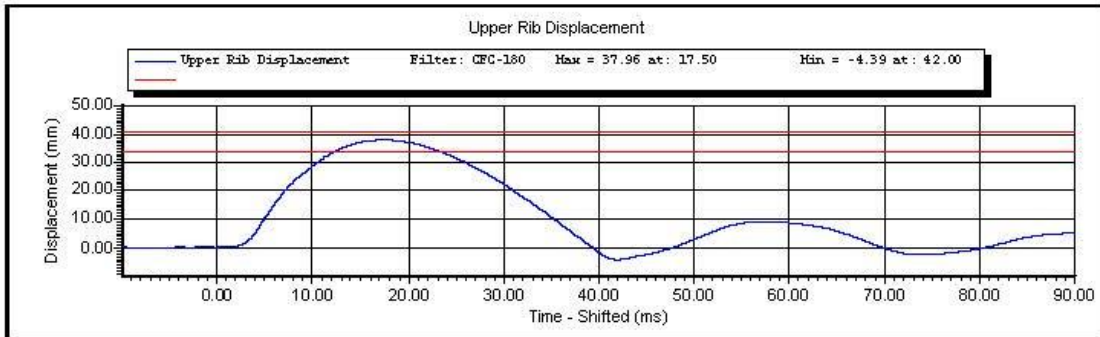
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Test ID:

Test Time: 4:28:06 PM

Test Date: 12/14/2011

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#### VERIFICATION REPORT

Test Name:	<b>Abdominal Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>3</b>	Test Time:	<b>6:54:34 PM</b>

Component Part Number	Component Serial Number
<b>455-4001</b>	<b>0791</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>32</b> %RH P
Velocity	3.90 -- 4.10	<b>4.09</b> m/s P
Peak Abdominal Force	-2.70 -- -2.20	<b>-2.55</b> kN P
Time At Peak Abdominal Force	10.0 -- 12.3	<b>10.2</b> ms P
Maximum Pendulum Force	-4.80 -- -4.00	<b>-4.63</b> kN P
Time at Peak Pendulum Force	10.6 -- 13.0	<b>10.7</b> ms P

All test parameters are within specifications

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

Test ID:

Test Time: **6:54:34 PM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Denton	2631	LC-1512	3/25/2011
Denton	2631	LC-1526	3/25/2011
Denton	2631	LC-1516	3/25/2011

Test ID:

Test Time: 6:54:34 PM

Test Date: 12/14/2011

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2 of 2

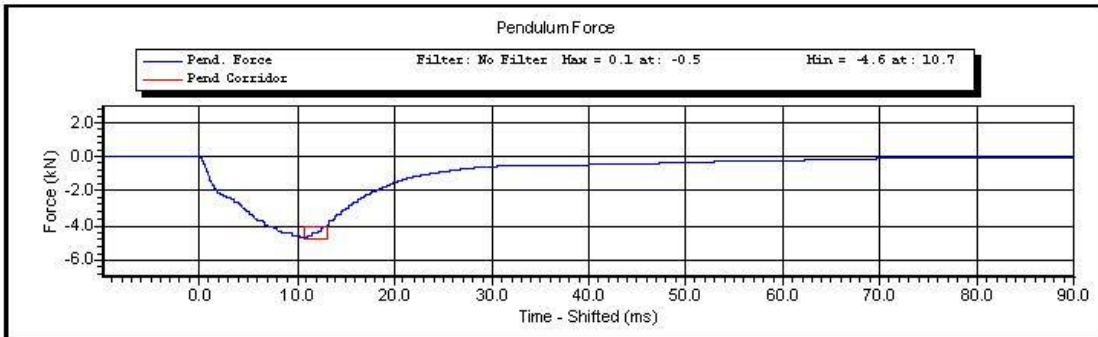
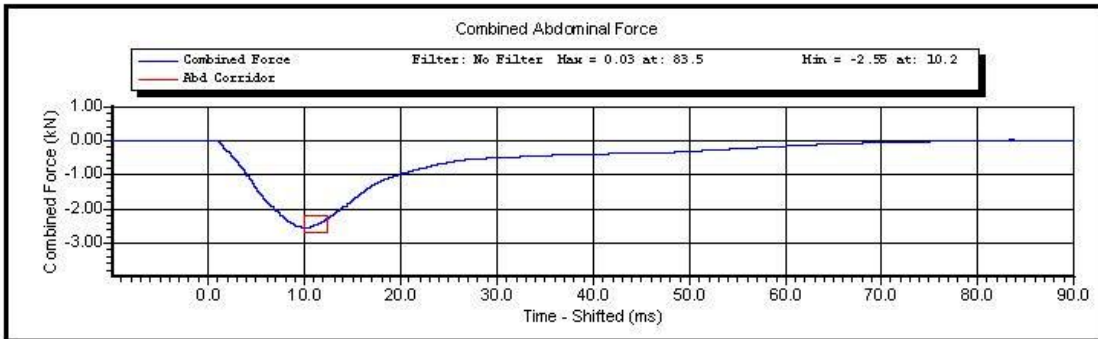


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Test Name:	<b>Abdominal Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>3</b>	Test Time:	<b>6:54:34 PM</b>



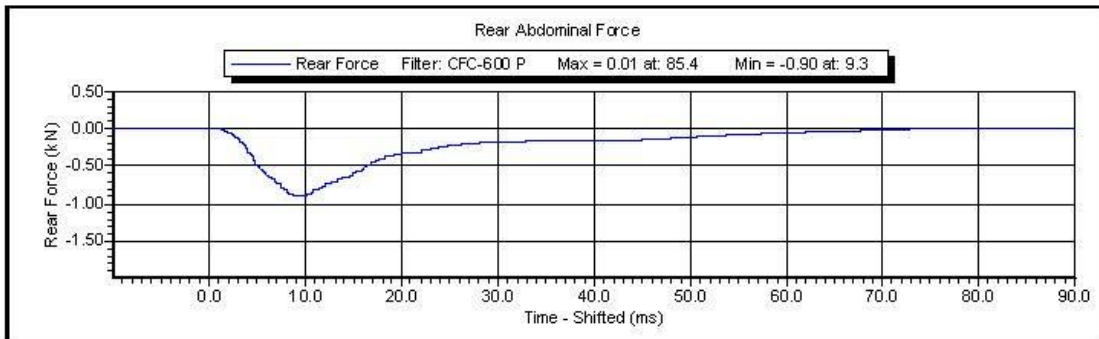
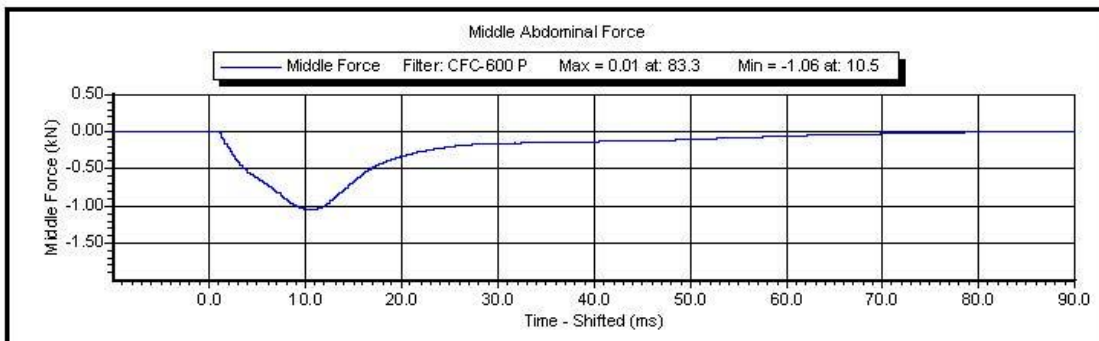
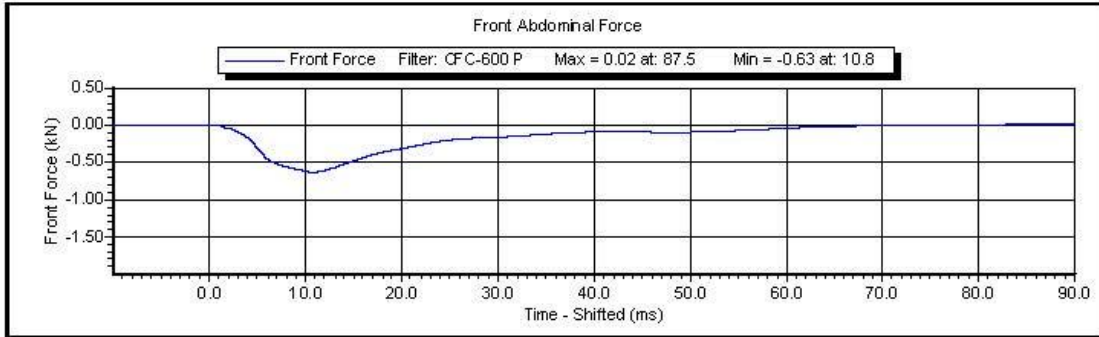
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Test Time: **6:54:34 PM**

Test Date: **12/14/2011**

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1 of 2



Test ID:

Test Time: 6:54:34 PM

Test Date: 12/14/2011

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**VERIFICATION REPORT**

Test Name:	<b>Lumbar Spine</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>12:06:59 PM</b>

Component Part Number	Component Serial Number
<b>175-5501</b>	<b>15050329A</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.5</b> deg C P
Humidity	10 -- 70	<b>49</b> %RH P
Velocity	5.95 -- 6.15	<b>6.15</b> m/s P
Maximum Headform Flexion Angle	45.0 -- 55.0	<b>45.2</b> degrees P
Time at Maximum Headform Flexion Angle	39.0 -- 53.0	<b>44.2</b> ms P
Decay to Zero Degrees	37.0 -- 57.0	<b>40.5</b> ms P
Velocity Corridor	--	P

All test parameters are within specifications

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

Test ID:

Test Time: **12:06:59 PM**

Test Date: **12/15/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	7000428	094	4/25/2011
DentonATD	7000428	095	4/25/2011
DentonATD	7000428	093	4/25/2011

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Test Time: 12:06:59 PM

Test Date: 12/15/2011

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2 of 2

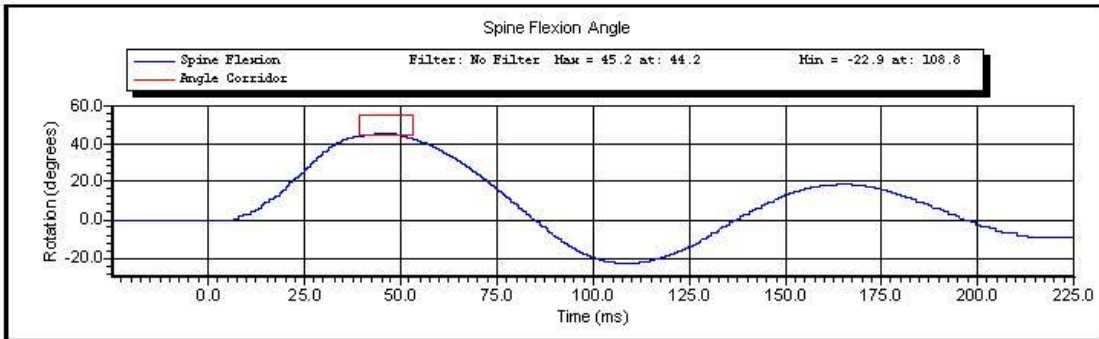
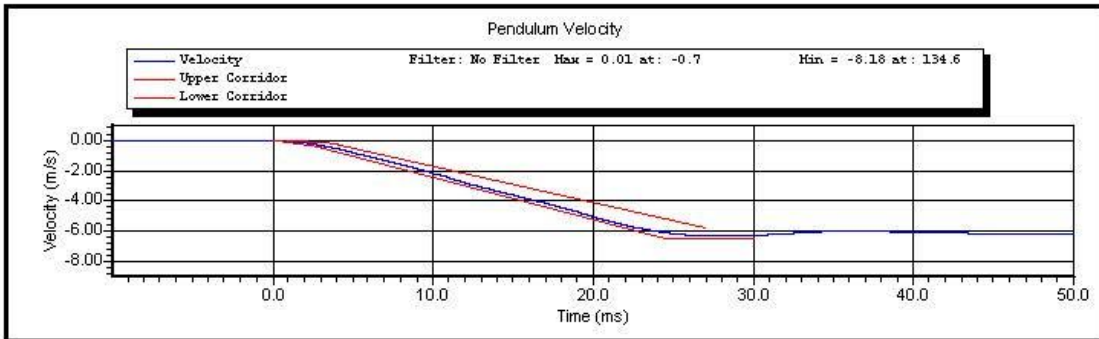


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Test Name:	<b>Lumbar Spine</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>12:06:59 PM</b>



Test ID:

Test Time: **12:06:59 PM**

Test Date: **12/15/2011**

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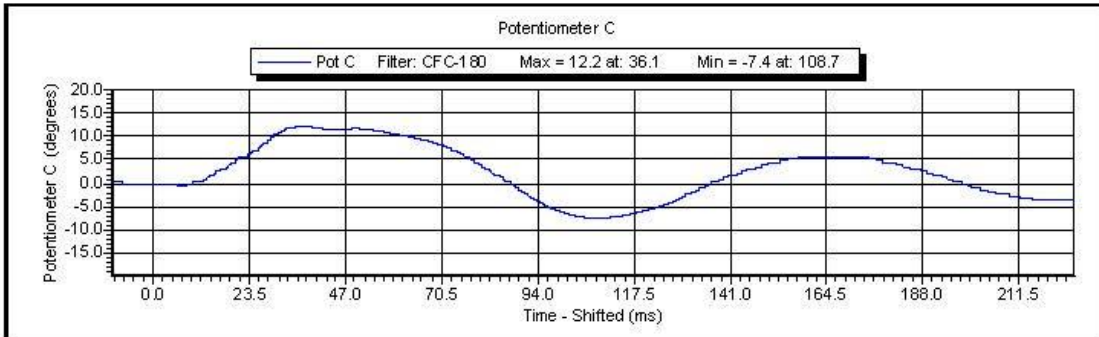
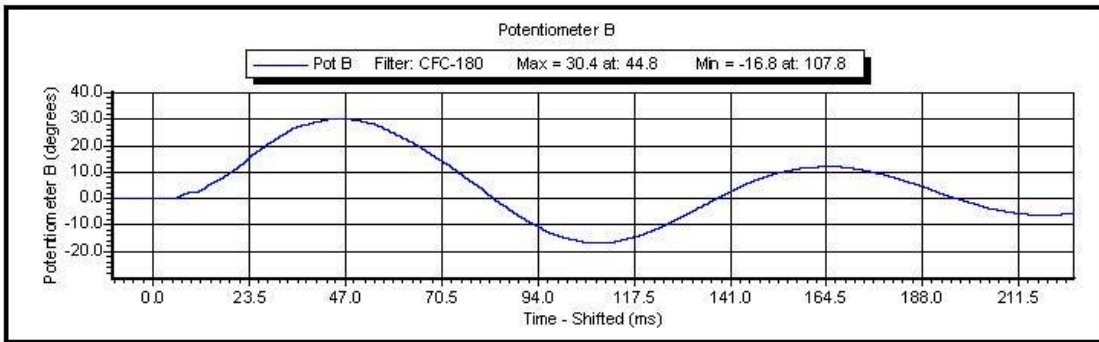
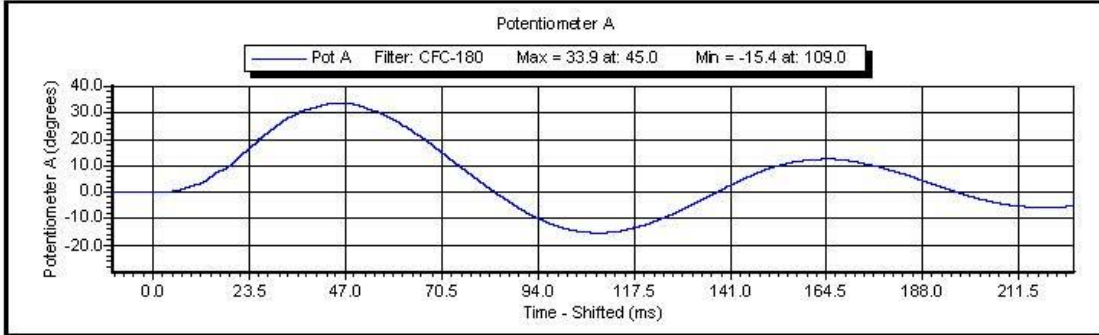
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Test Time: 12:06:59 PM

Test Date: 12/15/2011

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#### VERIFICATION REPORT

Test Name:	<b>Pelvis Impact</b>	Revision:	<b>12/4/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>3:46:09 PM</b>

Component Part Number	Component Serial Number
<b>455-4003</b>	

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.2</b> deg C P
Humidity	10 -- 70	<b>29</b> %RH P
Velocity	4.20 -- 4.40	<b>4.40</b> m/s P
Peak Pendulum Force	-5.40 -- -4.70	<b>-5.16</b> kN P
Time at Peak Pendulum Force	11.80 -- 16.10	<b>13.35</b> ms P
Peak Pubic Symphysis Force	-1.59 -- -1.23	<b>-1.41</b> kN P
Time at Peak Pubic Symphysis Force	12.20 -- 17.00	<b>13.85</b> ms P

All test parameters are within specifications

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

Test ID:

Test Time: **3:46:09 PM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P66927	12/10/2011
Denton	3096	LC-465Fy	8/31/2011

Test ID:

Test Time: **3:46:09 PM**

Test Date: **12/14/2011**

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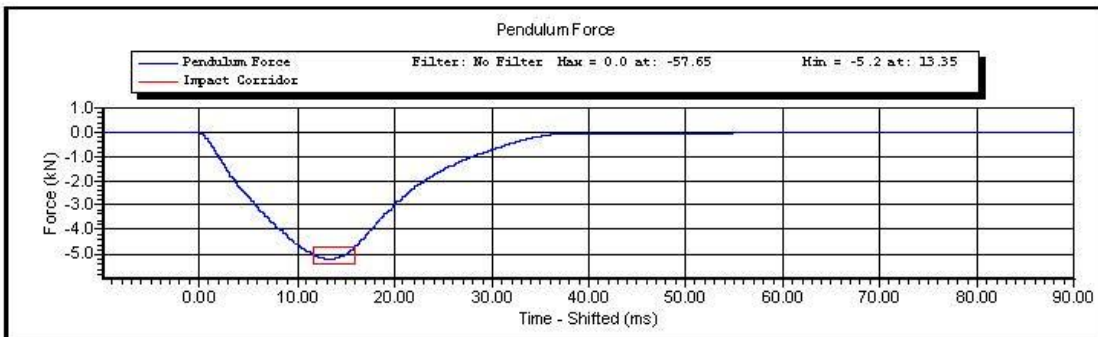
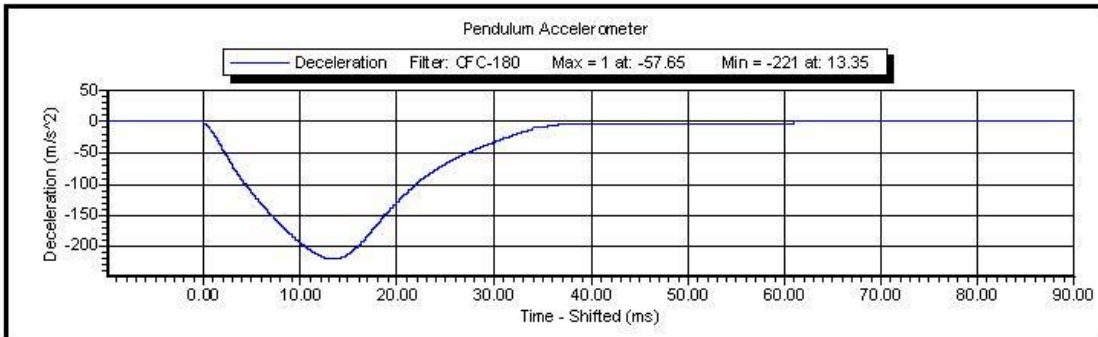


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Test Name:	<b>Pelvis Impact</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>ES-2re</b>		
ATD Serial Number:	<b>F034</b>		
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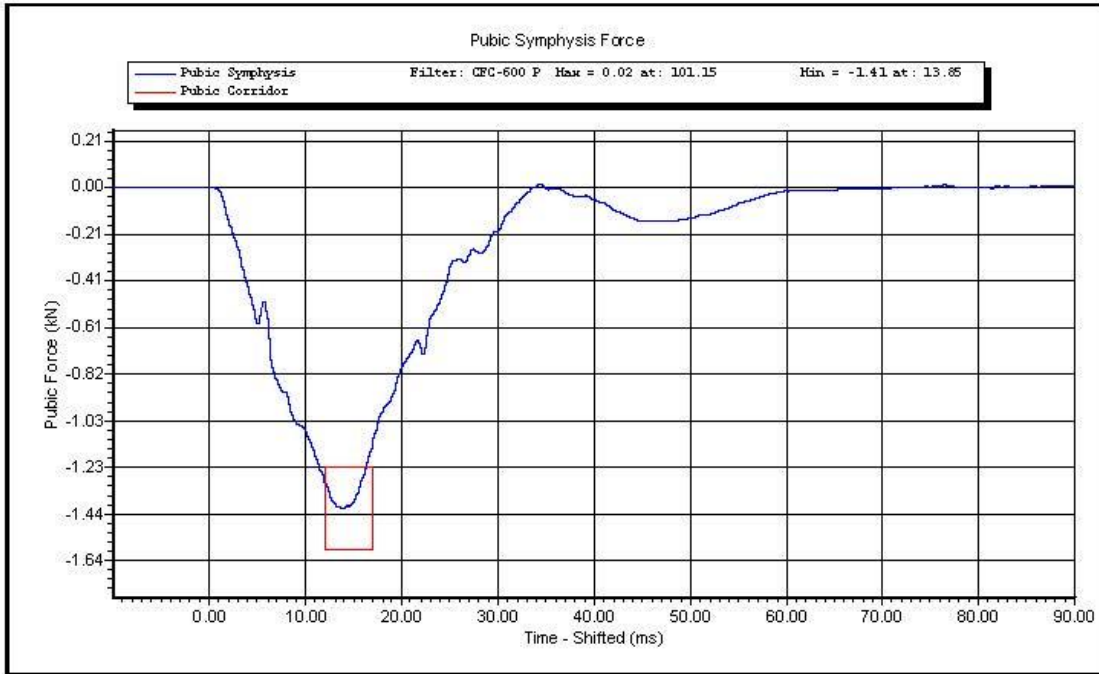
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1 of 2



Test ID:

Test Time: 3:46:09 PM

Test Date: 12/14/2011

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**CALIBRATION TEST RESULTS**

**POST-TEST**

**SID-IIs No: 300**

**CONFIGURED FOR LEFT SIDE IMPACT**



### SID-ItsD External Measurements

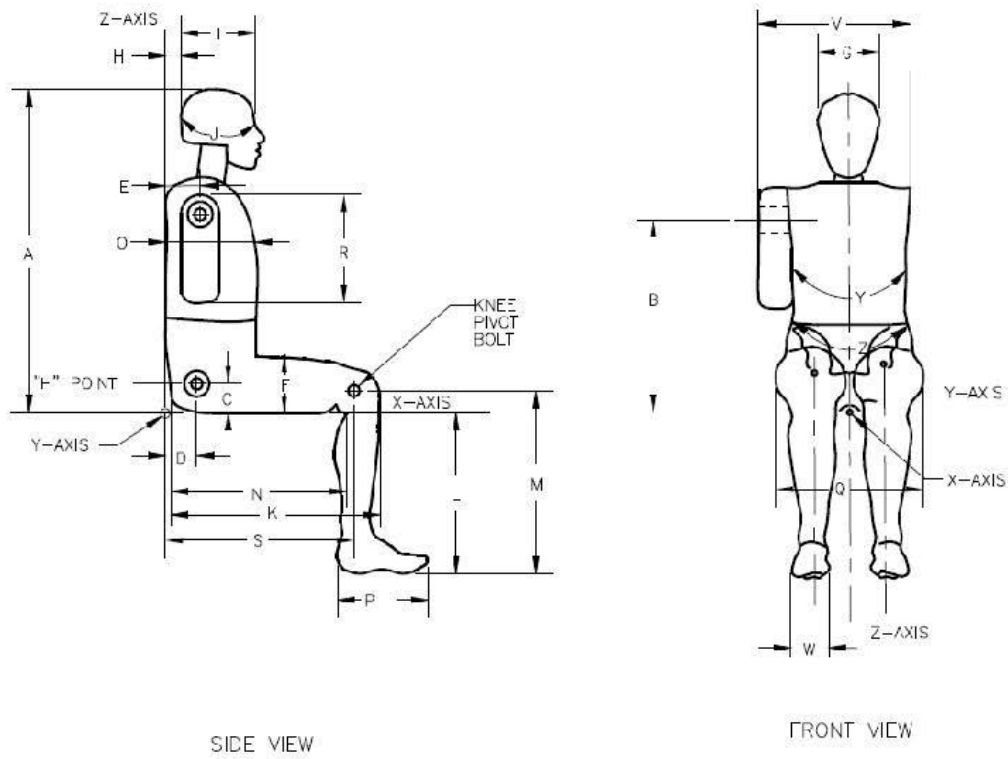
#### NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	782	Yes
B	Shoulder Pivot Height	437.0 - 453.0	440	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	143	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	122	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	181	Yes
J	Head Circumference	541.0 - 551.0	545	Yes
K	Buttock to Knee Length	514.0 - 540.0	525	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	433	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to Seat back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	346	Yes
W	Foot Width (right)	78.0 - 94.0	85	Yes
W	Foot Width (left)	78.0 - 94.0	85	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	866	Yes
Z	Waist Circumference	761.0 - 791.0	777	Yes

Technician: AR

Date: 12/16/2011

## SID-IIIsD External Dimension Reference Diagram





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#### VERIFICATION REPORT

Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>8:35:00 AM</b>

Component Part Number	Component Serial Number
<b>Head Skin - 180-1002</b>	<b>1355</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.8</b> deg C P
Humidity	10 -- 70	<b>45</b> %RH P
Resultant Acceleration	115.0 -- 137.0	<b>135.6</b> g P
Oscillation	0.0 -- 15.0	<b>8.0</b> % P
Fore-Aft Acceleration	-15.0 -- 15.0	<b>-3.9</b> g P

All test parameters are within specifications

Technician:     **S. Zito**    

Supervisor:     **D. Tavale**    

Test ID:

Test Time: **8:35:00 AM**

Test Date: **12/15/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

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

Test ID:

Test Time: **8:35:00 AM**

Test Date: **12/15/2011**

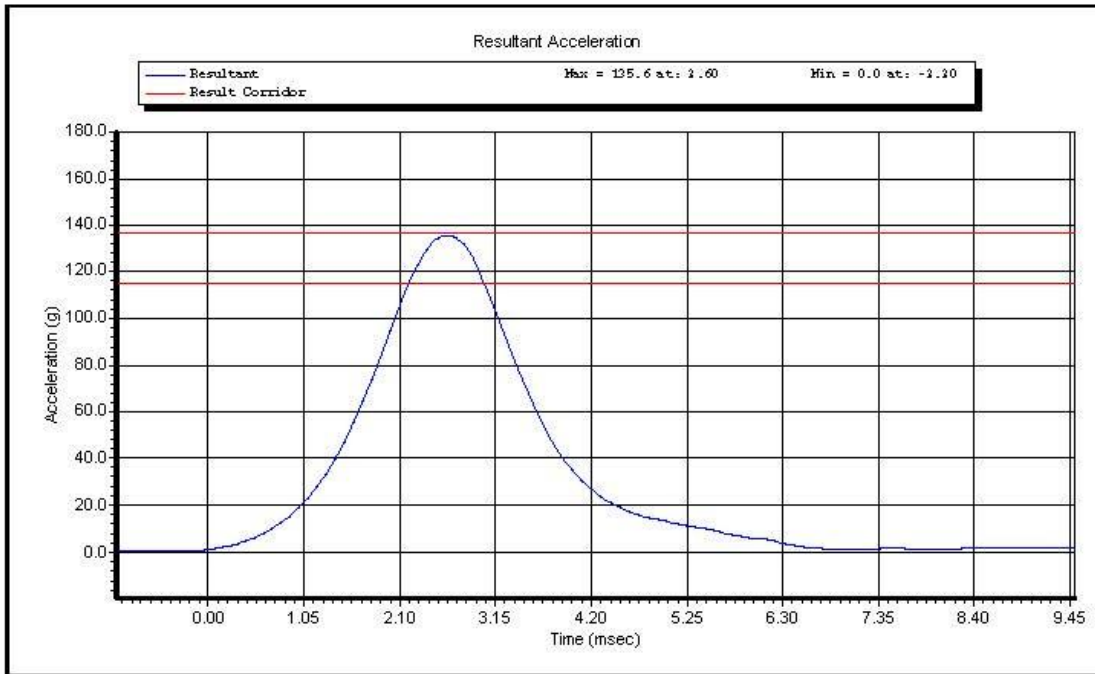


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Test Name:	<b>Head Drop</b>	Revision:	<b>12/14/2006</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>8:35:00 AM</b>



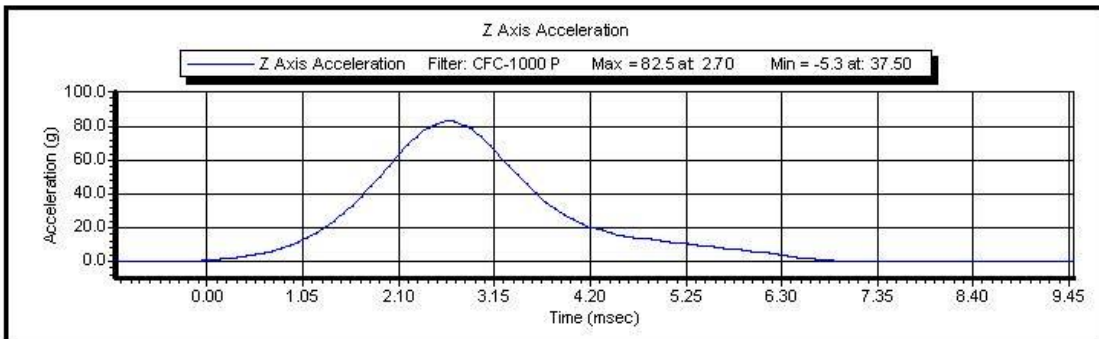
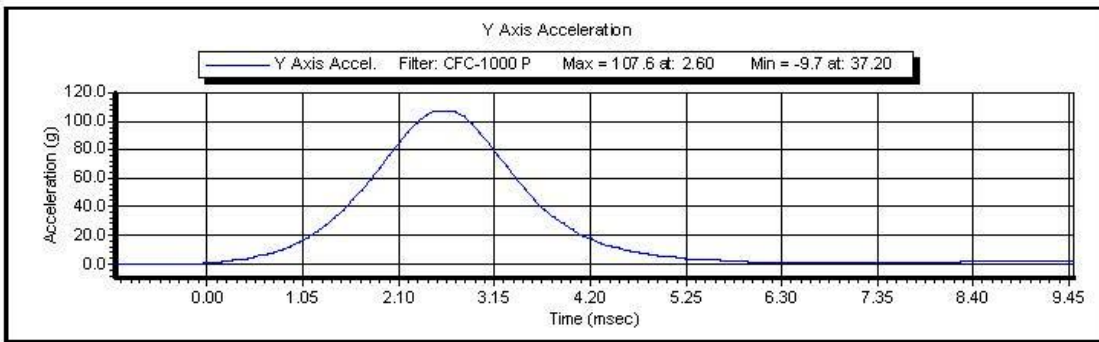
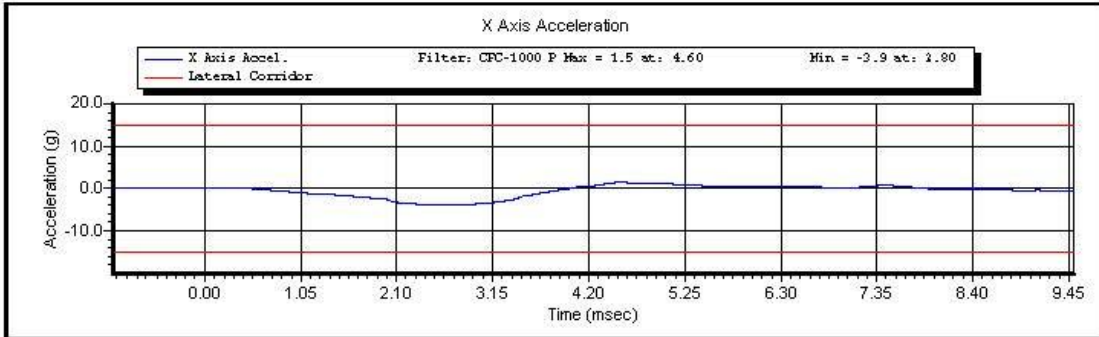
Test ID:

Test Time: **8:35:00 AM**

Test Date: **12/15/2011**

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Test ID:

Test Time: 8:35:00 AM

Test Date: 12/15/2011

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#### VERIFICATION REPORT

Test Name:	<b>Neck Pendulum</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Left Side</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:20:26 PM</b>

Component Part Number	Component Serial Number
<b>Neck - 180-2000</b>	<b>787</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.2</b> deg C P
Humidity	10 -- 70	<b>46</b> %RH P
Velocity	5.51 -- 5.63	<b>5.58</b> m/s P
Pendulum Impulse at 10 ms	2.20 -- 2.80	<b>2.40</b> m/s P
Pendulum Impulse at 15 ms	3.30 -- 4.10	<b>3.53</b> m/s P
Pendulum Impulse at 20 ms	4.40 -- 5.40	<b>4.74</b> m/s P
Pendulum Impulse at 25 ms	5.40 -- 6.10	<b>5.60</b> m/s P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	<b>5.80</b> m/s P
Max D Plane Rotation	71.0 -- 81.0	<b>73.6</b> degrees P
Time at Max Rotation	50.0 -- 70.0	<b>61.1</b> ms P
Moment about OC	-44.0 -- -36.0	<b>-41.7</b> Nm P
Moment Decay to Zero	102.0 -- 126.0	<b>113.6</b> ms P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **4:20:26 PM**

Test Date: **12/15/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
Denton	1716A	LC-1591 Fy	6/20/2011
Denton	1716A	LC-1591 Mx	6/20/2011
DentonATD	78051-342	184	5/8/2011
DentonATD	78051-342	174	5/8/2011
DentonATD	78051-342	185	5/8/2011

Test ID:

Test Time: **4:20:26 PM**

Test Date: **12/15/2011**

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2 of 2

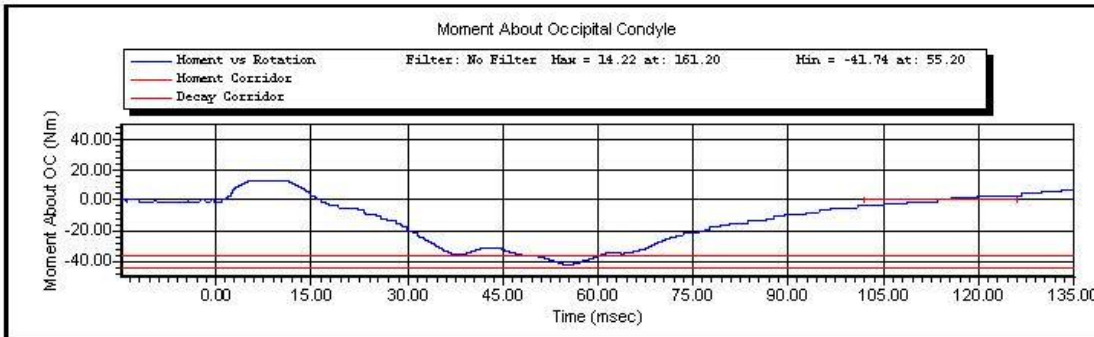
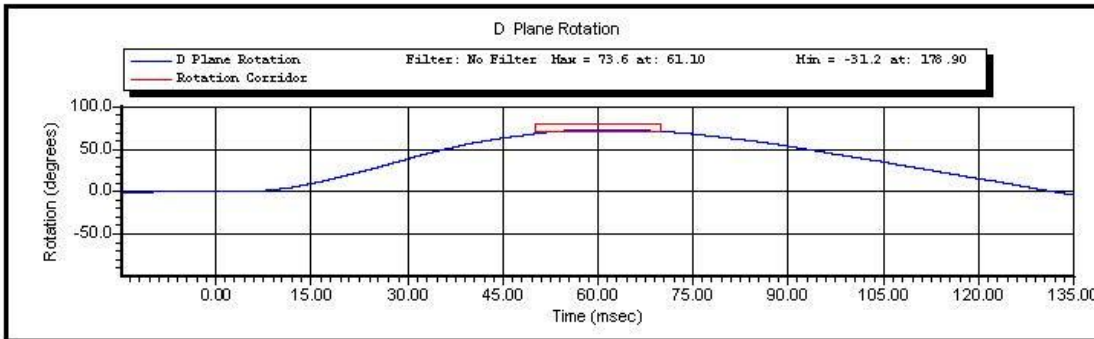


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Test Name:	<b>Neck Pendulum</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Left Side</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>4:20:26 PM</b>



Test ID:

Test Time: **4:20:26 PM**

Test Date: **12/15/2011**

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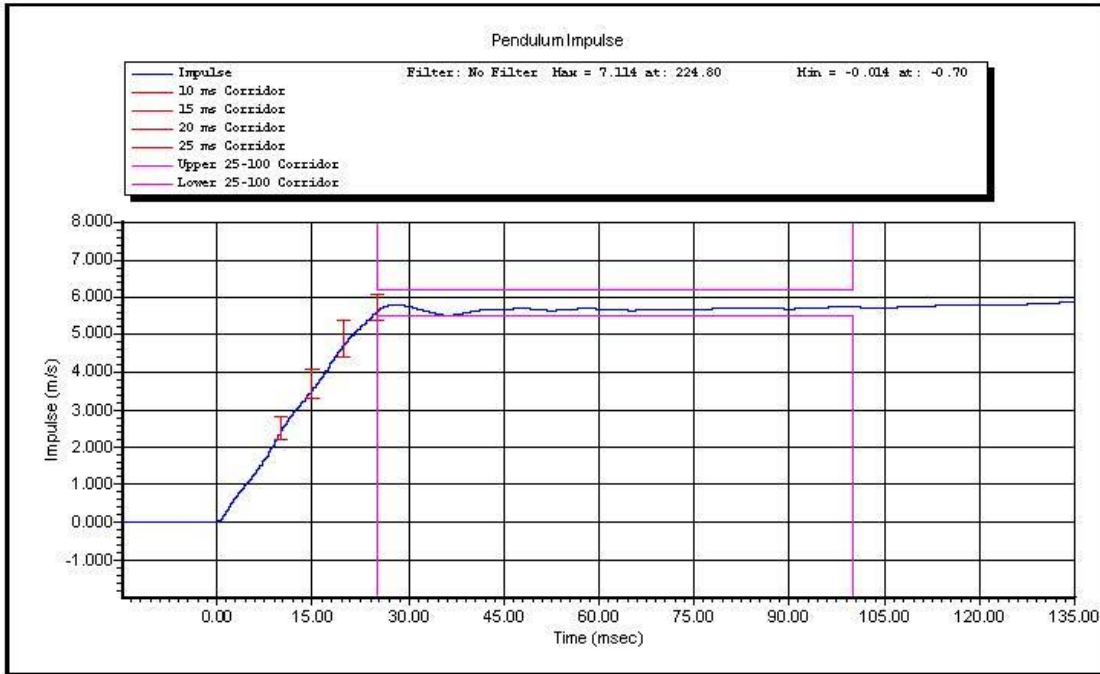
1 of 2



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Test ID:

Test Time: 4:20:26 PM

Test Date: 12/15/2011

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#### VERIFICATION REPORT

Test Name:	<b>Shoulder Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:41:02 PM</b>

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>21.20</b> deg C P
Humidity	10.0 -- 70.0	<b>27.0</b> %RH P
Velocity	4.20 -- 4.40	<b>4.27</b> m/s P
Probe Acceleration	13.0 -- 18.0	<b>17.1</b> g P
Shoulder Deflection	28.0 -- 37.0	<b>28.1</b> mm P
T1 Acceleration	17.0 -- 22.0	<b>21.3</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **2:41:02 PM**

Test Date: **12/14/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P66927	12/10/2011
Servo	180-3885	DS-1063	10/31/2011
Endevco	7264-2000	P58806	11/3/2011

Test ID:

Test Time: **2:41:02 PM**

Test Date: **12/14/2011**

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2 of 2

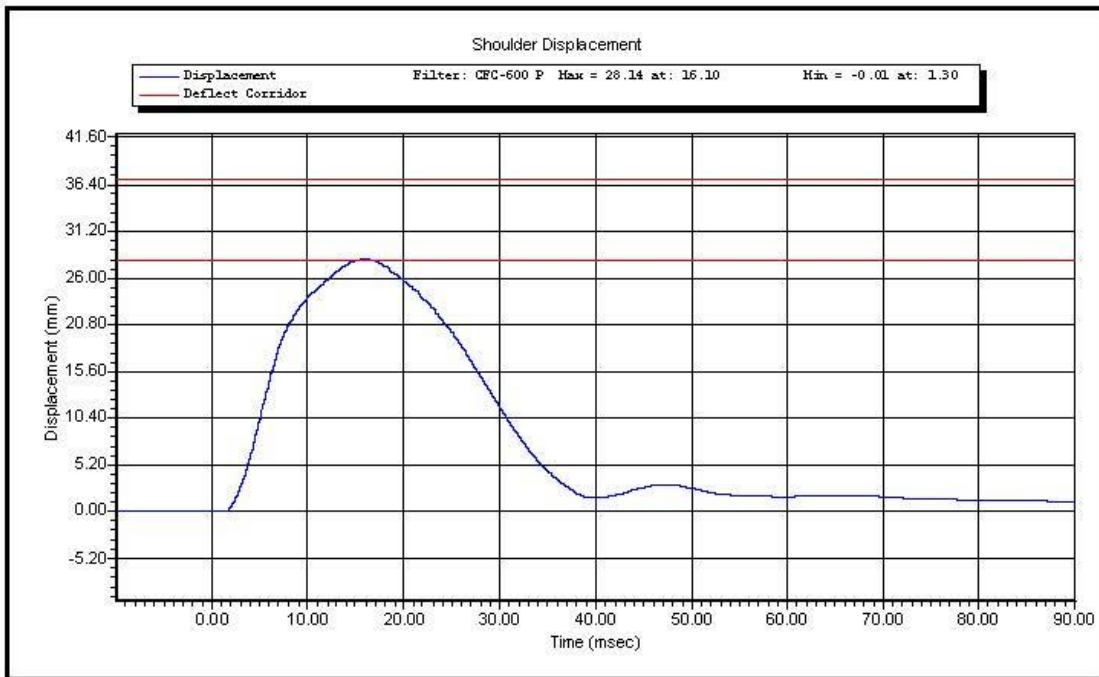


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Test Name:	<b>Shoulder Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/14/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:41:02 PM</b>



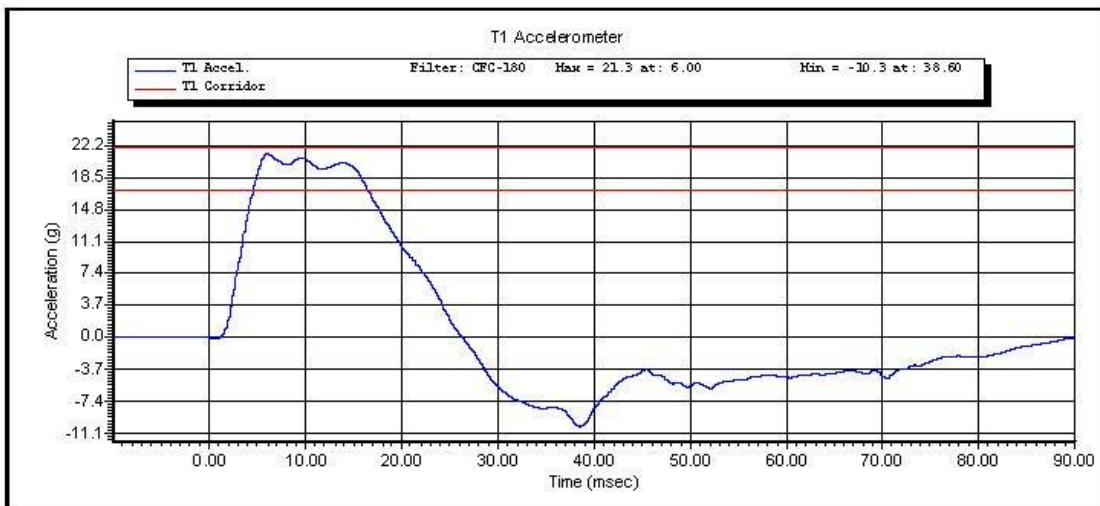
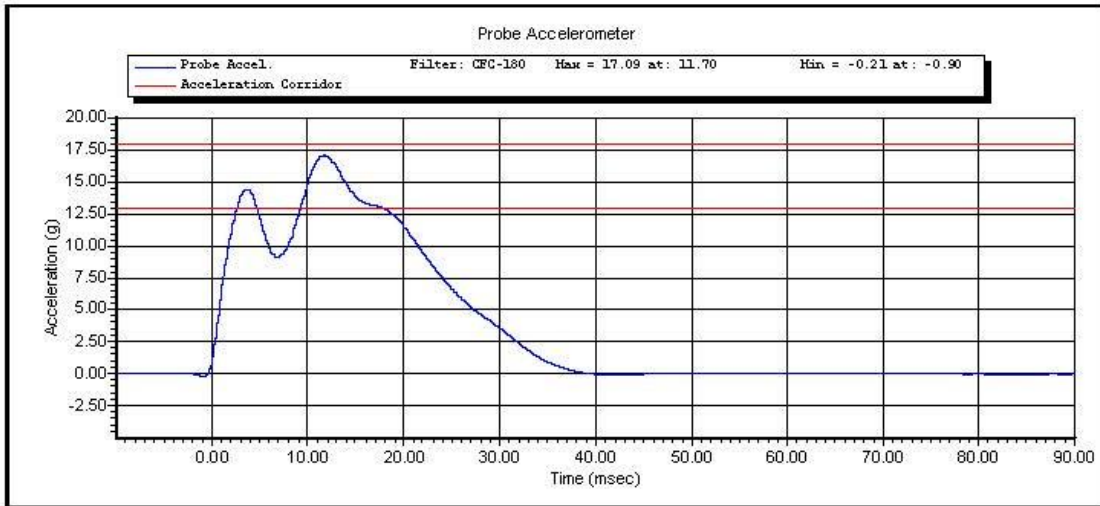
Test ID:

Test Time: **2:41:02 PM**

Test Date: **12/14/2011**

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1 of 2



Test ID:

Test Time: 2:41:02 PM

Test Date: 12/14/2011

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**VERIFICATION REPORT**

Test Name:	<b>Thorax Impact with Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:20:59 PM</b>

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	6.60 -- 6.80	<b>6.76</b> m/s P
Probe Acceleration after 5ms	30.0 -- 36.0	<b>35.2</b> g P
Upper Thorax Rib Deflection	25.0 -- 32.0	<b>27.3</b> mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	<b>32.9</b> mm P
Lower Thorax Rib Deflection	32.0 -- 38.0	<b>34.6</b> mm P
Upper Spine Acceleration ("y")	34.0 -- 43.0	<b>41.2</b> g P
Lower Spine Acceleration ("y")	29.0 -- 37.0	<b>34.7</b> g P
Shoulder Deflection	31.0 -- 40.0	<b>34.3</b> mm P

All test parameters are within specifications

Technician:           **A. Rudniski**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **2:20:59 PM**

Test Date: **12/16/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011
Servo	180-3885	DS-1063	10/31/2011

Test ID:

Test Time: 2:20:59 PM

Test Date: 12/16/2011

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2 of 2

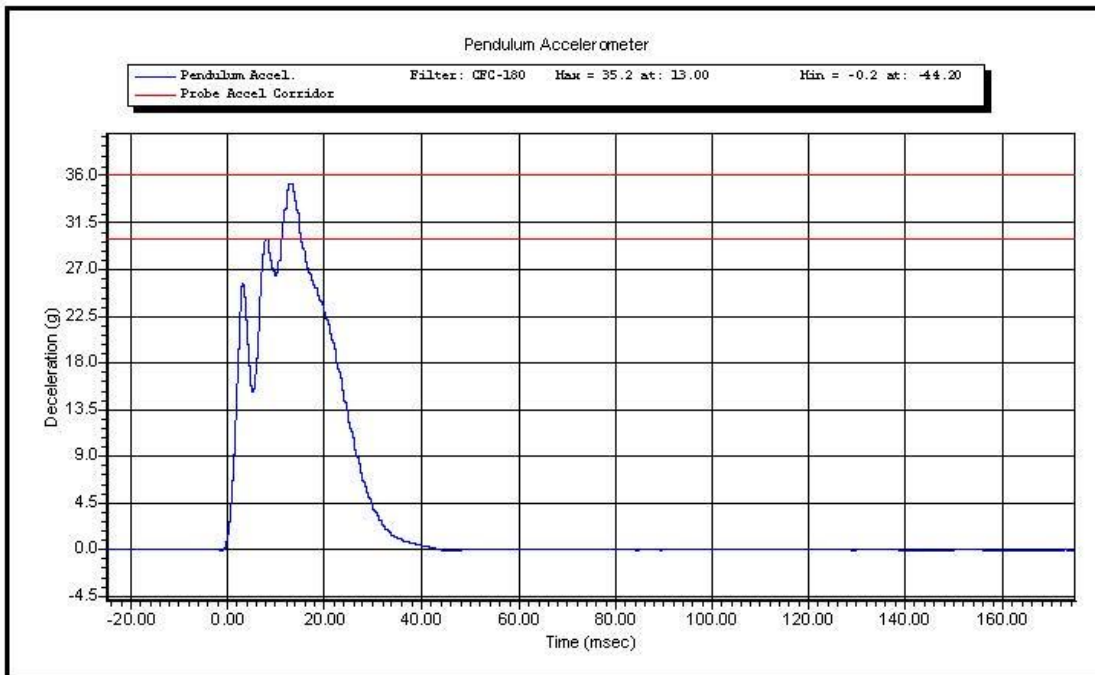


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Test Name:	<b>Thorax Impact with Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:20:59 PM</b>



Test ID:

Test Time: **2:20:59 PM**

Test Date: **12/16/2011**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

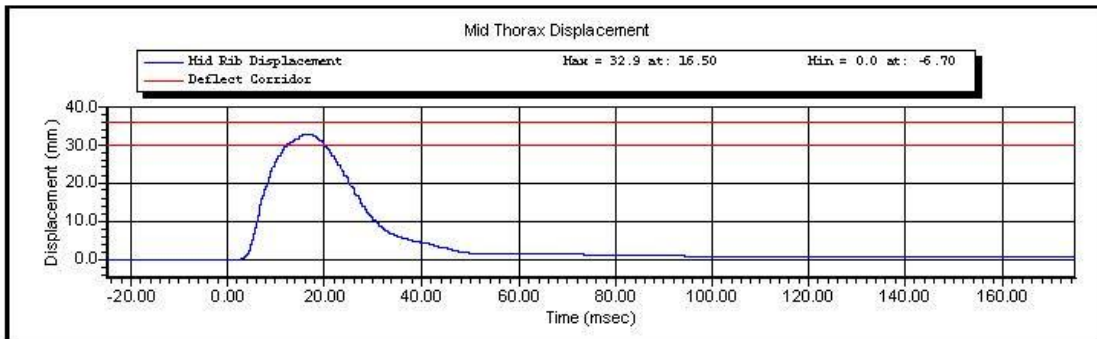
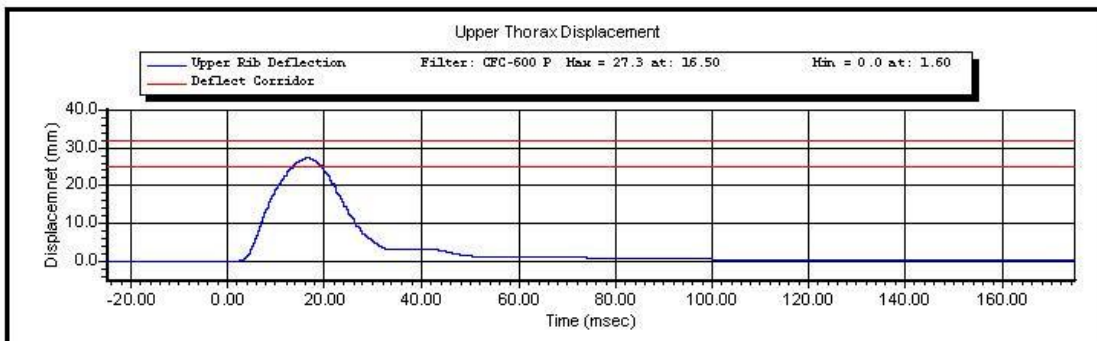
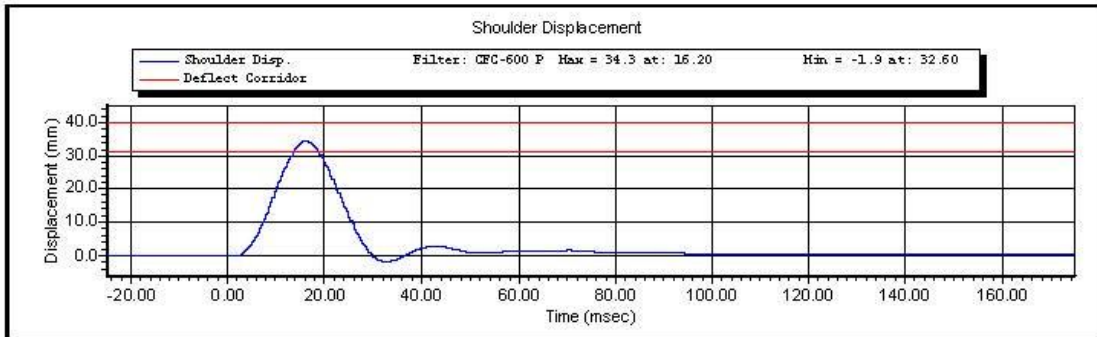
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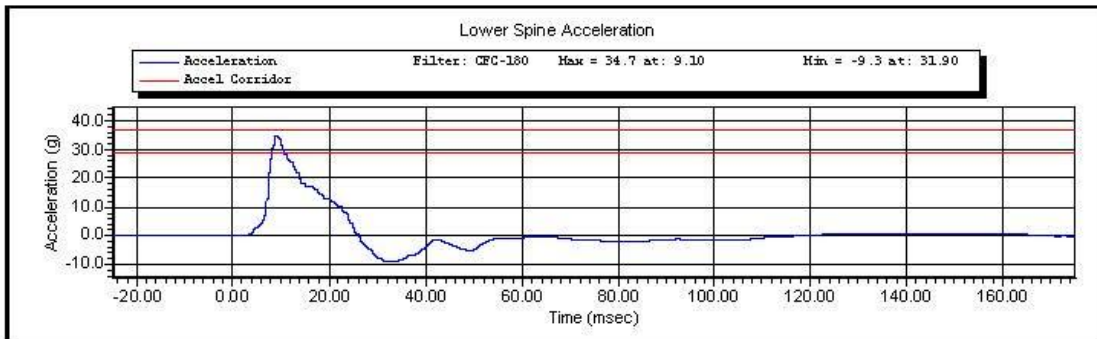
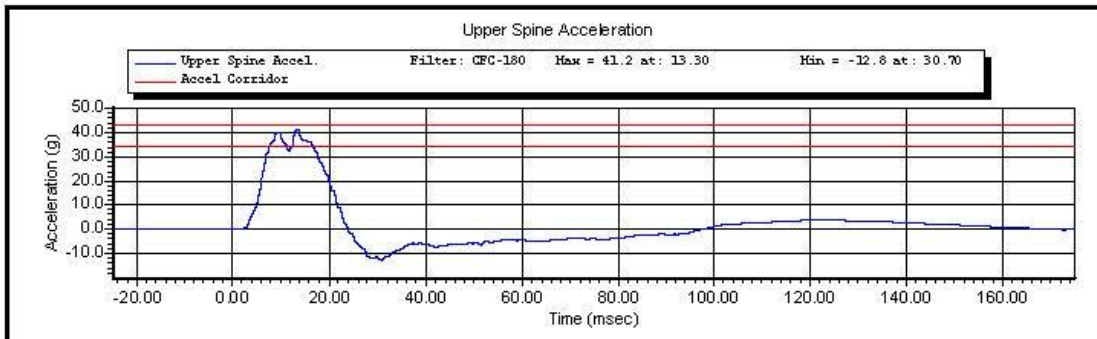
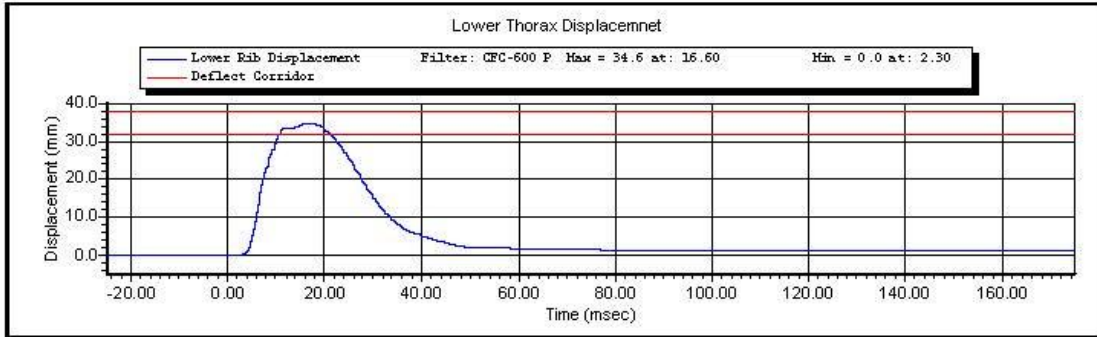
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Test Date: 12/16/2011

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2 of 3



Test ID:

Test Time: 2:20:59 PM

Test Date: 12/16/2011

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#### VERIFICATION REPORT

Test Name:	<b>Thorax Impact without Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>11:23:36 AM</b>

Component Part Number	Component Serial Number
<b>Thorax Ribs 1, 2, 3</b>	<b>2024, 2061, 2062</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.0</b> deg C P
Humidity	10 -- 70	<b>46</b> %RH P
Velocity	4.20 -- 4.40	<b>4.36</b> m/s P
Probe Acceleration	14.0 -- 18.0	<b>16.6</b> g P
Upper Thorax Rib Deflection	32.0 -- 40.0	<b>33.8</b> mm P
Mid Thorax Rib Deflection	39.0 -- 45.0	<b>41.9</b> mm P
Lower Thorax Rib Deflection	35.0 -- 43.0	<b>40.2</b> mm P
Upper Spine Acceleration T1	13.0 -- 17.0	<b>15.8</b> g P
Lower Spine Acceleration T12	7.0 -- 11.0	<b>10.3</b> g P

All test parameters are within specifications

Technician:           **S. Zito**          

Supervisor:           **D. Travale**          

Test ID:

Test Time: **11:23:36 AM**

Test Date: **12/15/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Servo	180-3885	DS-1121	10/29/2011
Servo	180-3885	DS-1151	10/31/2011
Servo	180-3885	DS-1156	10/31/2011
Endevco	7264-2000	P58806	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: 11:23:36 AM

Test Date: 12/15/2011

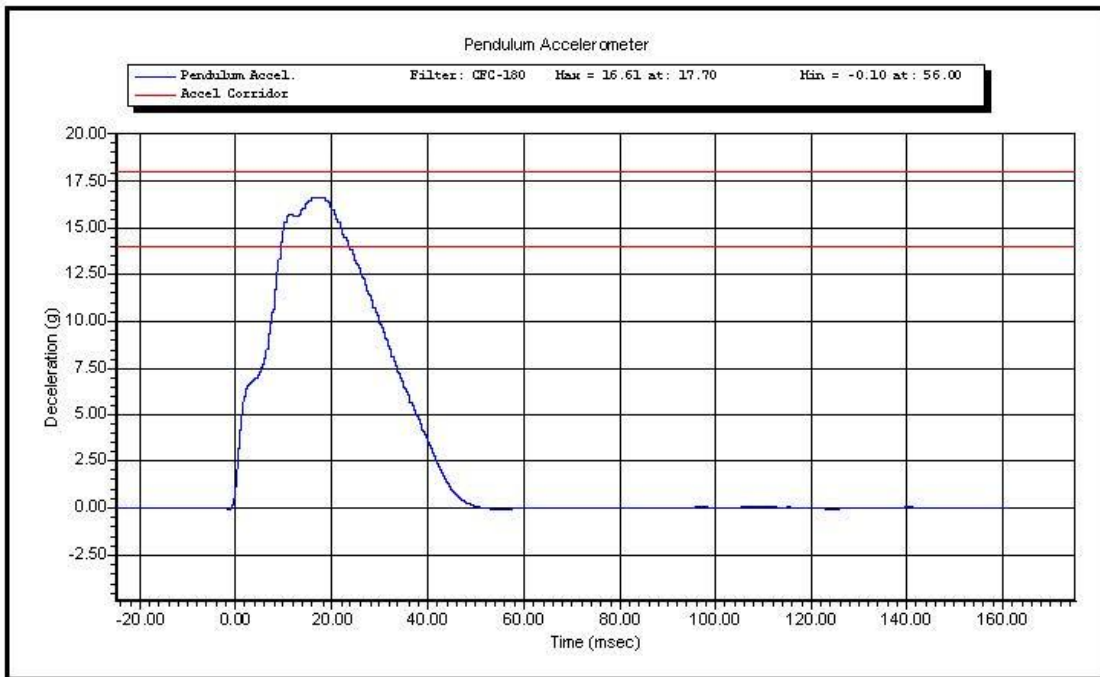


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Test Name:	<b>Thorax Impact without Arm</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>11:23:36 AM</b>



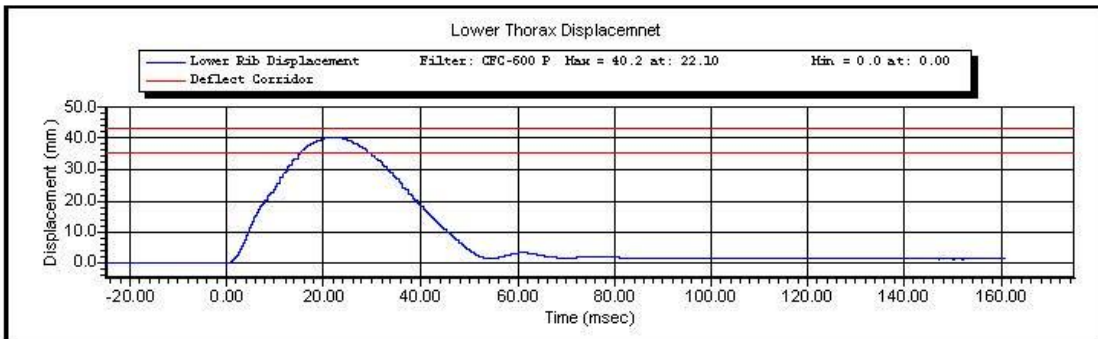
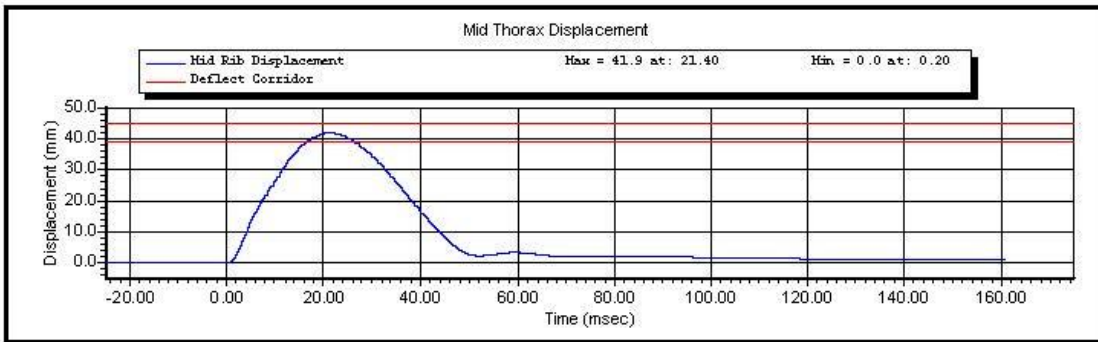
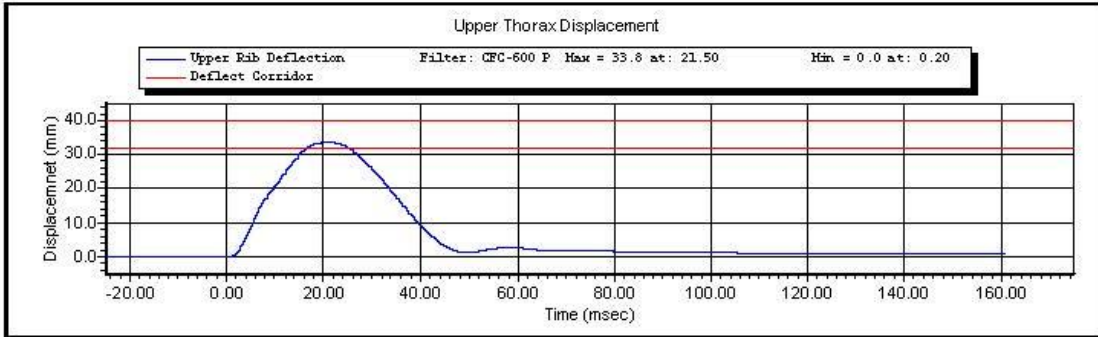
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Test Time: **11:23:36 AM**

Test Date: **12/15/2011**

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1 of 3



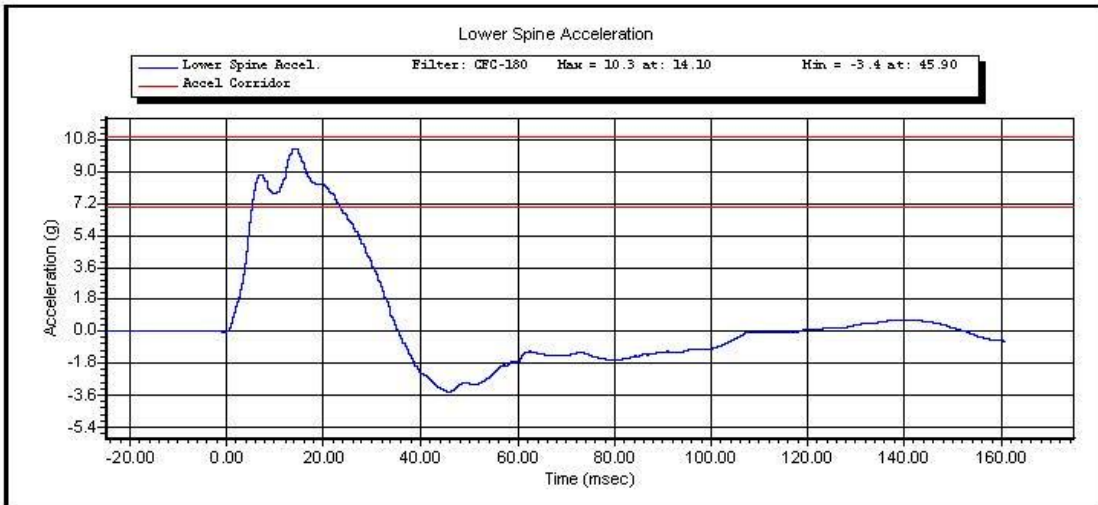
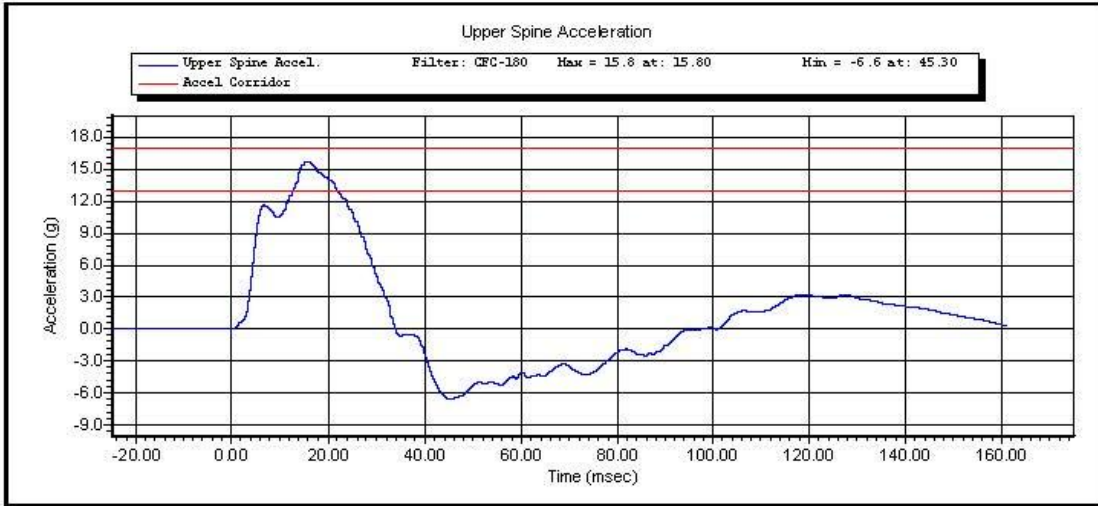
Test ID:

Test Time: 11:23:36 AM

Test Date: 12/15/2011

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2 of 3



Test ID:

Test Time: 11:23:36 AM

Test Date: 12/15/2011

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**VERIFICATION REPORT**

Test Name:	<b>Abdominal Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:19:49 AM</b>

Component Part Number	Component Serial Number
<b>Abdomen Ribs 4, 5</b>	<b>2024, 2061</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.2</b> deg C P
Humidity	10 -- 70	<b>46</b> %RH P
Velocity	4.20 -- 4.40	<b>4.38</b> m/s P
Probe Acceleration	12.0 -- 16.0	<b>15.6</b> g P
Upper Abdominal Rib Deflection	36.0 -- 47.0	<b>40.6</b> mm P
Lower Abdominal Rib Deflection	33.0 -- 44.0	<b>37.7</b> mm P
Lower Spine Acceleration - T12	9.0 -- 14.0	<b>12.5</b> g P

All test parameters are within specifications

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

Test ID:

Test Time: **10:19:49 AM**

Test Date: **12/15/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Servo	180-3885	DS-1162	11/3/2011
Servo	180-3885	DS-1622	11/3/2011
Endevco	7264-2000	P64147	11/1/2011

Test ID:

Test Time: **10:19:49 AM**

Test Date: **12/15/2011**

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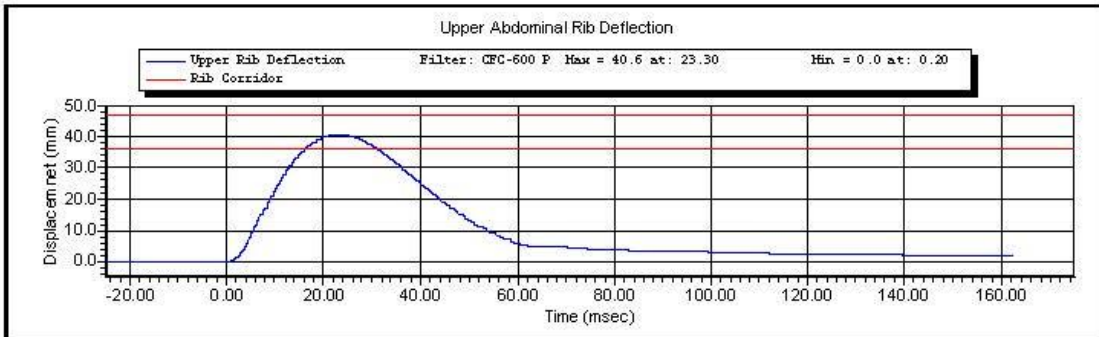
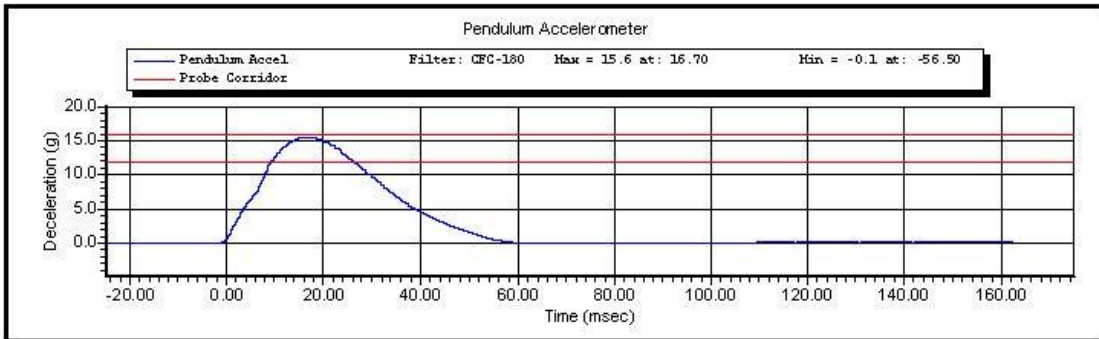


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Test Name:	<b>Abdominal Impact</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:		Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/15/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>10:19:49 AM</b>



Test ID:

Test Time: **10:19:49 AM**

Test Date: **12/15/2011**

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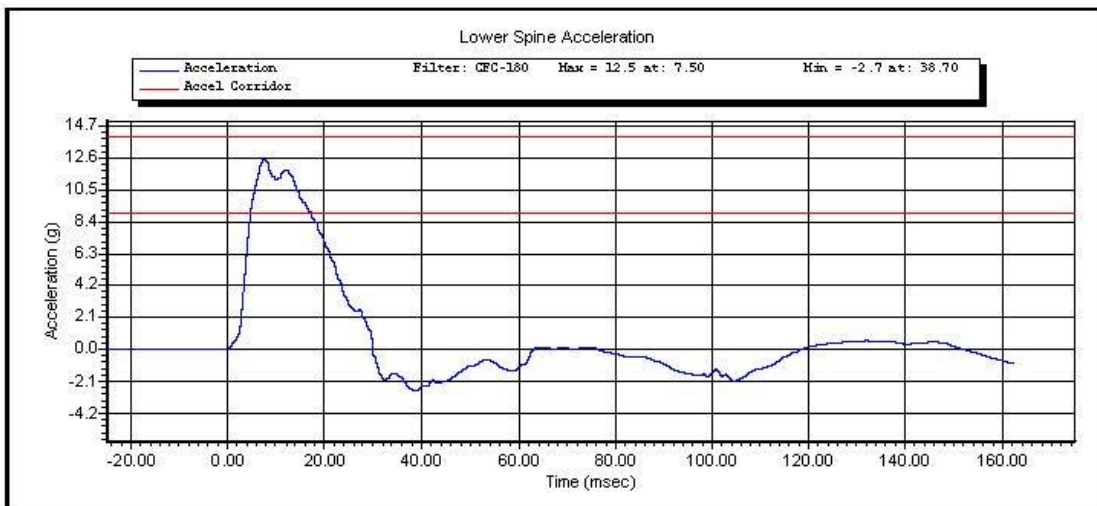
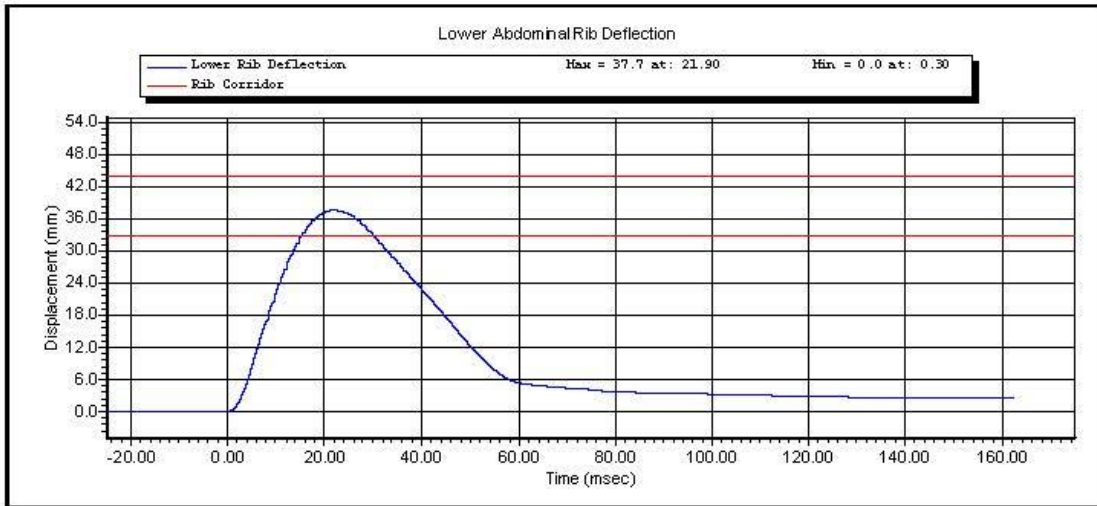
1 of 2



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Test ID:

Test Time: 10:19:49 AM

Test Date: 12/15/2011

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300 Cert test 12/16/11

### Resultant Data - SIDIIS Plug Compression



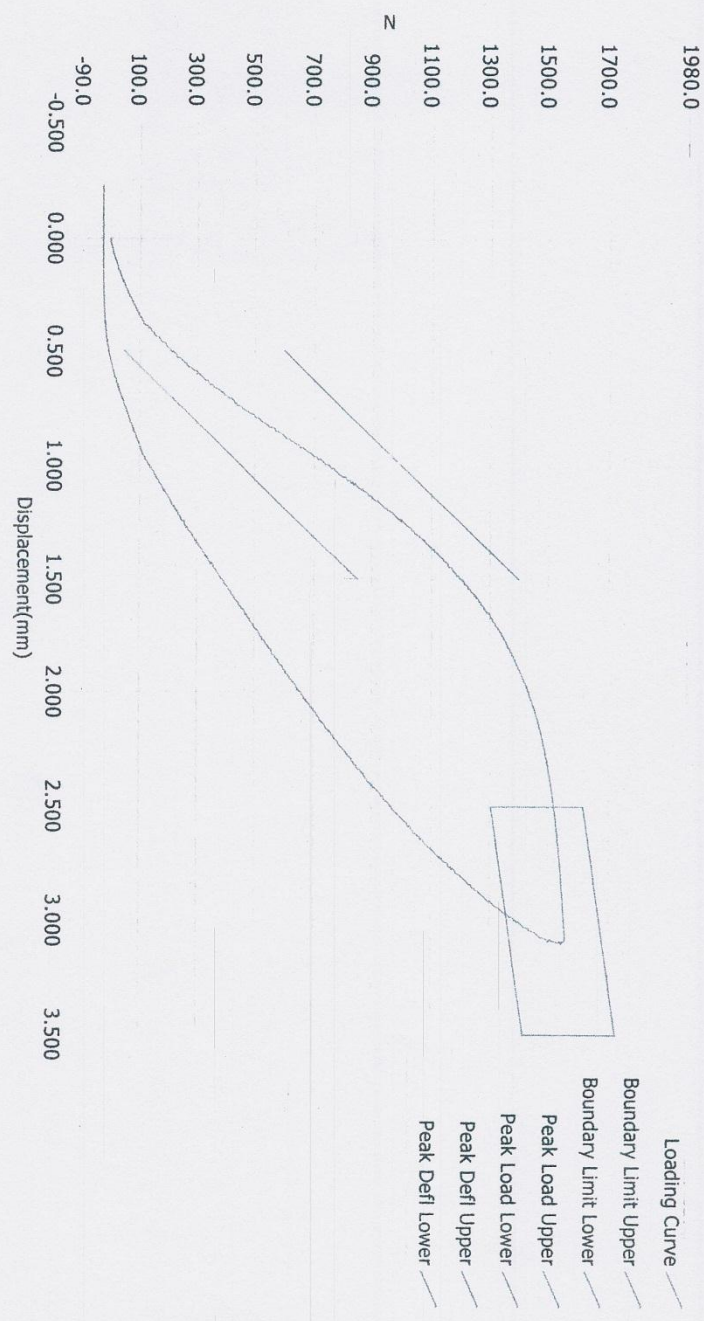
### ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
<u>Cert ID</u>	46459	9/22/2011	8:30 PM
	<u>ATD Serial Number</u>	<u>ATD Type</u>	
	N/A	SIDIIS	

Current Date : 9/22/2011

Current Time : 20:31:09

### Resultant Data - SIDIIS Plug Compression



#### ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
45953	45953	9/20/2011	8:13 PM
Cert ID	ATD Serial Number	ATD Type	
N/A	N/A	SIDIIS	

Current Date : 9/20/2011      Current Time : 20:13:36



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**VERIFICATION REPORT**

Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Acetabulum Impact Redundant Ac</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>11:54:40 AM</b>

Component Part Number	Component Serial Number
<b>180-4343 Pelvis Flesh</b>	<b>D13396</b>
<b>Humanetics Cert Plug</b>	<b>46459</b>
<b>Humanetics Test Plug</b>	<b>45953</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.2</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	6.60 -- 6.80	<b>6.61</b> m/s P
Peak Probe Acceleration	38.0 -- 47.0	<b>45.8</b> g P
Peak Pelvis Acceleration	34.0 -- 42.0	<b>40.9</b> g P
Peak Acetabulum Force	3.60 -- 4.30	<b>3.87</b> kN P

All test parameters are within specifications

Technician:     **A. Rudniski**    

Supervisor:     **D. Travale**    

Test ID:

Test Time: **11:54:40 AM**

Test Date: **12/16/2011**



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### VERIFICATION REPORT

#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3249J	LC-275a	11/3/2011
Endevco	7264-2000	P13323	12/15/2010

Test ID:

Test Time: **11:54:40 AM**

Test Date: **12/16/2011**

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2 of 2

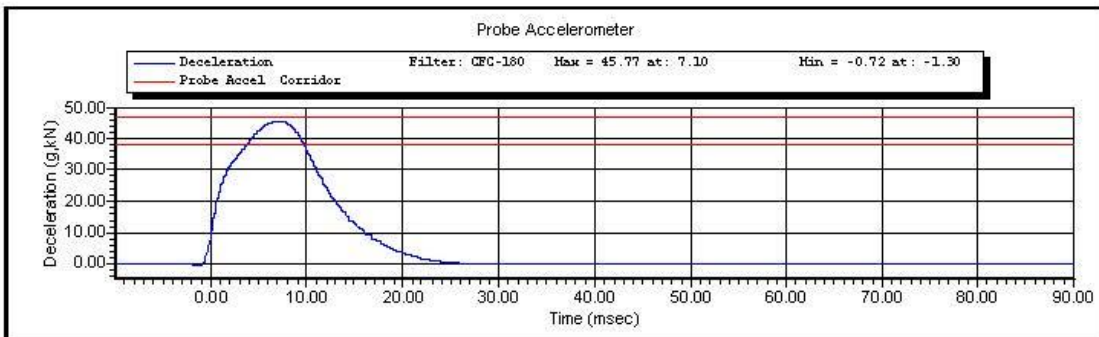
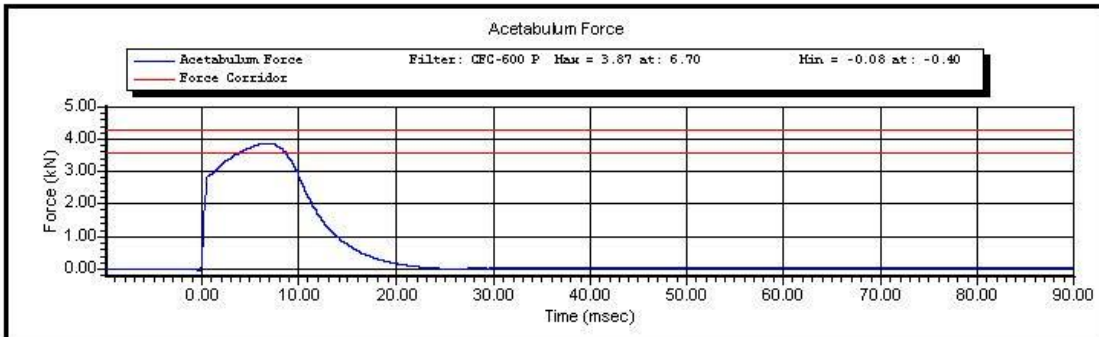


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Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Acetabulum Impact Redundant Ac</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>2</b>	Test Time:	<b>11:54:40 AM</b>



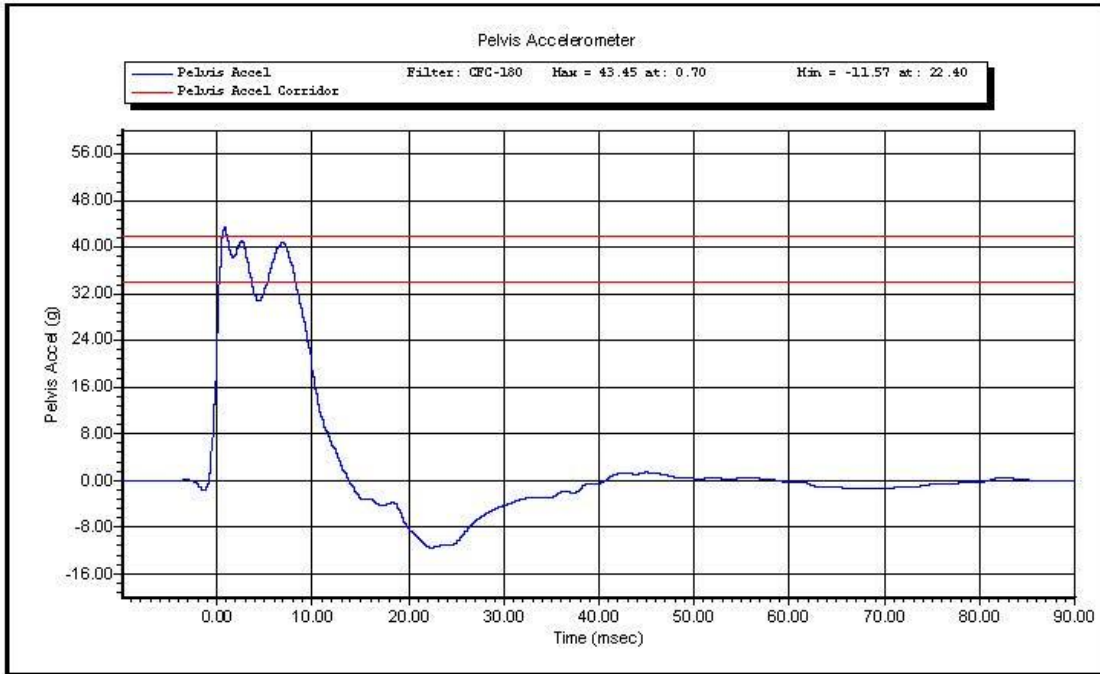
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Test Date: **12/16/2011**

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1 of 2



Test ID:

Test Time: 11:54:40 AM

Test Date: 12/16/2011

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#### VERIFICATION REPORT

Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Iliac Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-11s</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:58:23 PM</b>

Component Part Number	Component Serial Number
<b>180-4343 Pelvis Flesh</b>	<b>D13396</b>

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	<b>22.1</b> deg C P
Humidity	10 -- 70	<b>26</b> %RH P
Velocity	4.20 -- 4.40	<b>4.32</b> m/s P
Peak Probe Acceleration	36.0 -- 45.0	<b>41.7</b> g P
Peak Pelvis Acceleration	28.0 -- 39.0	<b>32.5</b> g P
Peak Iliac Force	4.10 -- 5.10	<b>4.57</b> kN P

All test parameters are within specifications

Technician:     **A. Rudniski**    

Supervisor:     **D. Travale**    

Test ID:

Test Time: **2:58:23 PM**

Test Date: **12/16/2011**



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#### REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	AGHF5	12/14/2011
Endevco	7264-2000	P15526	10/31/2011
DentonATD	3228J	LC-279 Fy	11/3/2011

Test ID:

Test Time: **2:58:23 PM**

Test Date: **12/16/2011**

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2 of 2

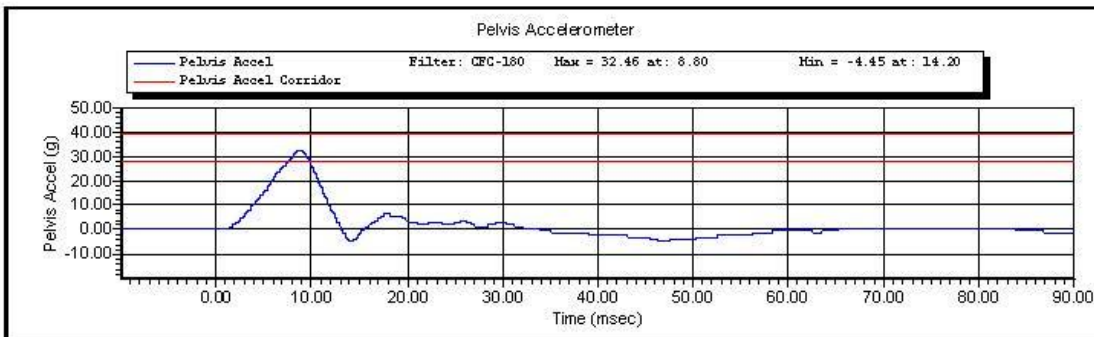
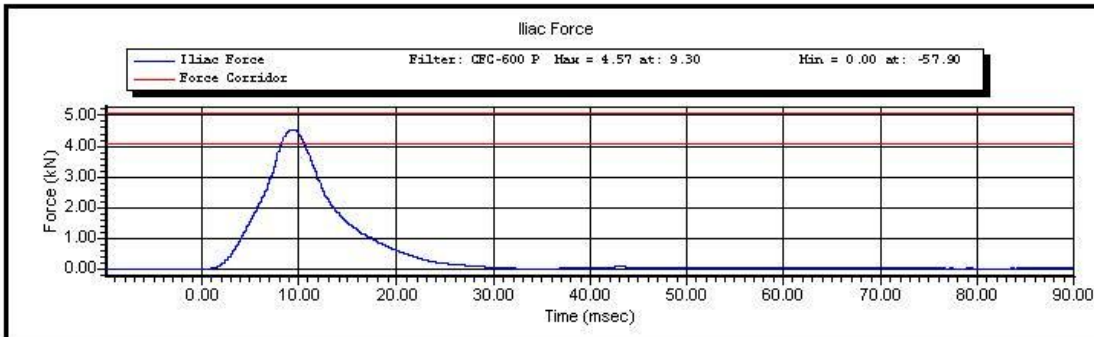


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Test Name:	<b>Pelvis</b>	Revision:	<b>8/24/2009</b>
Sub Test Name:	<b>Iliac Impact</b>	Spec Type:	<b>NHTSA</b>
ATD Type:	<b>SID-IIs</b>		
ATD Serial Number:	<b>300</b>		
Test ID:		Test Date:	<b>12/16/2011</b>
Test Number:	<b>1</b>	Test Time:	<b>2:58:23 PM</b>



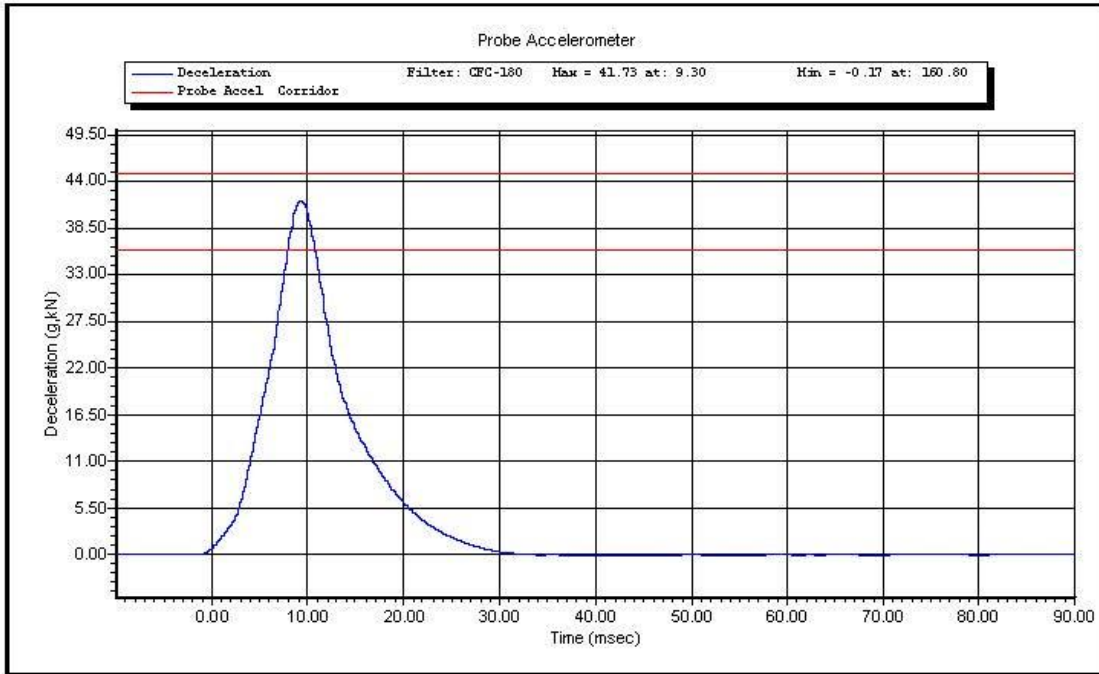
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Test Time: **2:58:23 PM**

Test Date: **12/16/2011**

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Test ID:

Test Time: 2:58:23 PM

Test Date: 12/16/2011

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**Appendix D**  
**Test Equipment and Instrumentation Calibration Data**

**Table 1 – Dummy Instrumentation (ES-2re)**

		ES-2re S/N: F034			
		Serial Number	Manufacturer	Calibration Date	
Head Accelerometers	X	P58737	Edevco	9/29/2011	
	Y	P52022	Edevco	9/29/2011	
	Z	P52040	Edevco	9/29/2011	
Head Accelerometers Redundant	RX	P58843	Edevco	9/29/2011	
	RY	P51668	Edevco	9/29/2011	
	RZ	P51327	Edevco	9/29/2011	
Thorax Rub Displacement Potentiometers	Upper	Y	183	Honeywell	8/31/2011
	Middle	Y	184	Honeywell	8/31/2011
	Lower	Y	182	Honeywell	8/31/2011
Abdominal Load Cells	Upper	Y	1512	Denton	6/3/2011
	Middle	Y	1526	Denton	6/3/2011
	Lower	Y	1516	Denton	6/3/2011
Lower Spine Accelerometers (T12)	X	P58987	Edevco	8/17/2011	
	Y	P51873	Edevco	8/17/2011	
	Z	P52152	Edevco	8/17/2011	
Public Symphysis Load Cell		Y	465	Denton	8/31/2011

**Table 2 – Dummy Instrumentation (SID-IIs)**

		SID-IIs S/N: 300				
		Serial Number	Manufacturer	Calibration Date		
Head Accelerometers	X	P51685	Edevco	10/31/2011		
	Y	P51682	Edevco	10/31/2011		
	Z	P51699	Edevco	10/31/2011		
Head Accelerometers Redundant	RX	P51701	Edevco	10/31/2011		
	RY	P45019	Edevco	10/31/2011		
	RZ	P51690	Edevco	10/31/2011		
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	1121	FTSS	10/29/2011
		Middle	Y	1151	FTSS	10/31/2011
		Lower	Y	1156	FTSS	10/31/2011
	Abdominal Rib	Upper	Y	1162	FTSS	10/29/2011
		Lower	Y	1622	Denton	10/31/2011
Lower Spine Accelerometers (T12)	X	P58883	Edevco	10/31/2011		
	Y	P64147	Edevco	10/31/2011		
	Z	P58786	Edevco	10/31/2011		
Acetabulum Load Cell		Y	275	Denton	11/3/2011	
Lilac Wing Load Cell		Y	279Fy	Denton	11/3/2011	

**Table 3 – Vehicle Instrumentation**

Vehicle Instrumentation			Serial Number	Manufacturer	Calibration Date
1	Vehicle Center of Gravity	X	P39743	Endevco	10/4/2011
	Vehicle Center of Gravity	Y	P18532	Endevco	10/4/2011
	Vehicle Center of Gravity	Z	P23303	Endevco	10/4/2011
2	Right Side Sill at Front Seat	X	P69809	Endevco	8/10/2011
	Right Side Sill at Front Seat	Y	P69802	Endevco	10/4/2011
	Right Side Sill at Front Seat	Z	P71294	Endevco	10/4/2011
3	Right Side Sill at Rear Seat	X	P16289	Endevco	9/15/2011
	Right Side Sill at Rear Seat	Y	P32219	Endevco	10/4/2011
	Right Side Sill at Rear Seat	Z	P35786	Endevco	10/4/2011
4	Left Side Sill at Front Door	Y	A081447	MS	10/4/2011
5	Left Side Sill at Rear Door	Y	A081424	MS	10/4/2011
6	Left A-Post Lower	Y	A081431	MS	10/4/2011
7	Left A-Post Middle	Y	A081414	MS	10/4/2011
8	Left B-Post Lower	Y	A081413	MS	10/4/2011
9	Left B-Post Middle	X	A081443	MS	10/4/2011
10	Front Seat Track	Y	A081410	MS	10/4/2011
11	Rear Seat Track or Structure	Y	A081457	MS	10/4/2011
12	Right Rear Occ. Compartment	Y	A081412	MS	10/4/2011
13	Engine Block	X	A027662	MS	10/4/2011
	Engine Block	Y	A034971	MS	10/4/2011
14	Rear Floorpan Above Axle	X	A081456	MS	10/4/2011
	Rear Floorpan Above Axle	Y	A081436	MS	10/4/2011
	Rear Floorpan Above Axle	Z	A081453	MS	10/4/2011

**TABLE 4 – MDB Instrumentation**

MDB Instrumentation		Serial Number	Manufacturer	Calibration Date
MDB Center of Gravity	X	C16680	Endevco	10/4/2011
MDB Center of Gravity	Y	C14901	Endevco	10/4/2011
MDB Center of Gravity	Z	CP30	Endevco	10/4/2011
Left Frame at Rear Axle Centerline	X	C16507	Endevco	10/4/2011
Left Frame at Rear Axle Centerline	Y	C16499	Endevco	10/4/2011