REPORT NUMBER: SNCAP-CAL-11-017

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

Chrysler Group LLC
2011 Ram 1500 Crew Cab
Four Door Pickup

NHTSA NUMBER: MB0301

PREPARED BY:
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December 6, 2010

FINAL REPORT

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

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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

1. Report No. SNCAP-CAL-11-017	*2. Government Accession No.*	*3. Recipient's Catalog No.*
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of 2011 Ram 1500 Crew Cab 4 Door Pickup NHTSA No.: MB0301		*5. Report Date* 12/6/2010 *6. Performing Organization Code* CAL
7. Author(s) Bethany Koetje, Project Engineer		*8. Performing Organization Report No.* TR2494
9. Performing Organization Name and Address Calspan Corporation Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-09-D-00126
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		*13. Type of Report and Period Covered:* *Final Report, 12/6/2010* *14. Sponsoring Agency Code* NVS-111

15. *Supplementary Notes*

16. Abstract

A 55/28 kph 90^0 Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Ram 1500 Crew Cab 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 10/6/2010.

The impact velocity of the Moving Deformable Barrier (MDB) was 62.2 km/h, and the ambient temperature at the struck side (driver side) of the vehicle was 22°C. The target vehicle's maximum post-test static crush was 316 mm at level 1. The test vehicle's performance was as follows:

	Driver ATD (ES-2re)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	11.369
Maximum Chest Deflection	mm	44	27.128
Total Abdominal Force	N	2500	631.175
Pubic Symphysis Force	N	6000	744.218
	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	17.941
Lower Spine Resultant Acceleration	G	82	32.688
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	894.731

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

17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs	*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave. SE Room W43-410 Washington, D.C. 20590

19. Security Class. (of this report)	*20. Security Class. (of this page)*	*21. No. of Pages*	*22. Price*
Unclassified	Unclassified	121	

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PURPOSE

This moving deformable barrier side impact test is part of the MY 2011 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 2011 Ram 1500 Crew Cab 4 Door Pickup. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Ram 1500 Crew Cab 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 62.2 km/h (38.7 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 on 10/6/2010. Pretest and post- test photographs of the test vehicle, the MDB and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated January 2010. The side impact event was documented by nine high-speed cameras. Camera locations are included in this report.

The Dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)
Head Accelerometers
Thorax Rib 1 to Rib 3 Potentiometers
Abdomen Forward, Middle, and Rear Load Cells
Pubic Load Cell
Lower Spine Accelerometers

PASSENGER ATD (SID-IIs)
Head Accelerometers
Thorax Upper, Middle, and Lower Rib Potentiometers
Abdomen Upper and Lower Rib Load Cells
Acetabulum Load Cell
Iliac Load Cell
Lower Spine Accelerometers

Dummy injury values were recorded as follows:

	Driver ATD (ES-2re)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	11.369
Maximum Chest Deflection	mm	44	27.128
Total Abdominal Force	N	2500	631.175
Pubic Symphysis Force	N	6000	744.218

	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	17.941
Lower Spine Resultant Acceleration	G	82	32.688
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	894.731

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT INFORMATION

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

GENERAL COMMENTS

None

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB0301	Anti-Lock Brakes	Yes
Model Year	2011	All-Wheel Drive	No
Make	Ram	Power Steering	Yes
Model	1500 Crew Cab	Driver Front Airbag	Yes
Body Style	4 Door Pickup	Driver Curtain Airbag	Yes
VIN	1D7RB1CP5BS500412	Driver Head/Torso Airbag	No
Body Color	Charcoal gray	Driver Torso Airbag	No
Delivery Date	9/22/2010	Driver Torso/Pelvis Airbag	No
Odometer Reading (km/mi)	11.3 km / 7 mi	Driver Pelvis Airbag	No
Dealer	Hoover Chrysler Jeep Dodge	Driver Knee Airbag	No
Transmission	5-speed Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Rear Wheel Drive	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	V8	Rear Pass. Torso Airbag	No
Engine Displacement (L)	4.7	Rear Pass. Torso/Pelvis Airbag	No
Engine Placement	Transverse	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Pretensioners	Yes
Sunroof/T-Top	No	Load Limiters	No
Tinted Glass	Yes	Automatic Door Locks	No
Traction Control	Yes	Bucket Seats	No
Power Brakes	Yes	Tilt Steering	Yes
Front Disc	Yes	Other	
Rear Disc	Yes	Other	

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler Group LLC	GVWR (kg)	3085
Date of Manufacture	07/2010	GAWR Front (kg)	1679
		GAWR Rear (kg)	1770

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	3	3		6	
Capacity Weight (VCW) (kg)				757	(A)
DSC x 68.04 (kg)				408	(B)
Cargo Weight (RCLW) (kg)				349*	(A-B)

* Maximum allowable RCLW is 136 kg

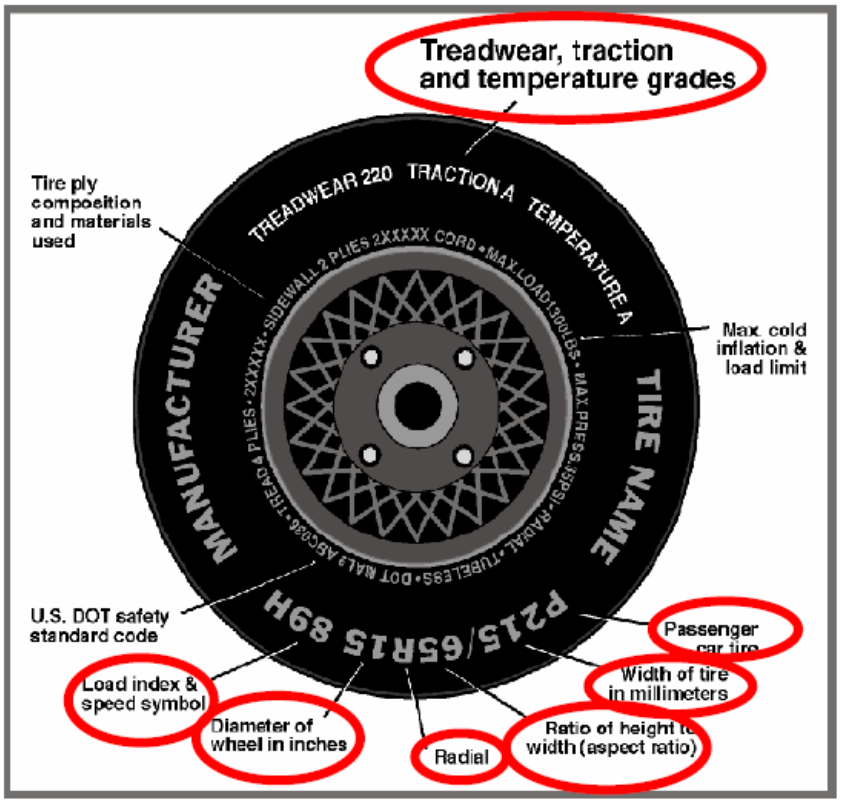
VEHICLE SEAT TYPE

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:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**

VEHICLE TIRE INFORMATION



	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	276	276
Recommended Tire Size	P265/70R17	P265/70R17
Tire Size on Vehicle	P265/70R17	P265/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler SR-A	Wrangler SR-A
Treadwear	500	500
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 polyester cord	2 polyester cord
Tire Plies Body	2 polyester cord, 2 steel cord	2 polyester cord, 2 steel cord
Load Index/Speed Symbol	113/R	113/R
Tire Material		
DOT Safety Code Right	4BT6EXWR2610	4BT6EXWR2610
DOT Safety Code Left	4BT6EXWR2610	4BT6EXWR2610

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

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

TEST VEHICLE AXLE WEIGHTS

		As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
	Units	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	684	504	1188	728	618	1346	730.5	619	1349.5
Right	kg	628	512	1140	638.5	607.5	1246	625.5	611	1236.5
Ratio	%	56	44		53	47		52	48	
Totals	kg	1312	1016	2328	1366.5	1225.5	2592	1356	1230	2586

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2328	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.8	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2600	(A+B+C)

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	LF	RF	RR	LR	CG (aft of front axle)
Fully Loaded	mm	904	908	967	956	
As Tested (Fully Loaded ± 10 mm at each wheel well)	mm	914	917	998	986	1687

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3566
Total Vehicle Length at Left Side	mm	5740
Total Vehicle Length at Centerline	mm	5821
Total Vehicle Length at Right Side	mm	5735
Weight of Ballast in Cargo Area	kg	136
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	94.6

Vehicle components removed to make Target Vehicle Test Weight:

None

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measured Parameter	Units	Value
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	518

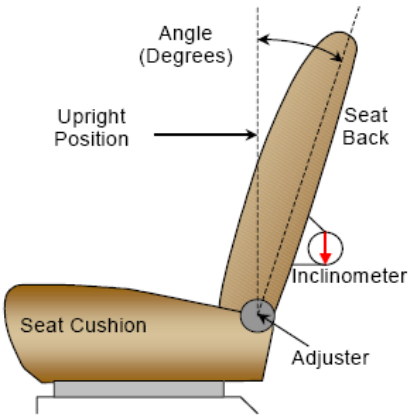
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

NORMAL DESIGN RIDING POSITION

Driver seat: Driver seat back angle positioned according to specifications listed in Form 1

Passenger Seat: Passenger seat has a fixed seat back angle of 3.5 degrees



FRONT SEAT ASSEMBLY

SEAT BACK ANGLES

	Degrees
Driver w/ Seated Dummy	5.5
Passenger w/ Seated Dummy	3.5

SEAT FORE/AFT POSITIONS

Driver seat fore/aft travel was 23 detents including full forward and full rearward. Placed in position 12, 1 detent rear of midpoint of travel.
Passenger seat is fixed in position and does not allow for fore/aft travel

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	23 detents	12
Rear Seat	NA	NA

SEAT BELT UPPER ANCHORAGES

Driver seat belt positioned in 2nd of 5 positions (midpoint) with the uppermost detent equal to 0
Passenger seat has fixed upper seat belt anchorage

SEAT BELT UPPER ANCHORAGES

	Total # of Positions	Placed in Position #
Driver Seat	5	2
Rear Seat	N/A	NA

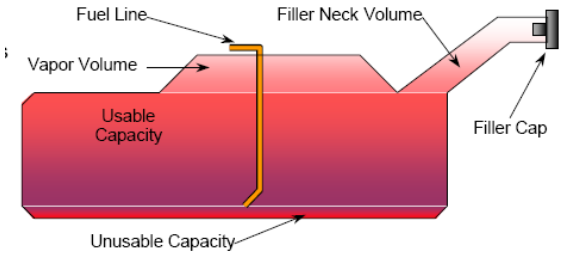
DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	121.1
Usable Capacity Used for FMVSS 301	98.4
Actual Amount of Solvent Used	94.6

Fuel was evacuated according to the specifications provided by the manufacturer in Form 1

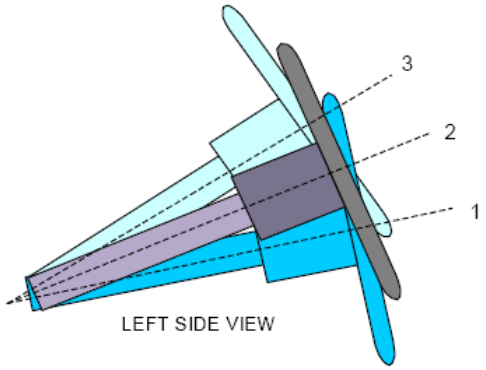


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering column was placed in the mid-point of tilt range. 10 detents exist in for steering wheel tilt position.

Telescoping was not available on this vehicle



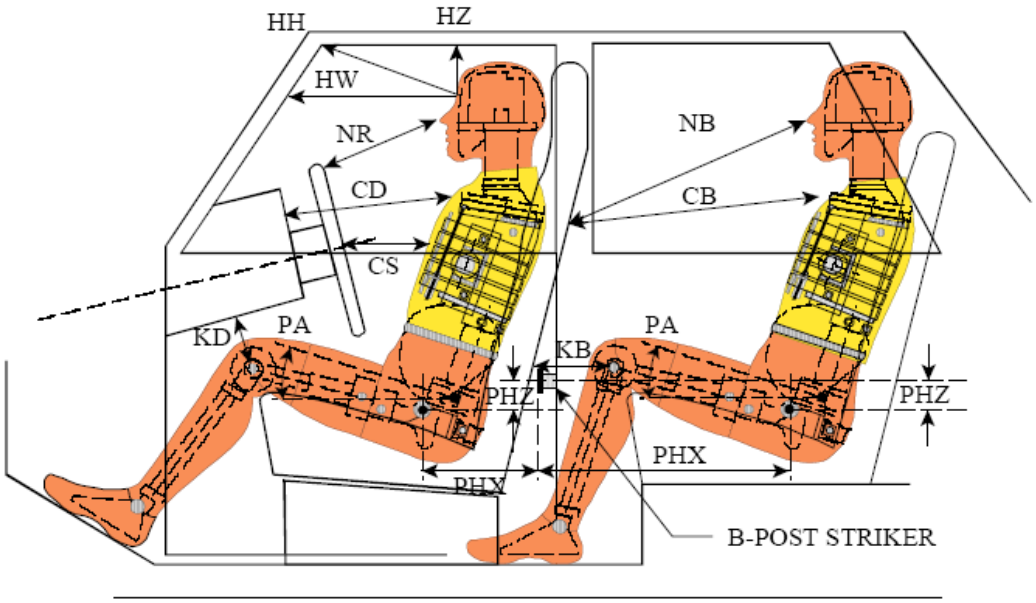
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1		
Geometric Center – Position 2	66.7	
Uppermost – Position 3		
Telescoping Steering Wheel Travel		NA
Test Position	66.7	NA

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



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

LEFT SIDE VIEW

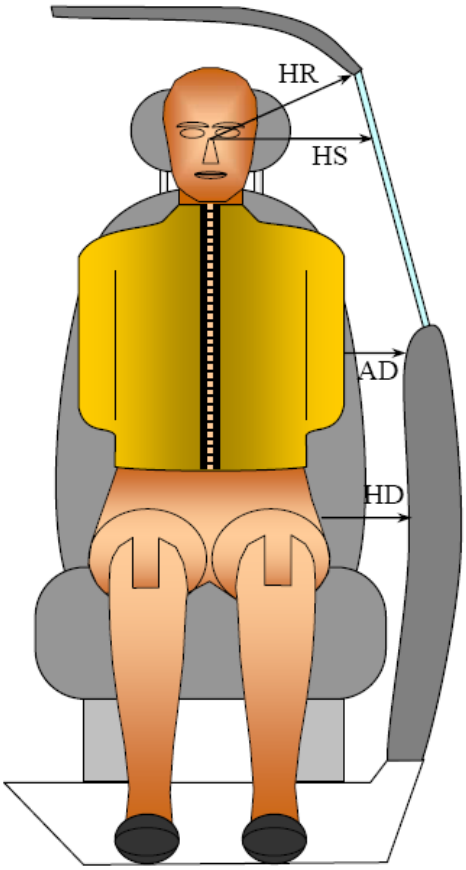
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 033		Passenger S/N 300	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	475	17		
HW		Header to Windshield	679	0		
HZ	HZ	Head to Roof	231	90	317	90
NR	NB	Nose to Rim/Seat Back	442	16.5	600	7.2
CD	CB	Chest to Dash/Seat Back	606		595	
CS		Chest to Steering Wheel	379	17		
KDL	KBL	Left Knee to Dash/Seat Back	151		325	30
KDR	KBR	Right Knee to Dash/Seat Back	140		326	30
PA	PA	Pelvic Angle		22		19.8
PHX	PHX	H-Point to Striker (X-Axis)				
PHZ	PHZ	H-Point to Striker (Z-Axis)				
SA	SA	Seat Back Angle		5.5 *		3.5

* Measurement from the head restraint post

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**

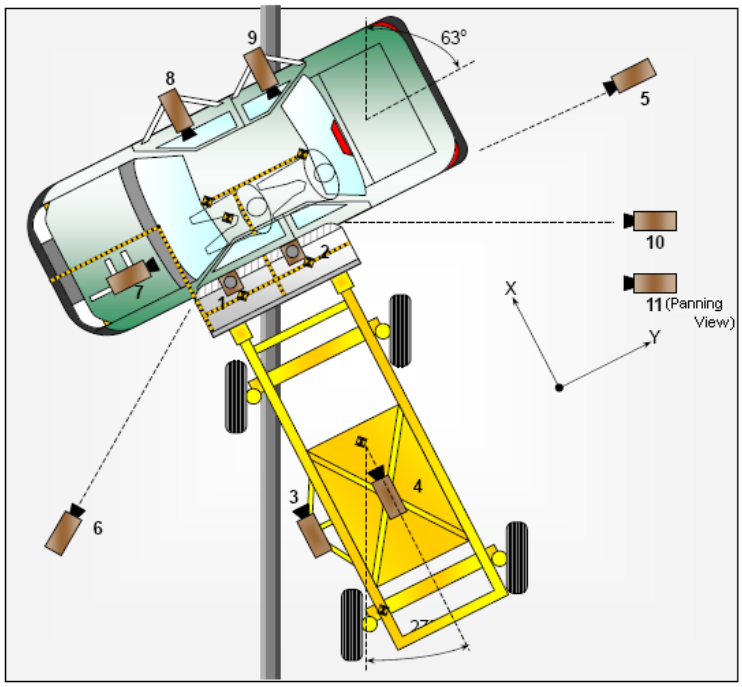


DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Description	Units	Driver S/N	Passenger S/N
HR	Head to Side Header	mm	210	274
HS	Head to Side Window	mm	323	248
AD	Arm to Door	mm	85	161
HD	H-point to Door	mm	139	157

DATA SHEET NO. 5
CAMERA LOCATIONS AND DATA

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



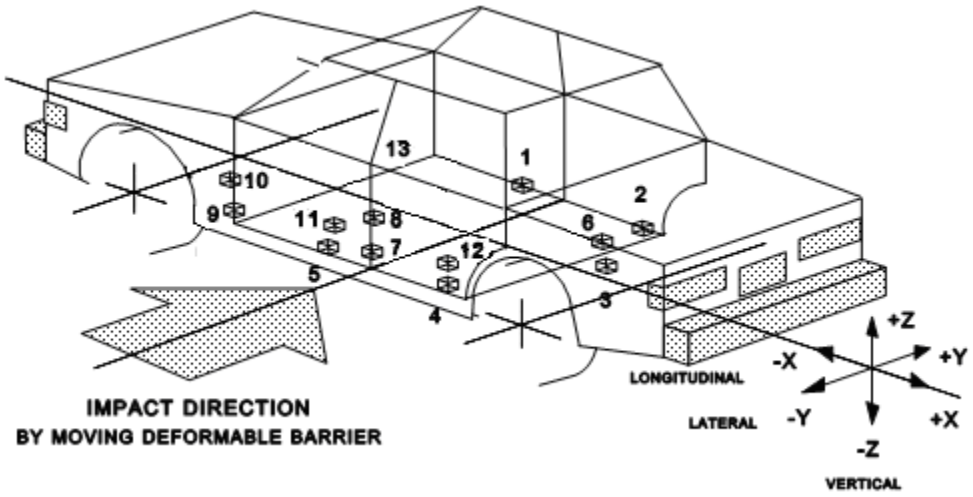
CAMERA LOCATIONS AND DATA

No.	Camera View	Location			Angle	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead Wide View	72	812	-4880	-90	20	1000
2	Overhead Close-up View	195	855	-4880	-90	28	1000
3	Impact Point	-1470	0	-847	0	25	500
4	Struck-Side View at Impact	-1140	838	-1587	-17	12.5	500
5	Rear Impact View of Struck Side				-3	50	1000
6	Front Oblique Impact View of Struck Side				-2	28	1000
7	Driver Dummy Front View (OB)				-12	25	500
8	Driver Dummy Side View (OB)				-4	12.5	500
9	Rear Passenger Dummy Side View (OB)				-1	12.5	500
10	Real-time Rear View of Impact				-	-	24
11	Real-time Pan View of Impact				-	-	24

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

DATA SHEET NO. 6
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010



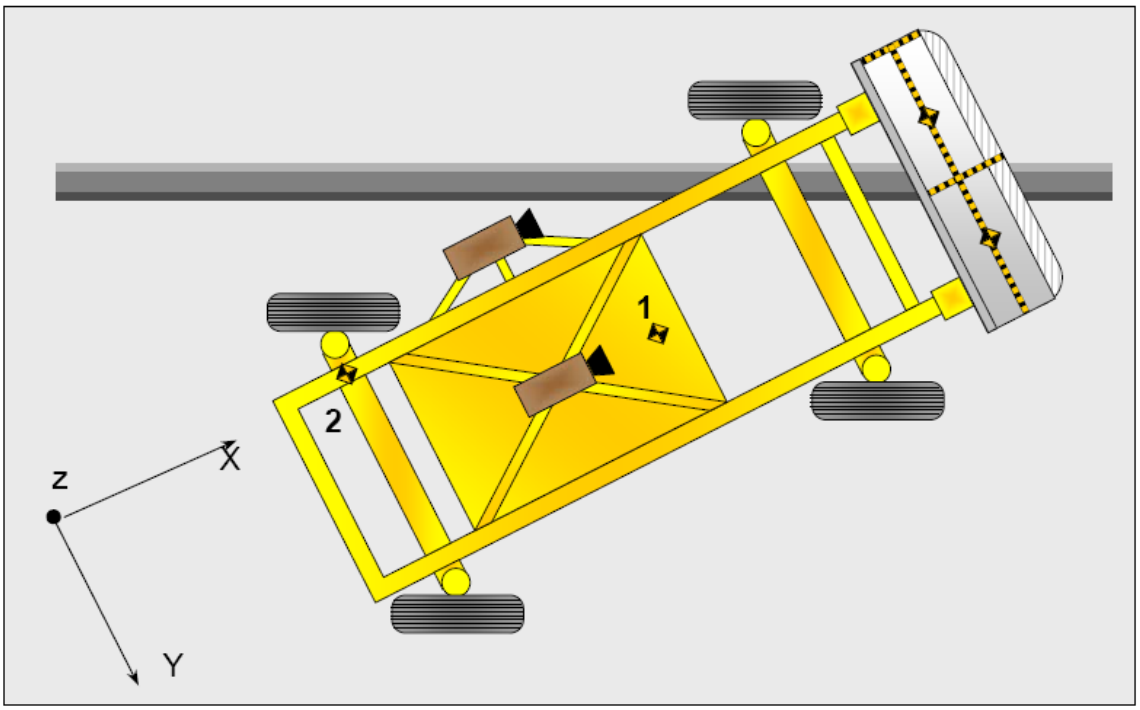
VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3944.0	760.0	528.0
2	Right Sill at Rear Seat	2636.0	740.0	571.0
3	Rear Floorpan Above Axle	995.0	1.0	804.0
4	Left Sill at Rear Door	2630.0	-741.0	564.0
5	Left Sill at Front Door	3942.0	-728.0	520.0
6	Rt. Rear Occ. Compartment	2926.0	439.0	561.0
7	B-Post Lower	3154.0	-762.0	632.0
8	B-Post Middle	3112.0	-798.0	1168.0
9	A-Post Lower	4169.0	-783.0	591.0
10	A-Post Middle	4155.0	-792.0	830.0
11	Front Seat Track	3217.0	-656.0	649.0
12	Rear Seat Structure	2380.0	-785.0	772.0
13	Vehicle CG	3730.0	-10.0	759.0

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

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



MDB ACCELEROMETER LOCATIONS

Loc No.	Accelerometer Locations	Measurements		
		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
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: **2011 Ram 1500 Crew Cab** **NHTSA No.:** **MB0301**
Test Program: **Side MDB NCAP** **Test Date:** **10/6/2010**

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	316	370
2	Occupant H-Point	mm	235	783
3	Mid Door	mm	207	885
4	Window Sill	mm	94	1207
5	Window Top	mm	8	1818
	Maximum Penetration	mm	316	370

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	0 *
Total	58

* Vehicle manufacturer requested that certain contact switches not be installed on ATDs.

CAMERA COVERAGE

High-Speed Vehicle Onboard	3
High-Speed Offboard	4
High-Speed MDB Onboard	2
Real-Time Panning	2
Total	11

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

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1250
Overall Length Including Honeycomb Frame	4120
Wheel Base of Framework Carriage	2590
CG Location of Front Axle	1104

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	409.5	281.5	691.0
Right	kg	372.5	299.0	671.5
Ratio	%	57.4	42.6	-
Totals	kg	782.0	580.5	1362.5

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.2
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	NA
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.2

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	430	800	Left	101
B	Top of Bumper	542	700	Left	83
C	Mid-Level	682	800	Right	88
D	Top of Stack	811	800	Right	159

MDB INSTRUMENTATION

Accelerometers	5
Contact Switches	2

DATA SHEET NO. 10
POST TEST OBSERVATIONS

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Dummy Type/Serial No.	033	300
Head Contact	Curtain Airbag	Curtain Airbag
Upper Torso Contact	Curtain Airbag/ Door Trim Panel	Door Trim Panel
Lower Torso Contact	Door Trim Panel	Door Trim Panel
Left Knee Contact	Door Trim Panel	Door Trim Panel
Right Knee Contact		

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Doors	Jammed Shut (0 mm)	Jammed Shut (0 mm)
Right Side Doors	Closed & Operational (0 mm)	Closed & Operational (0 mm)
Hatch and Other Doors	Closed & Operational (0 mm)	
Seat Movement	No	No
Seat Back Failure	No	No

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Intruded due to side impact
Sill Separation	None
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT INFORMATION

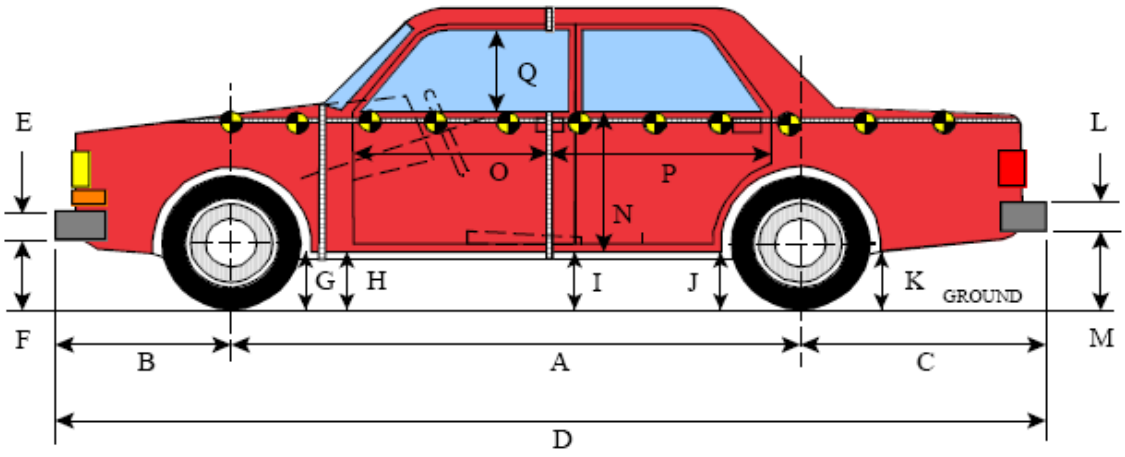
Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	NA	NA		
Side: Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	No	NA
Seat Belt Load Limiter	No	NA	No	NA

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-4
Vertical Offset	mm	+/- 20	-12

DATA SHEET NO. 11
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



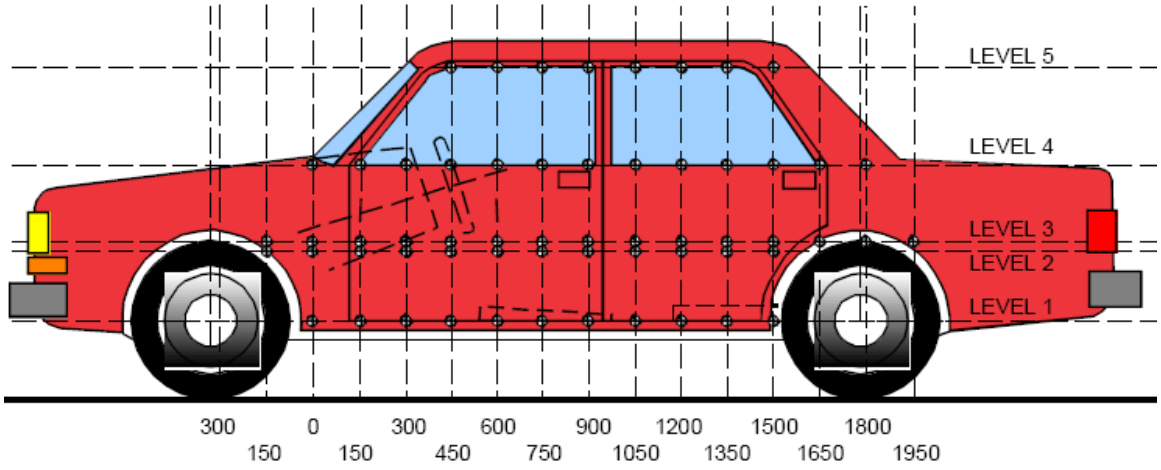
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3566	3572	7
B	Front Axle to FSOV	1024	1012	-12
C	Rear Axle to RSOV	1232	1237	5
D	Total Length at Centerline	5821	5821	-1
E	Front Bumper Thickness	381	381	0
F	Front Bumper Bottom to Ground	320	310	-10
G	Sill Height at Front Wheel Well	314	310	-4
H	Sill Height at Front Door Leading Edge	325	320	-5
I	Sill Height at B Pillar	334	354	20
J1	Sill Height at Rear Wheel Well	326	315	-11
J2	Pinch Weld Height at Rear Wheel Well	341	382	41
K	Sill Height Aft of Rear Wheel Well	416	418	2
L	Rear Bumper Thickness	215	215	0
M	Rear Bumper Bottom to Ground	501	481	-20
N	Sill Height to Window Bottom Sill	863	862	-1
O	Front Door Leading Edge to Impact CL	810	822	12
P	Rear Door Trailing Edge to Impact CL	1338	1311	-27
Q	Front Window Opening	488	488	0
R	Right Side Length	5735	5747	12
S	Left Side Length	5740	5720	-21
T	Vehicle Width at B Post	1856	1803	-53

DATA SHEET NO. 12
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



LEFT SIDE VIEW

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	370
2	Occupant H-Point	783
3	Mid-Door	885
4	Window Sill	1207
5	Window Top	1818

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. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-600	--	--	1004	851	--	--	--	989	862	--	--	--	15	-11	--
-450	--	--	1010	875	--	--	--	980	884	--	--	--	30	-9	--
-300	--	--	1012	896	--	--	--	972	902	--	--	--	40	-6	--
-150	--	1009	1016	912	--	--	944	964	896	--	--	65	52	16	--
0	926	1011	1011	925	--	777	937	954	900	--	149	74	57	25	--
150	923	1008	1013	934	--	728	877	915	912	--	195	131	98	22	--
300	924	1007	1011	941	--	694	863	889	916	--	230	144	122	25	--
450	923	1007	1010	947	--	680	840	846	916	--	243	167	164	31	--
600	923	1007	1009	952	--	665	805	835	914	--	258	202	174	38	--
750	922	1007	1009	958	--	656	789	823	912	--	266	218	186	46	--
900	918	1009	1011	963	708	658	774	804	907	707	260	235	207	56	1
1050	919	1011	1013	967	717	659	780	827	899	714	260	231	186	68	3
1200	919	1011	1014	970	724	651	824	848	876	721	268	187	166	94	3
1350	917	1011	1015	973	727	635	787	841	904	726	282	224	174	69	1
1500	912	1011	1015	976	729	618	808	857	918	731	294	203	158	58	-2
1650	912	1010	1015	978	732	604	839	871	944	729	308	171	144	34	3
1800	911	1009	1014	978	735	595	859	883	967	729	316	150	131	11	6
1950	908	1008	1013	980	736	659	891	921	987	728	249	117	92	-7	8
2100	909	1006	1012	980	733	707	919	947	1005	730	202	87	65	-25	3
2250	898	984	992	960	--	903	911	934	936	--	-5	73	58	24	--
2400	887	1003	1008	974	--	894	1020	1029	1002	--	-7	-17	-21	-28	--
2550	--	1008	1014	980	--	--	1031	1039	1013	--	--	-23	-25	-33	--
2700	--	--	1015	987	--	--	--	1046	1024	--	--	--	-31	-37	--
2850	--	--	--	991	--	--	--	--	1032	--	--	--	--	-41	--

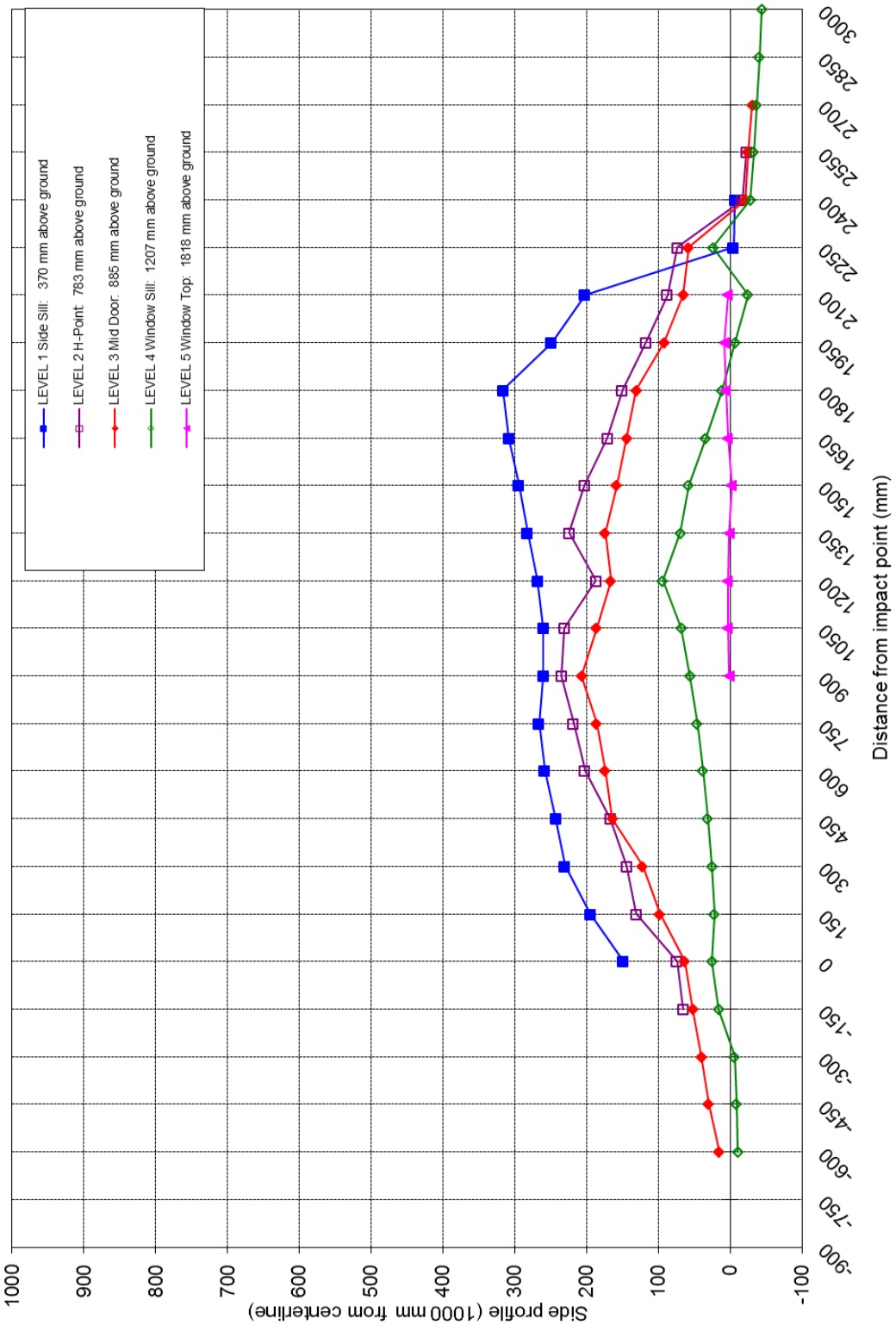
MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	316	235	207	94	8
Distance From Impact (mm)	1800	900	900	1200	1950

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.

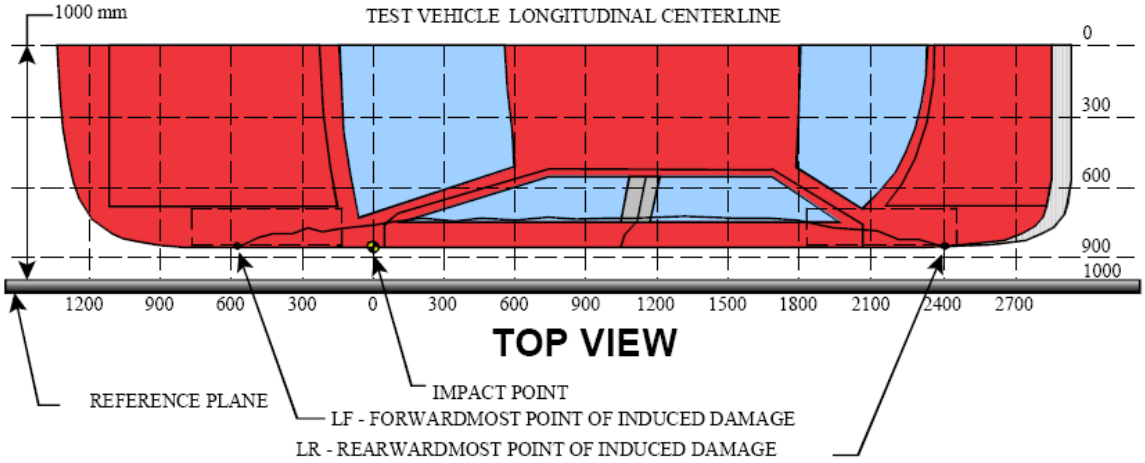
DATA SHEET NO. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**

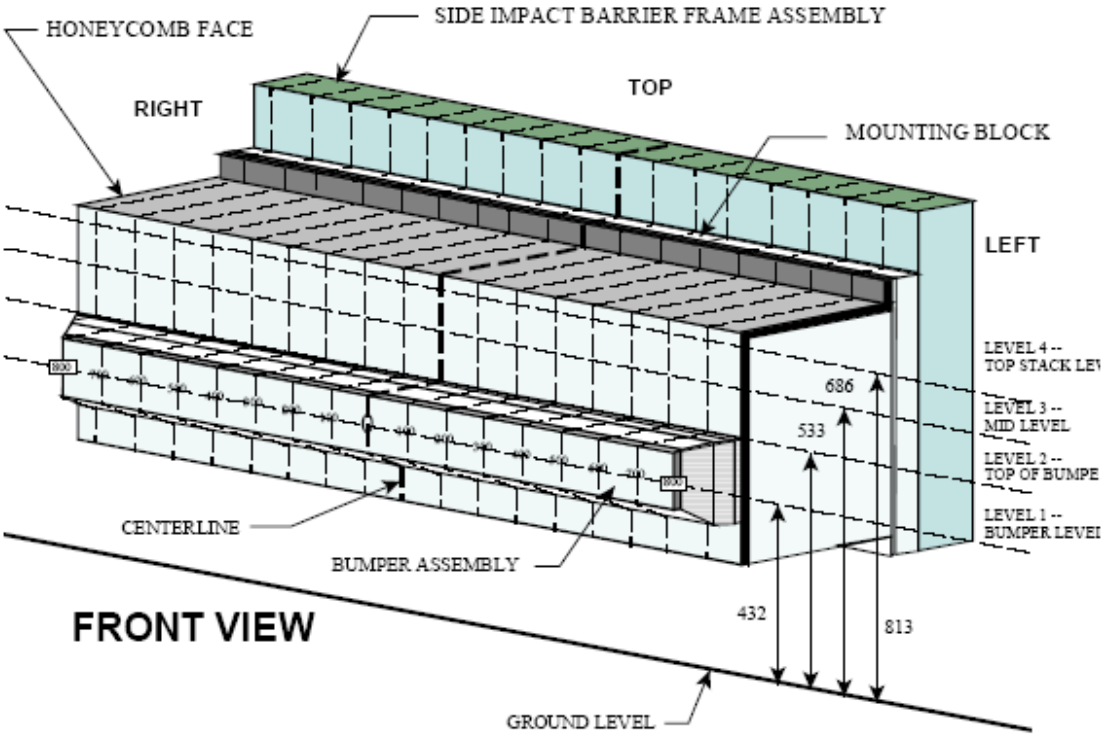


DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Maximum Static Crush (mm)
1	2400	2	-3	-20	-17
2	1800	1	89	405	316
3	1200	1	81	349	268
4	600	1	77	335	258
5	0	1	74	223	149
6	-600	3	-4	11	15

DATA SHEET NO. 14
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack	Distance Right of Center								C/L	Distance Left of Center							
Level	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	49	51	57	62	69	76	80	86	89	87	77	78	82	87	92	98	101
2	43	64	49	47	41	38	46	40	41	40	36	41	46	52	61	64	83
3	88	47	30	24	27	36	54	52	45	36	31	27	29	34	38	46	65
4	159	119	91	73	72	86	110	127	82	62	67	73	75	73	80	93	111

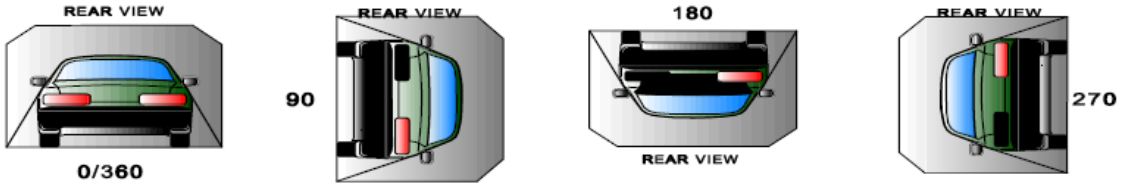
DATA SHEET NO. 15A
FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Ram 1500 Crew Cab **NHTSA No.:** MB0301
Test Program: Side MDB NCAP **Test Date:** 10/6/2010

Test Time: 3:00pm **Temperature:** 25° C

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

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	1:10	5:00	6:10
90 to 180	1:08	5:00	6:08
180 to 270	1:12	5:00	6:12
270 to 360	1:03	5:00	6:03

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	None	NA	NA	NA
90 to 180	None	NA	NA	NA
180 to 270	None	NA	NA	NA
270 to 360	None	NA	NA	NA

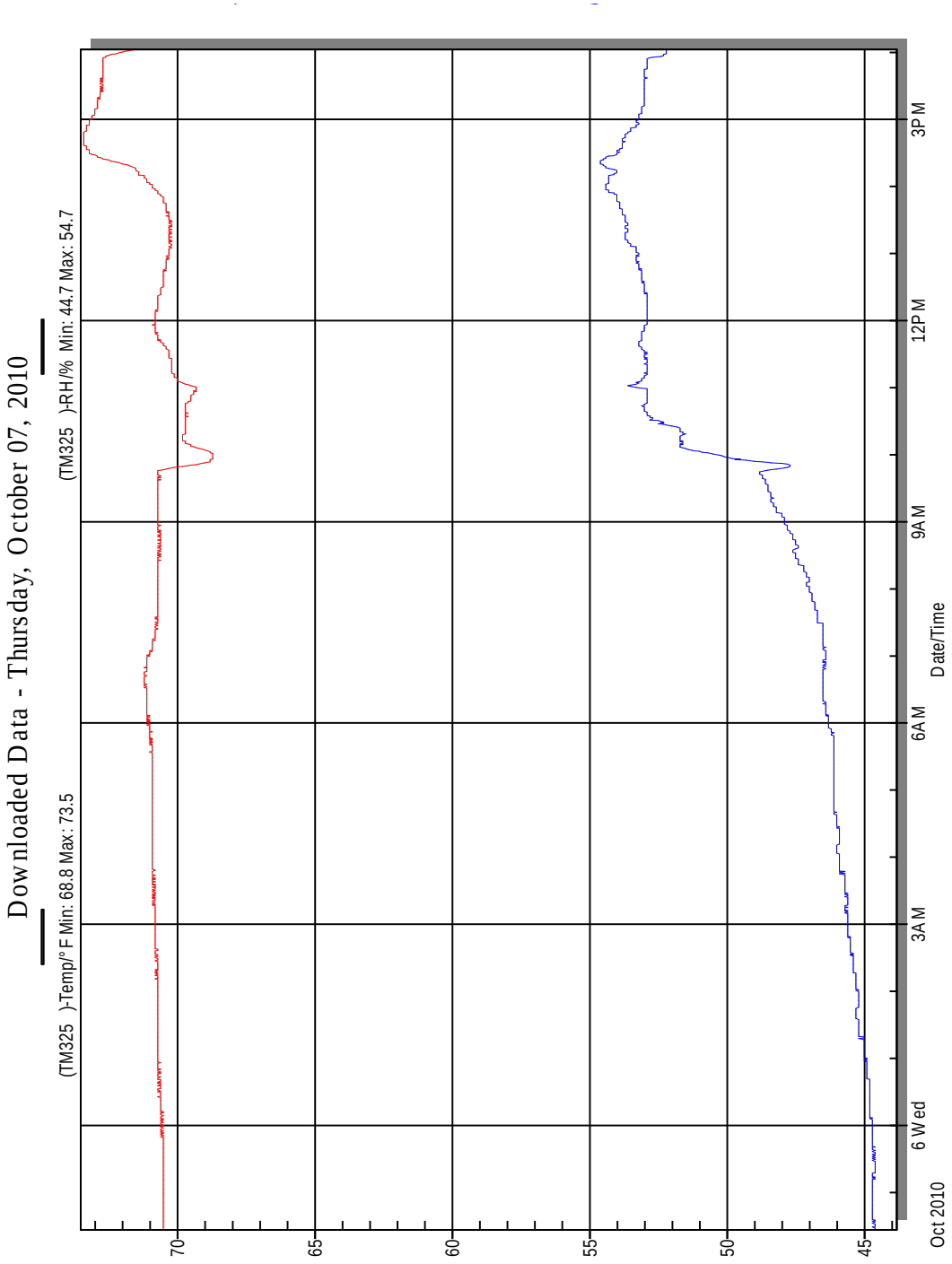
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 16

DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle:	**2011 Ram 1500 Crew Cab**	**NHTSA No.:**	**MB0301**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/6/2010**



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure A-1: As-Delivered Right Front ¾ View of Test Vehicle

Figure A-2: As-Delivered Left Rear ¾ View of Test Vehicle

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

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

Photo Not Available

Figure A-5: Pre-Test Left Front ¾ View of Test Vehicle

Figure A-6: Post-Test Left Front ¾ View of Test Vehicle

Photo Not Available

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 ¾ View of Test Vehicle

Photo Not Available

Figure A-10: Post-Test Left Rear ¾ View of Test Vehicle

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

Figure A-12: Post-Test Rear 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 Vehicle and MDB

Figure A-16: Post-Test Overhead View of Test Vehicle and MDB

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

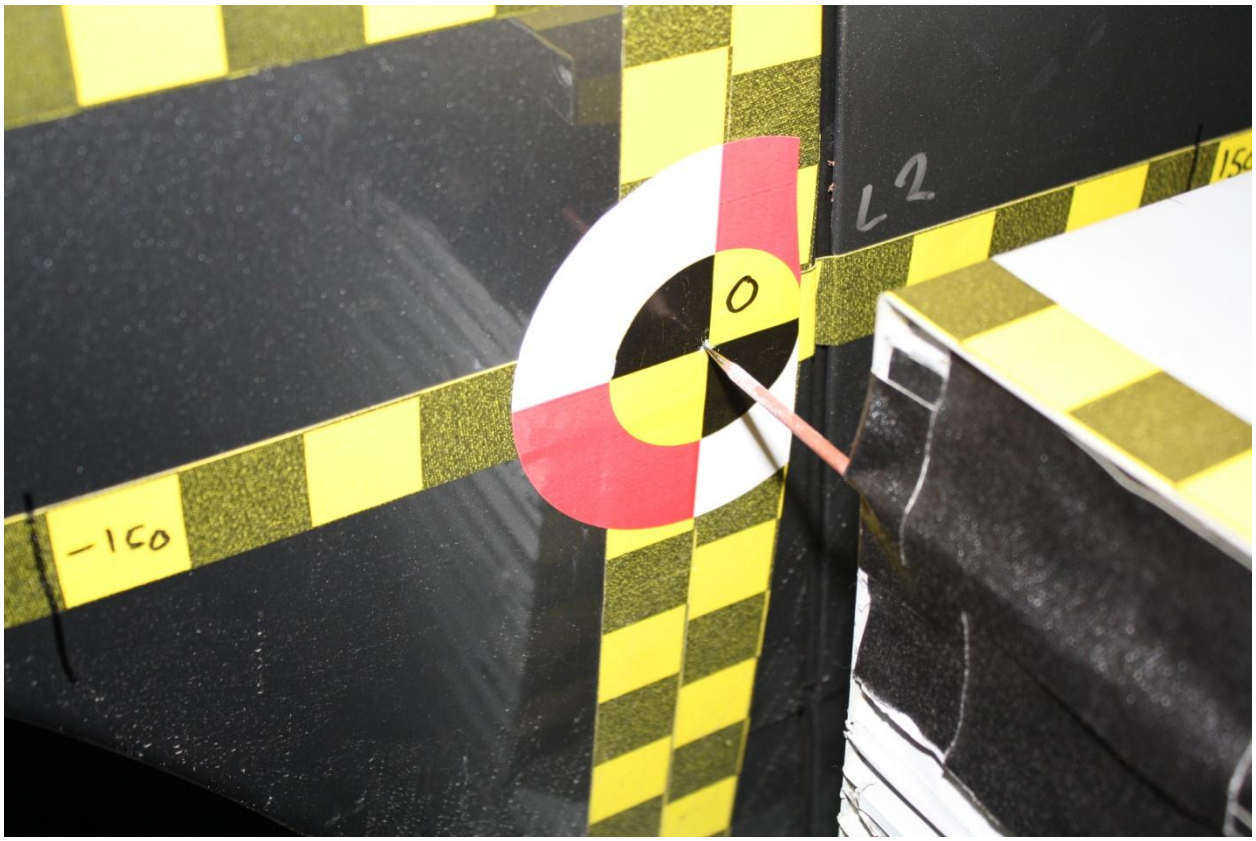


Figure A-19: Pre-Test Close-up View of Impact Point Target

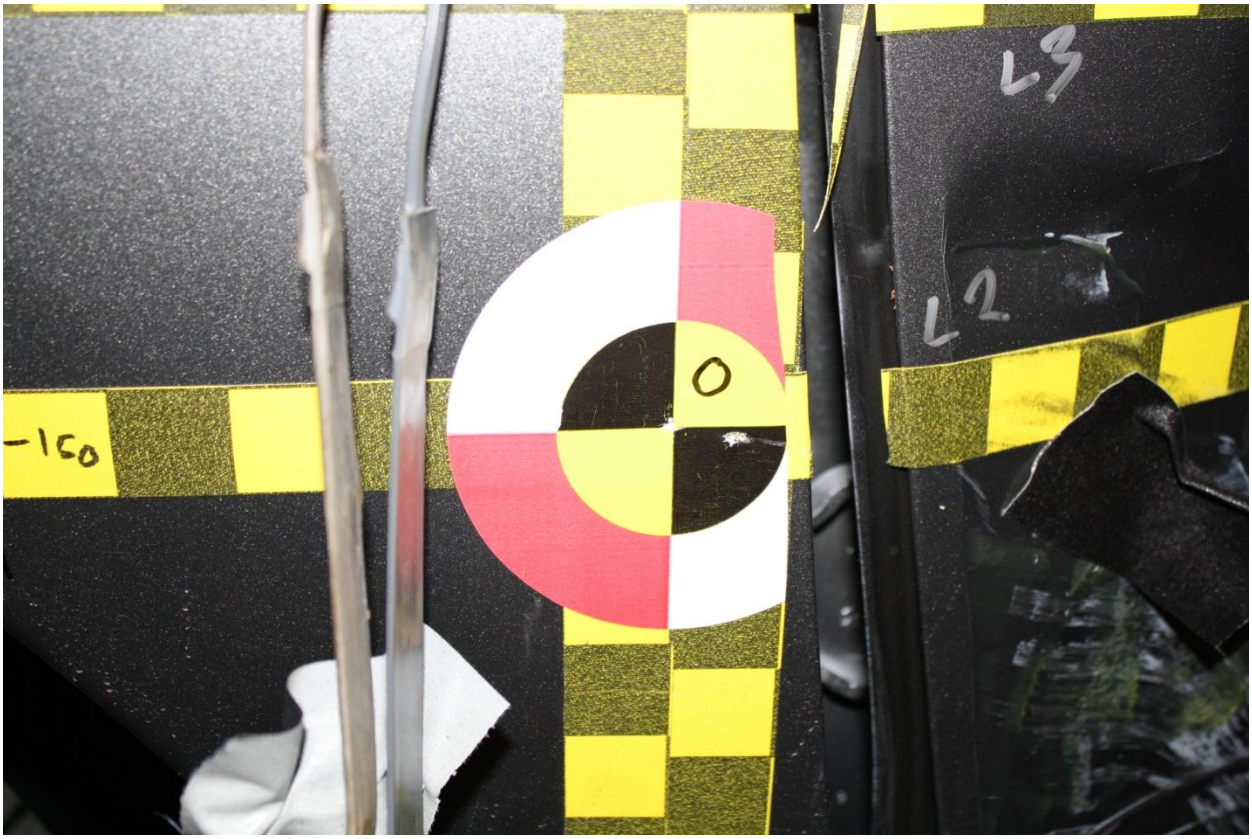


Figure A-20: Post-Test Close-up View of Impact Point Target

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

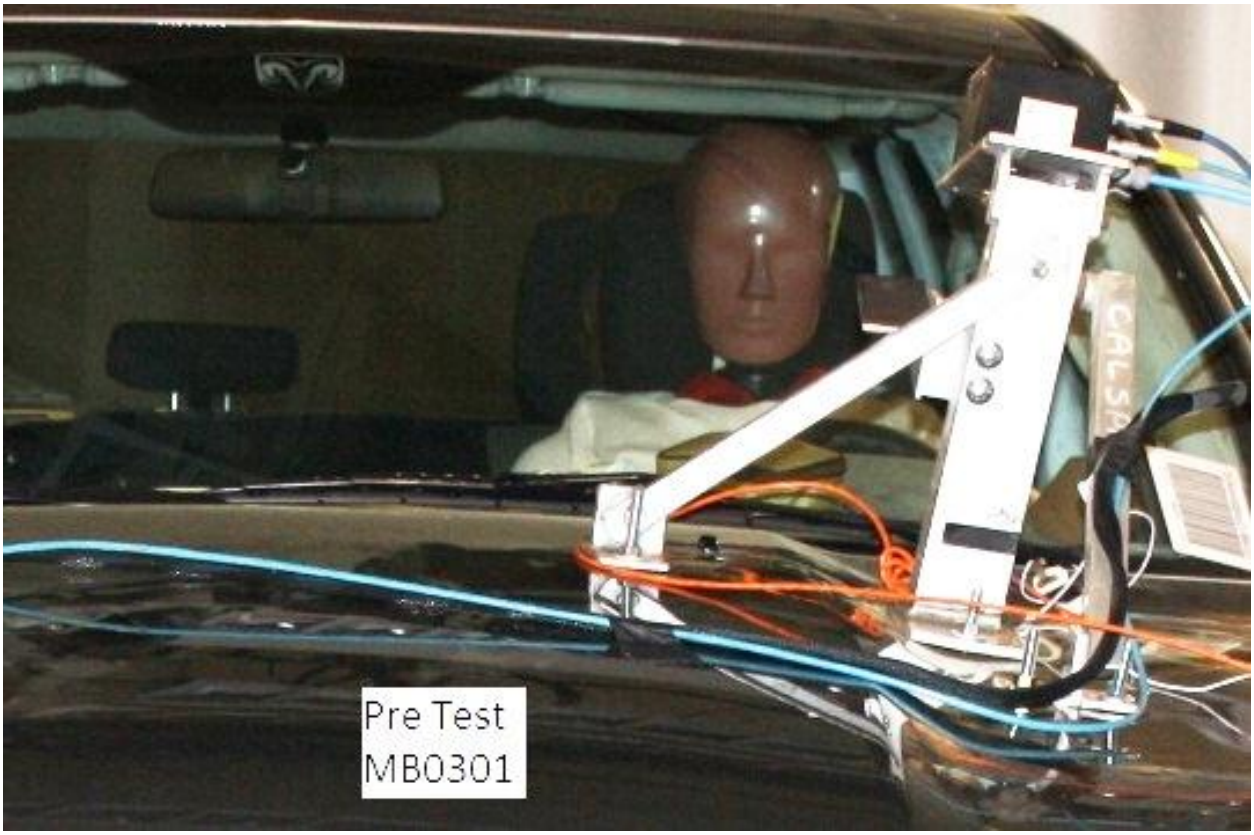


Figure A-25: Pre-Test Front Close-up View of Driver Dummy

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, Chalking, and Contact Switches

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

Photo Not Available

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

Photo Not Available

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

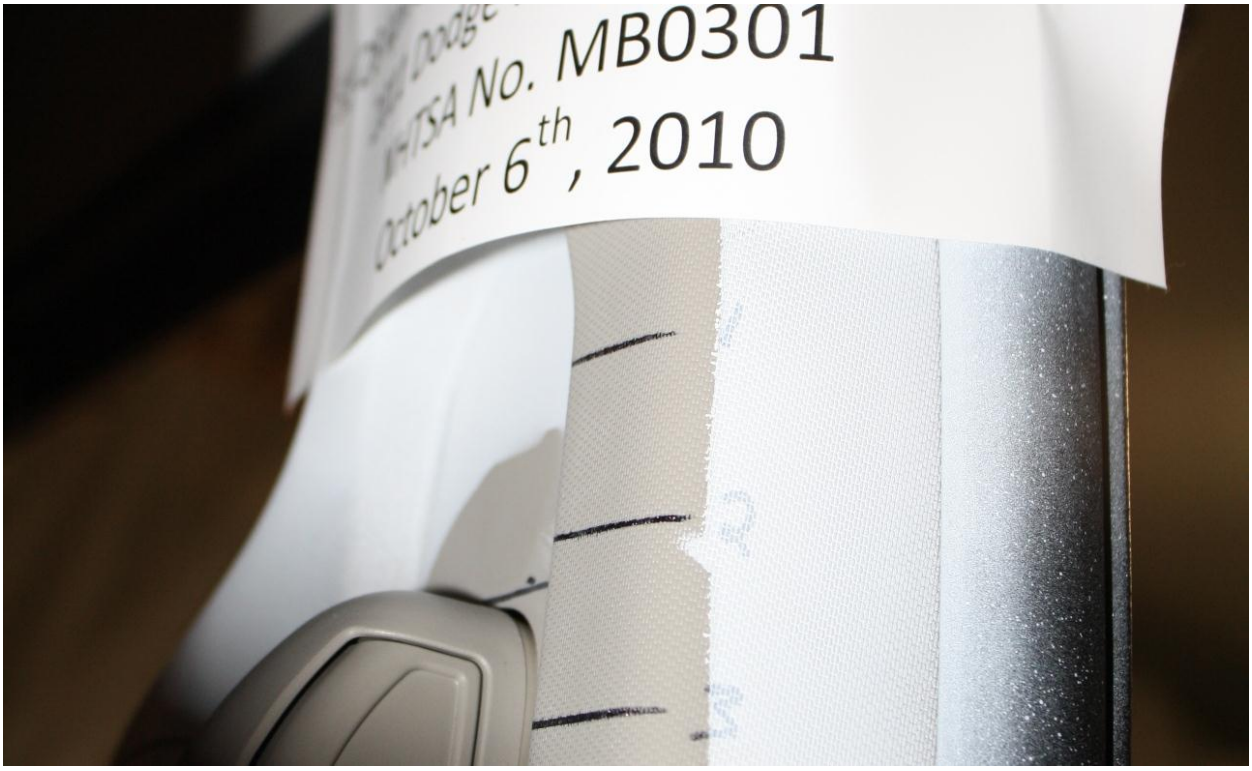


Figure A-35: Pre-Test View of Belt Anchorage for Driver Dummy to Show Position

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

Figure A-37: Pre-Test View of Parking Brake

Figure A-38: Pre-test Close-up Left Side View of Driver Seat Track Showing Seat Positioning

Figure A-39: Pre-test Close-up Left Side View of Driver Seat Back Showing Seat Back Positioning

Figure A-40: Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position

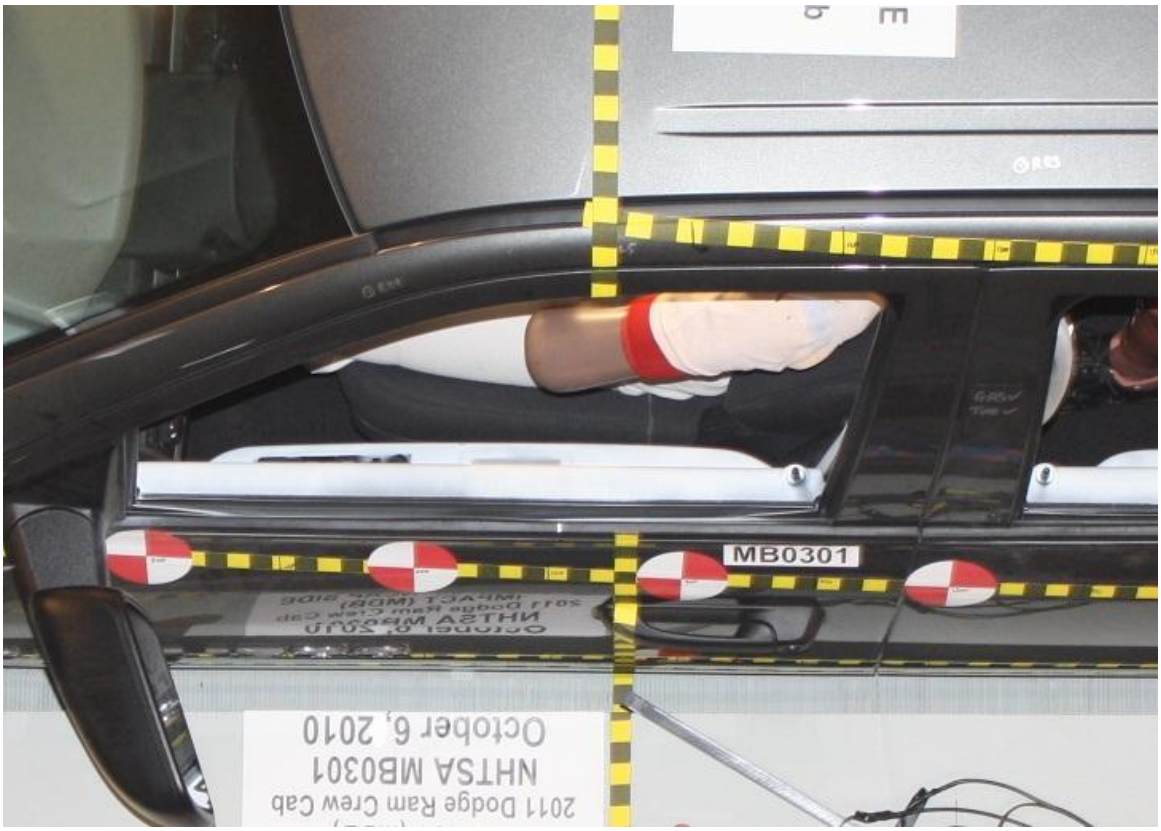


Figure A-41: Pre-test Driver Dummy and Door Clearance View

Figure A-42: Post-test Driver Dummy and Door Clearance View

Figure A-43: Pre-test Right Side View of Driver Dummy and Front Seat of Occupant Compartment

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

Figure A-45: Pre-test Driver Inner Door Panel View

Photo Not Available

Figure A-46: Post-test Driver Inner Door Panel View Showing Driver Dummy Contact Locations

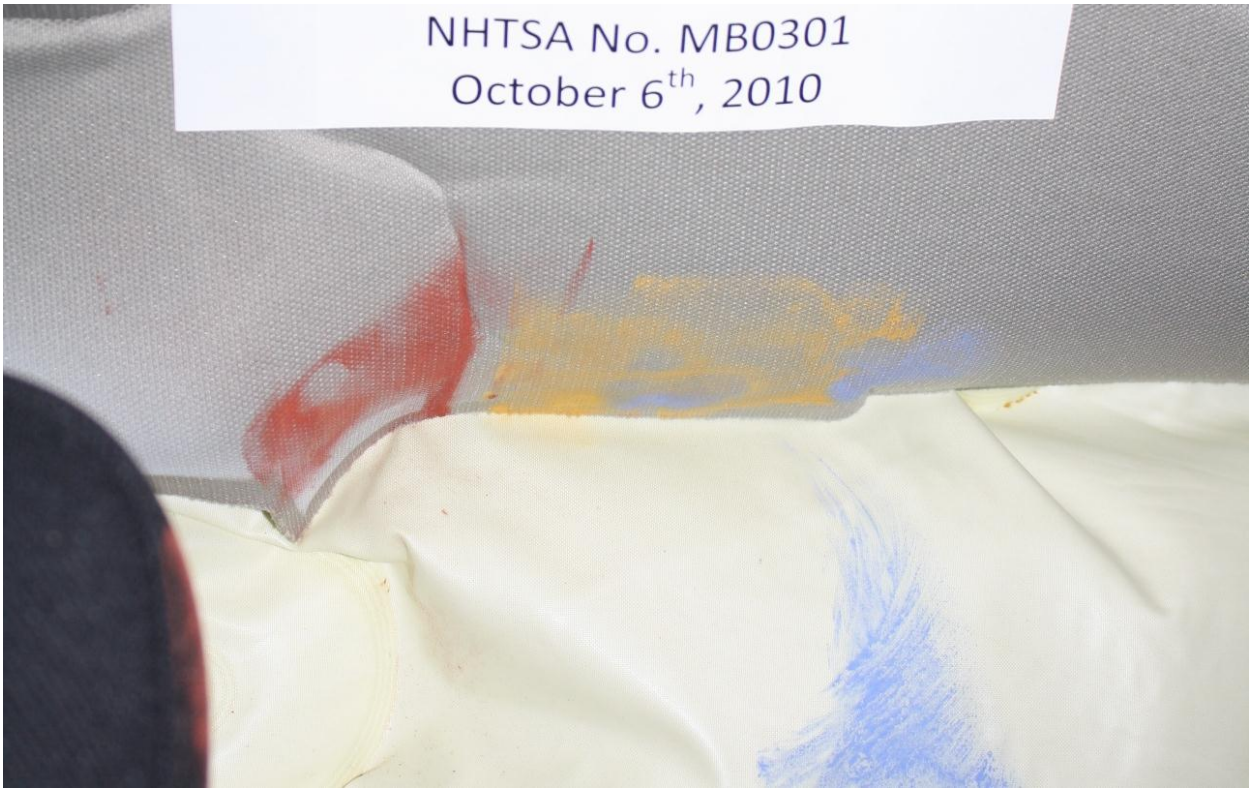


Figure A-47: Post-test Driver Dummy Close-Up Head Contact with Vehicle View

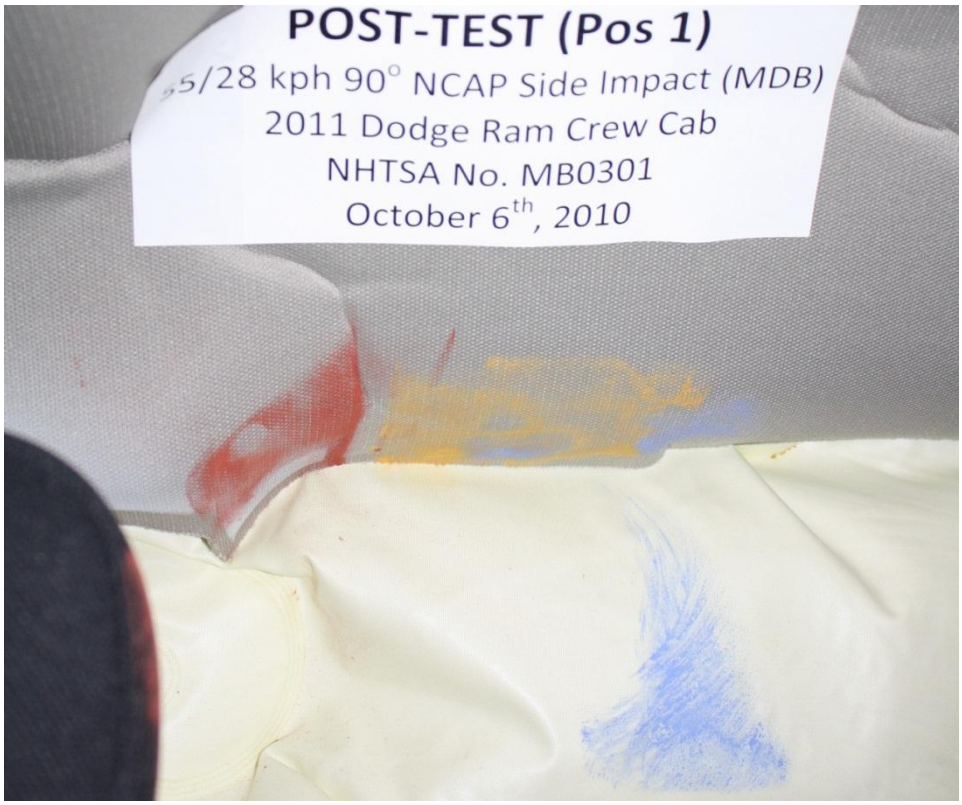


Figure A-48: Post-test Driver Dummy Close-Up Head Contact with Side Airbag View

Figure A-49: Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

Figure A-50: Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

Figure A-51: Post-Test Driver Dummy Close-Up Pelvis Contact View

Photo Not Applicable

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

Figure A-53: Pre-test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches

Figure A-54: Pre-test Left Side View of Passenger Dummy Shoulder and Door Top View

Photo Not Available

Figure A-55: Post-test Left Side View of Passenger Dummy Shoulder and Door Top View

Figure A-56: Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning

Photo Not Available

Figure A-57: Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint

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

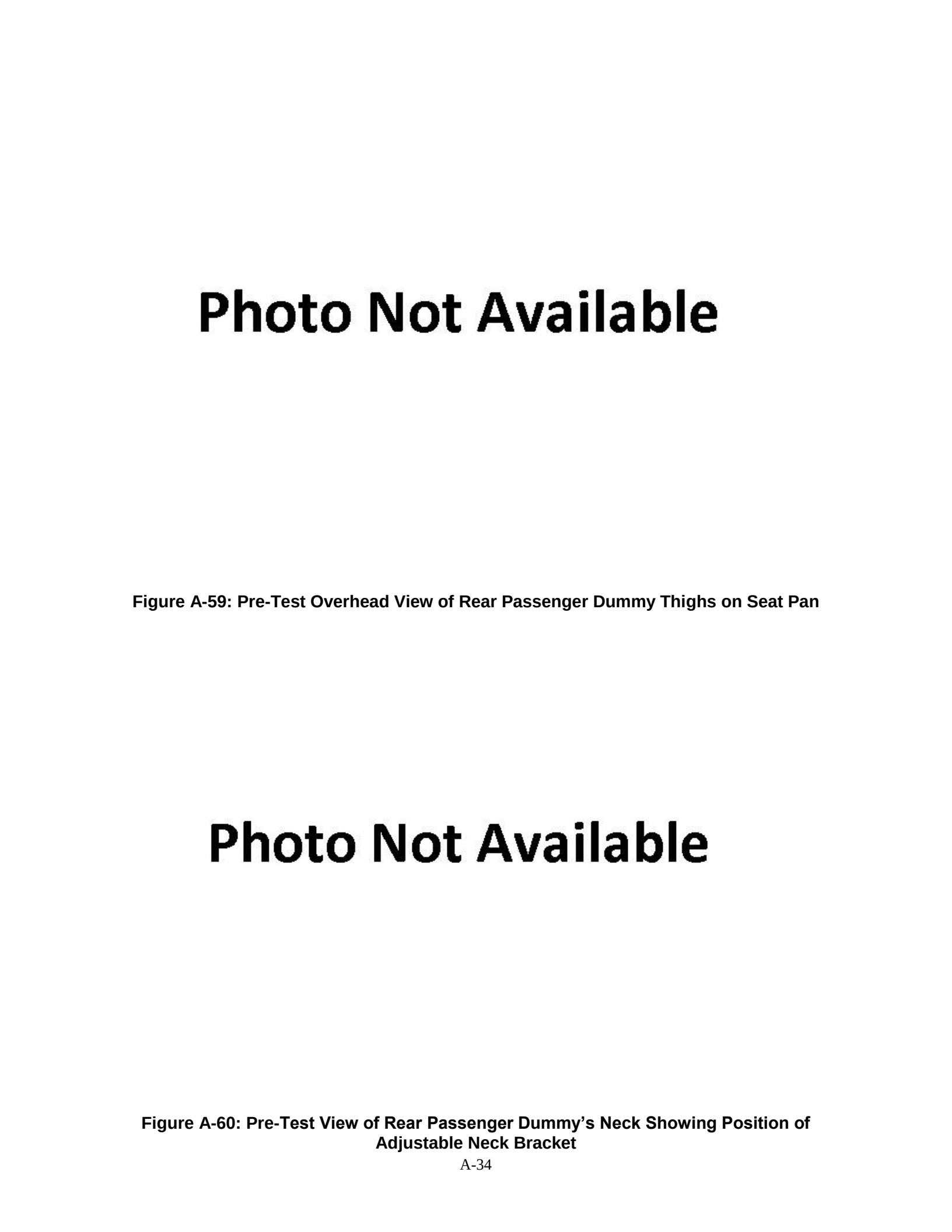


Figure A-59: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

Figure A-60: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

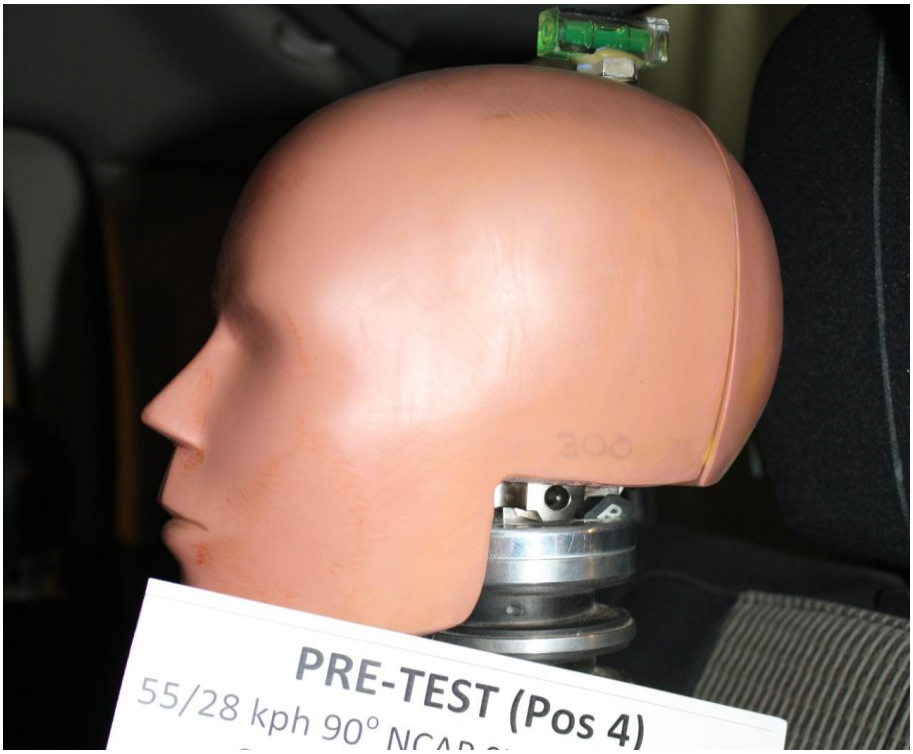


Figure A-61: Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level

Figure A-62: Pre-Test Placement of Rear Passenger Dummy's Feet

Figure A-63: Pre-Test View of Belt Anchorage for Rear Passenger Dummy to Show Position

Photo Not Applicable

Figure A-64: Pre-test Close-Up Left Side View of Rear Passenger Seat Track Showing Test Position

Figure A-65: Pre-test Close-Up Left Side View of Rear Passenger Seat Back Showing Test Position

Figure A-66: Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint Showing Seat Back Test Position

Figure A-67: Pre-Test Passenger Dummy and Door Clearance View

Photo Not Available

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

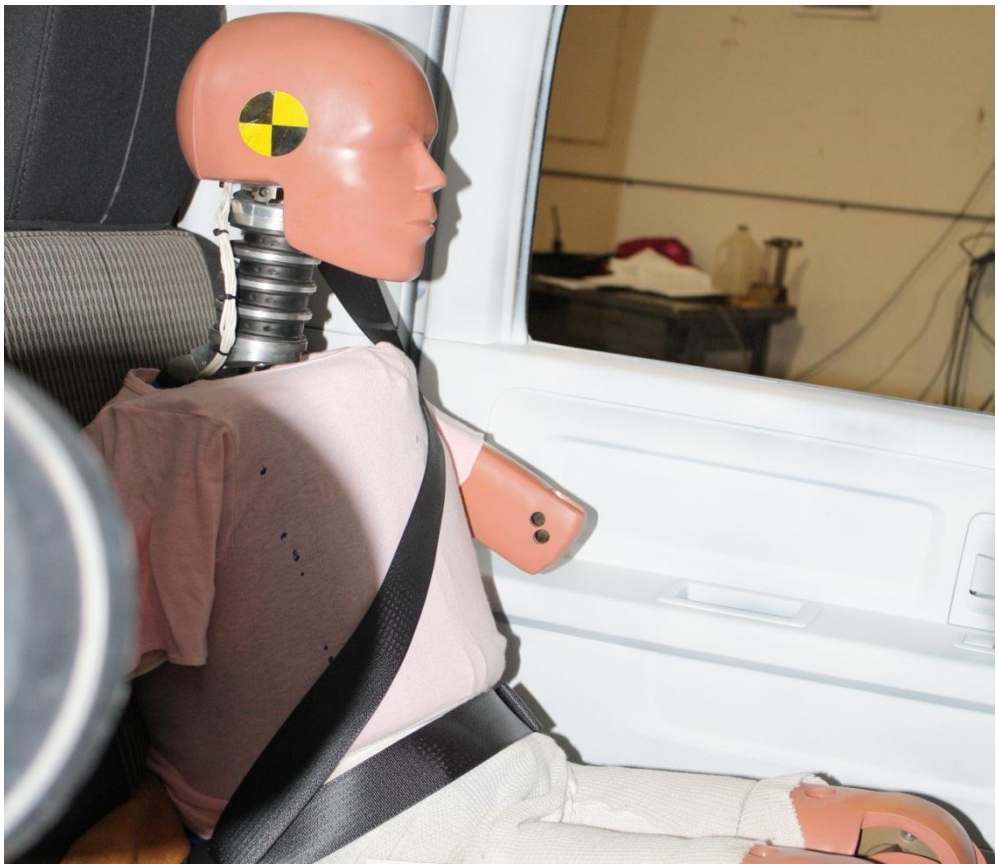


Figure A-69: Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

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

Figure A-71: Pre-test Passenger Inner Door Panel View

Figure A-72: Post-test Passenger Inner Door Panel View Showing Rear Passenger Dummy Contact Locations

Figure A-73: Post-test Rear Passenger Dummy Close-Up Head Contact with Vehicle View

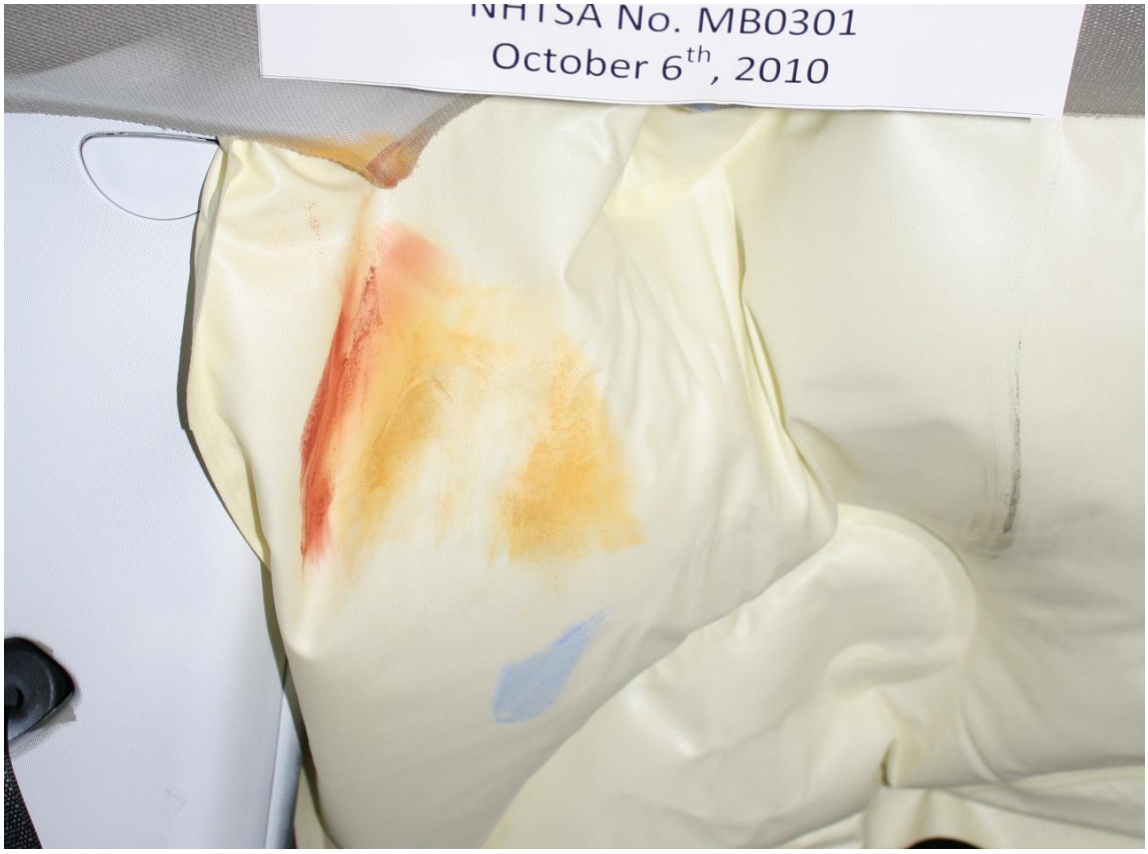


Figure A-74: Post-test Rear Passenger Dummy Close-Up Head Contact with Side Airbag View

Figure A-75: Post-Test Rear Passenger Dummy Close-Up Torso Contact with Vehicle Interior View

Photo Not Applicable

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

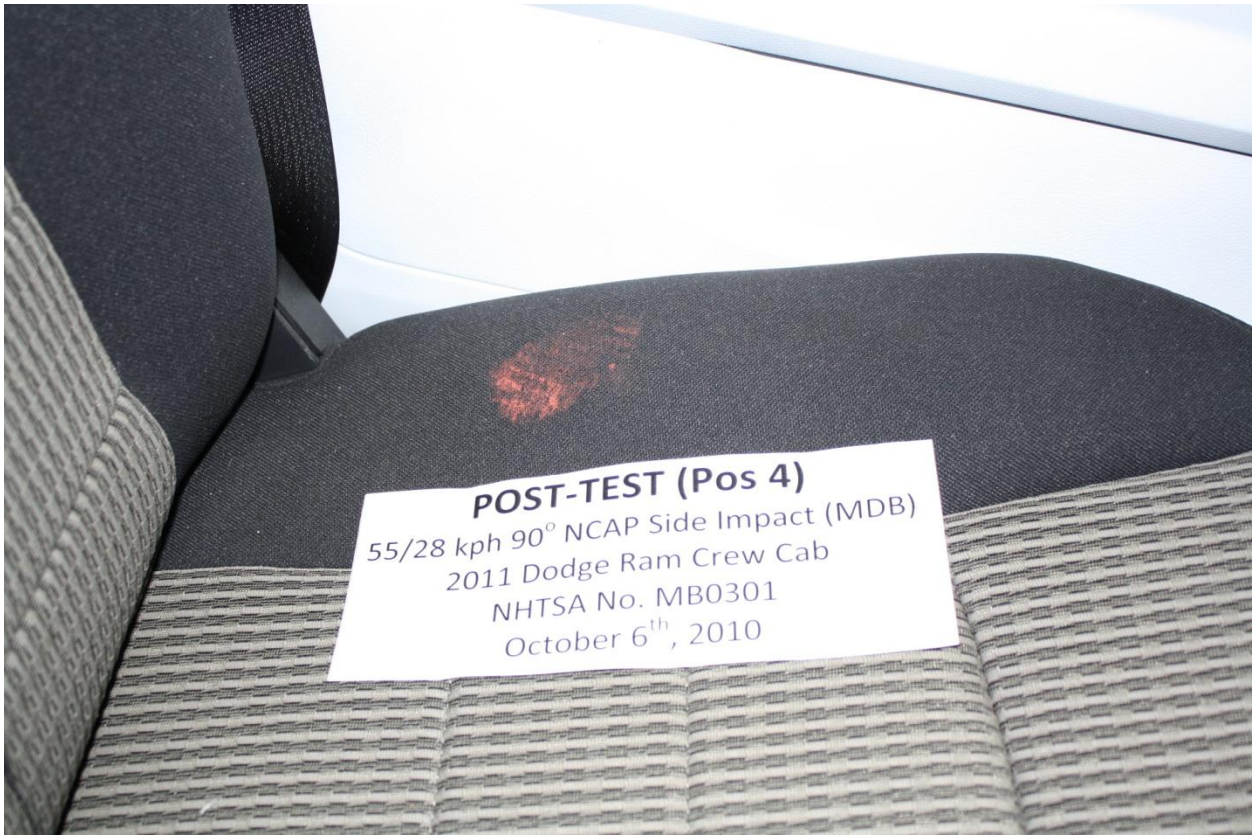


Figure A-77: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

Photo Not Applicable

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

Figure A-79: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

Figure A-81: Pre-Test Front View of MDB Impactor Face

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

Figure A-83: Pre-Test Top View of MDB Impactor Face

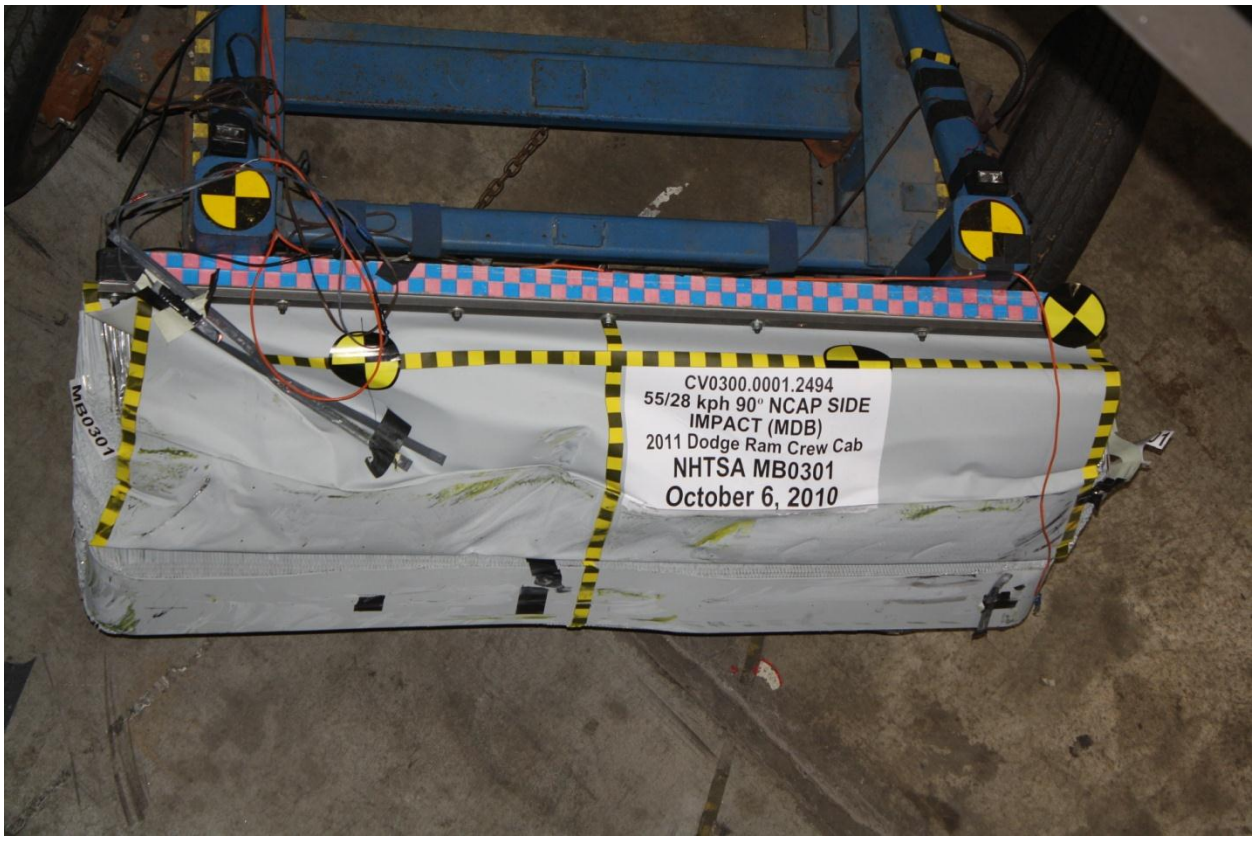


Figure A-84: Post-Test Top View of MDB Impactor Face

Figure A-85: Pre-Test Left Side View of MDB Impactor Face

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

Figure A-87: Pre-Test Right Side View of MDB Impactor Face

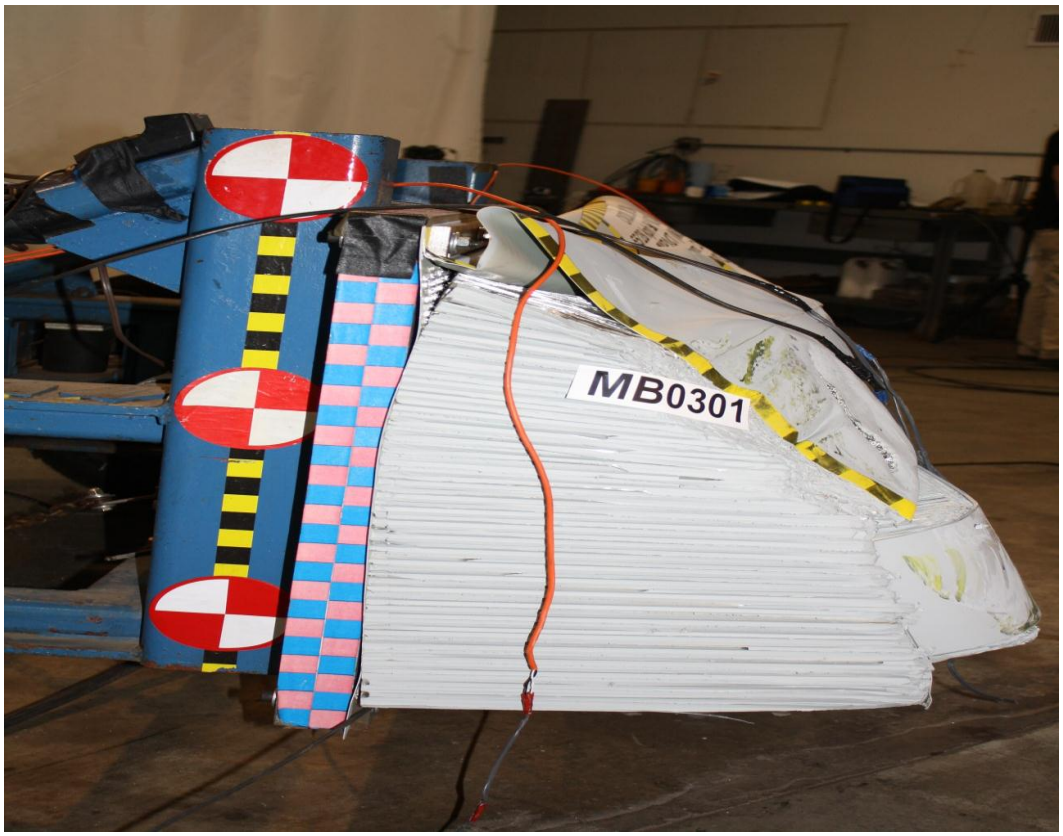


Figure A-88: Post-Test Right Side View of MDB Impactor Face

Figure A-89: Close-Up View of Vehicle's Certification Label

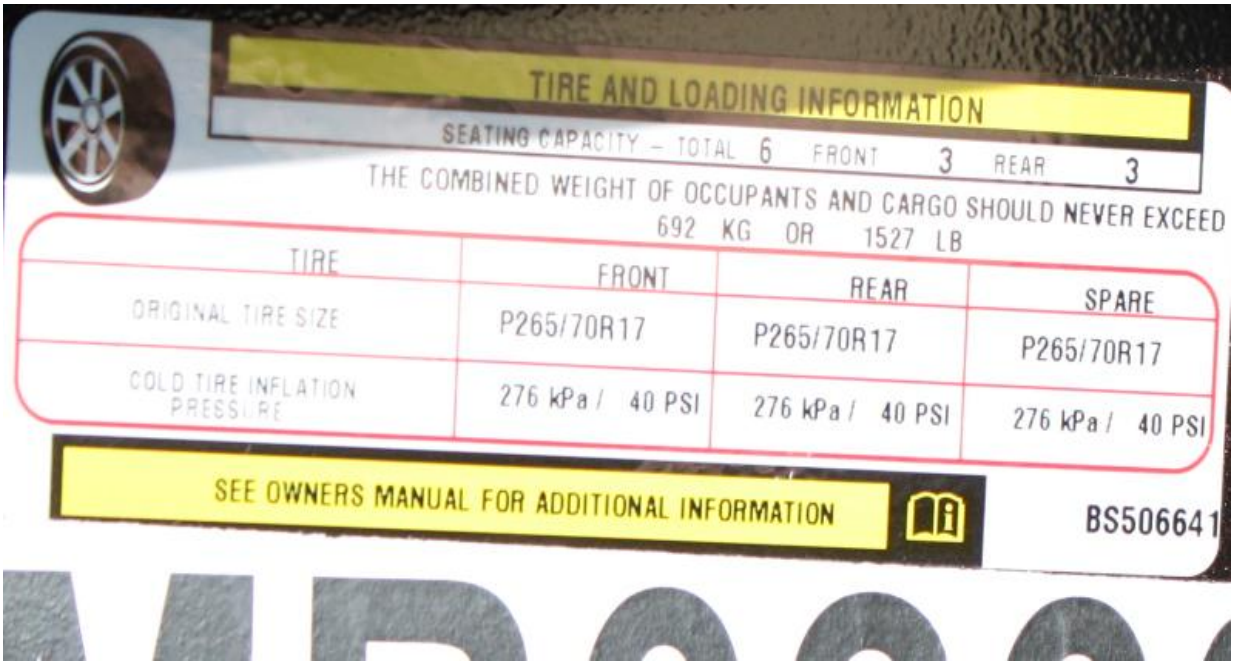


Figure A-90: Close-Up View of Vehicle's Tire Information Placard or Label

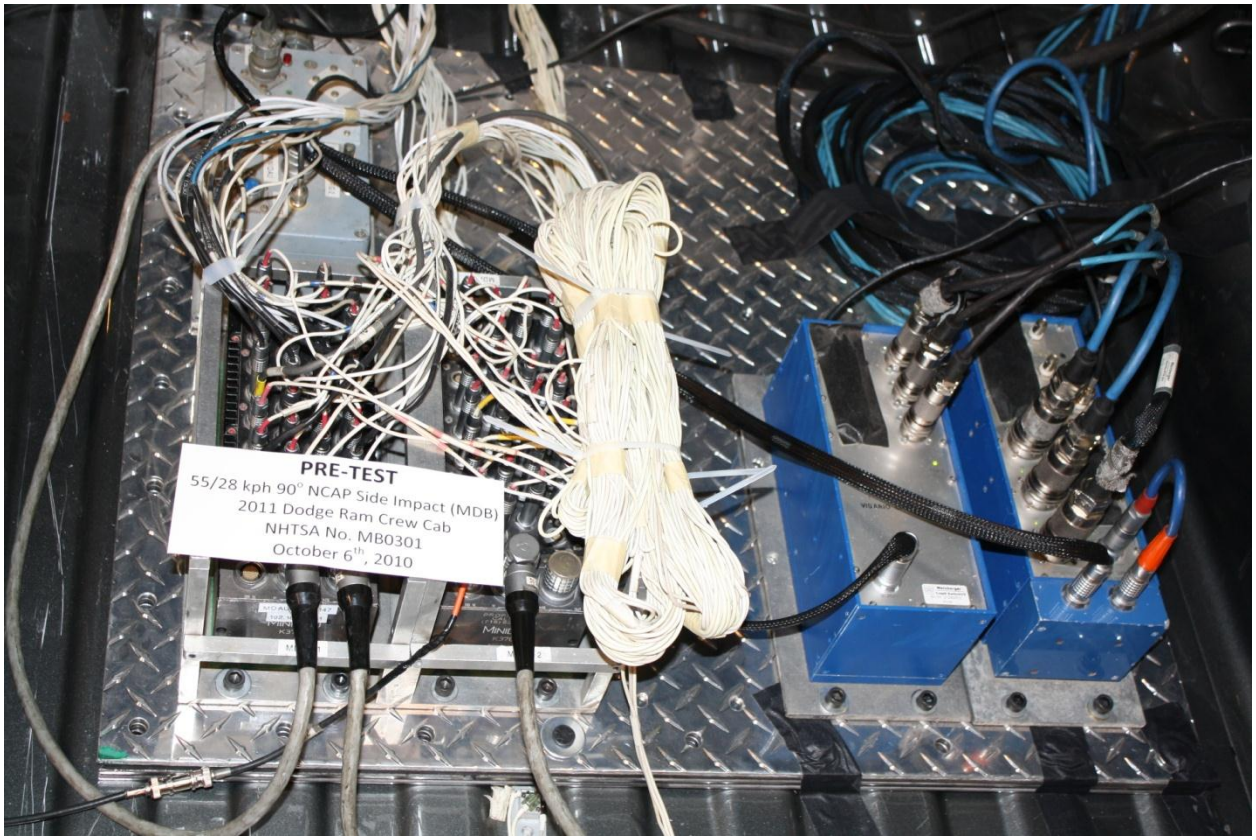


Figure A-91: Pre-Test Ballast View

Photo Not Available

Figure A-92: Post-Test Primary and Redundant Speed Trap Read-Out

Figure A-93: FMVSS No. 301 Rollover 0°

Figure A-94: FMVSS No. 301 Rollover 90°

Figure A-95: FMVSS No. 301 Rollover 180°

Figure A-96: FMVSS No. 301 Rollover 270°

Figure A-97: FMVSS No. 301 Rollover 360°

Figure A-98: Impact Event (Impact Side)

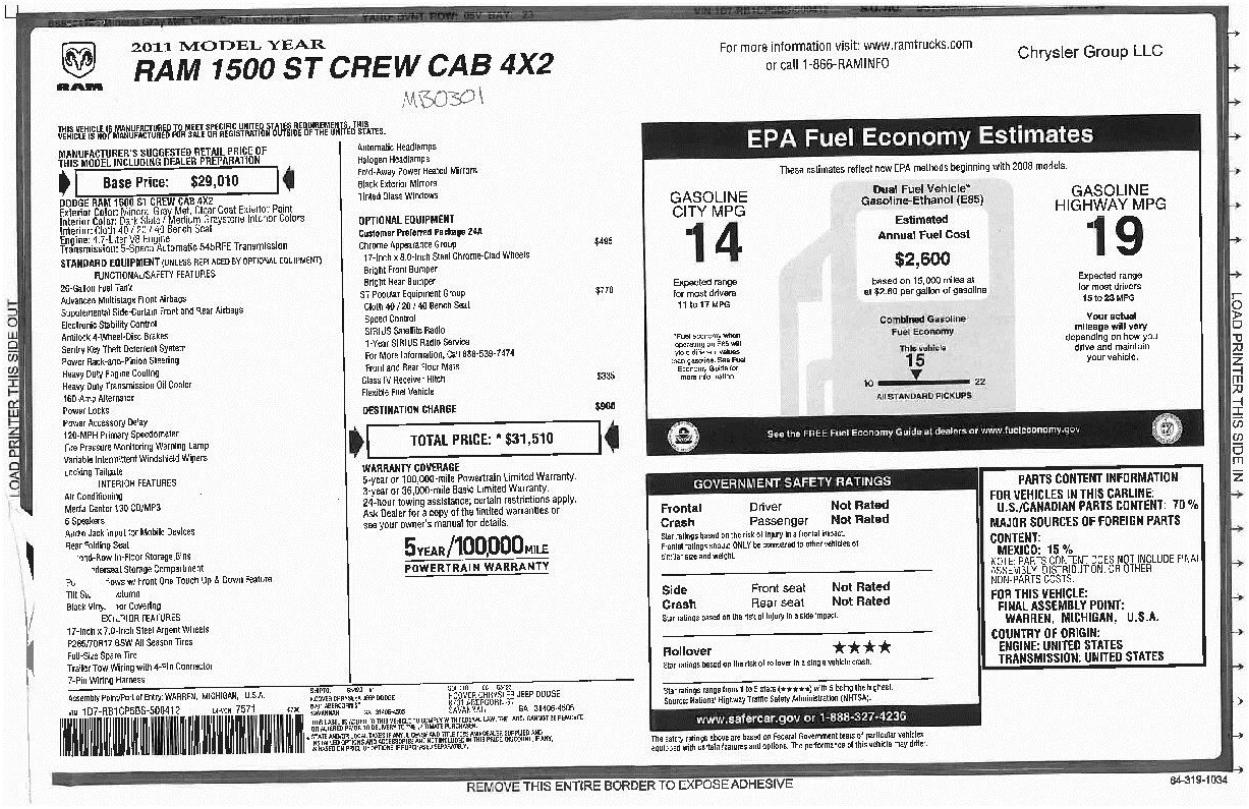


Figure A-99: Monroney Label

Photo Not Available

Figure A-100: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

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

APPENDIX B
DUMMY RESPONSE DATA

The following data plots shall be included in this appendix:

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

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.

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)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)
Passenger Shoulder Contact Switch
Passenger Torso Contact Switch
Passenger Pelvis Contact Switch

Vehicle Instrumentation Data

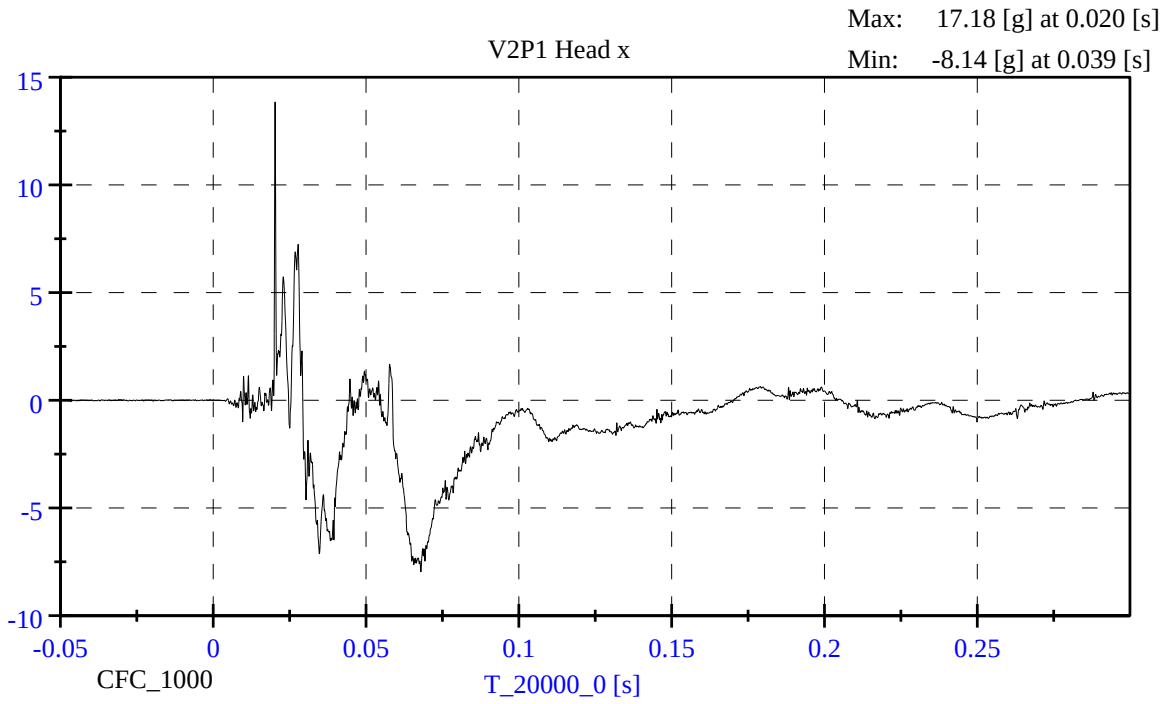
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Passenger Side Airbag Timing (if applicable)
Passenger Side Curtain Airbag Timing (if different from Driver)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (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)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Right Rear Occupant Compartment 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)

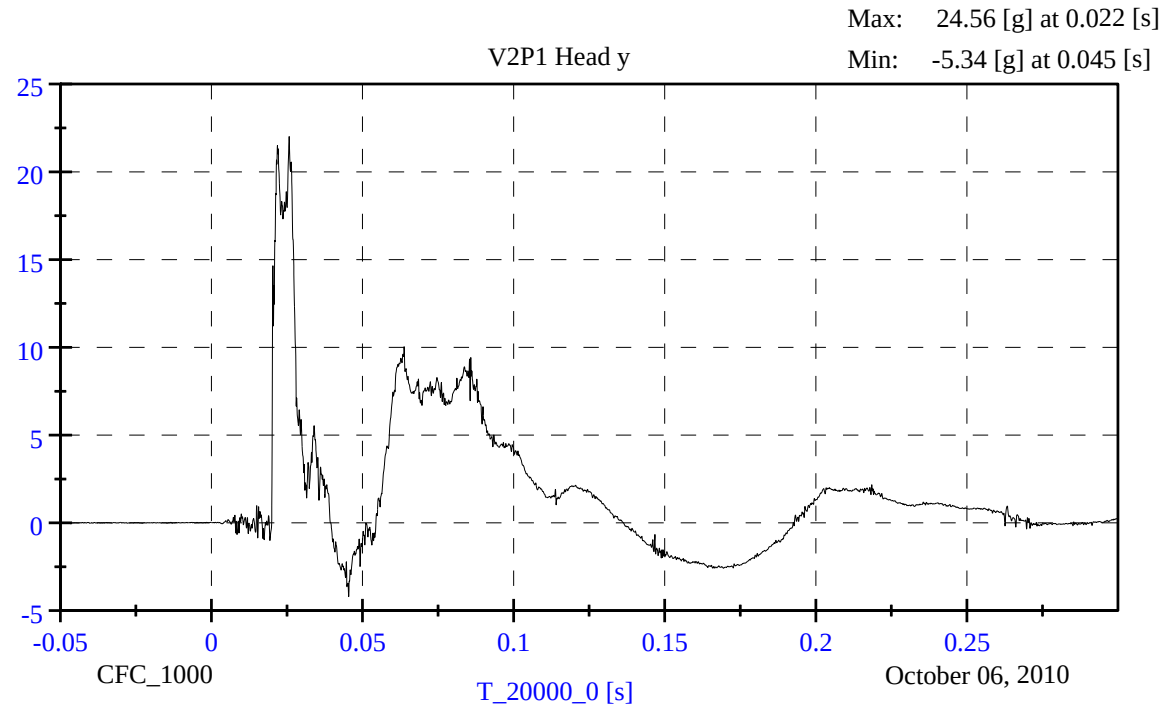
Rear Seat Track Acceleration (Y)
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)

MDB Instrumentation Data

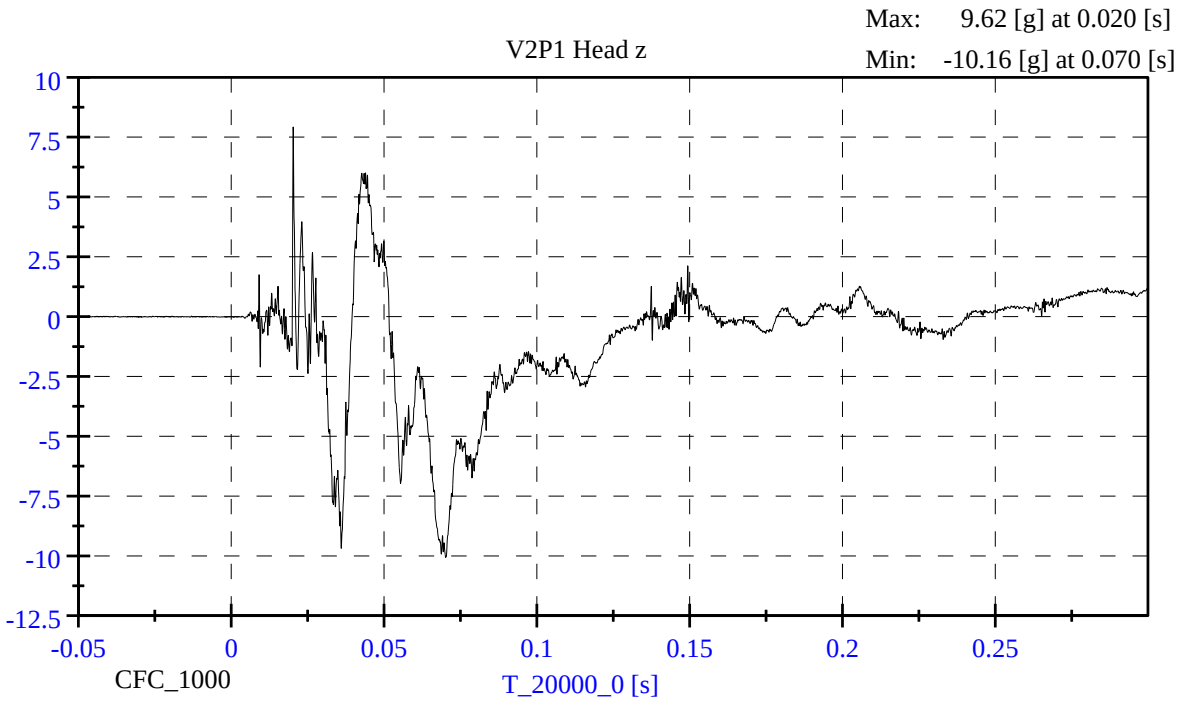
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

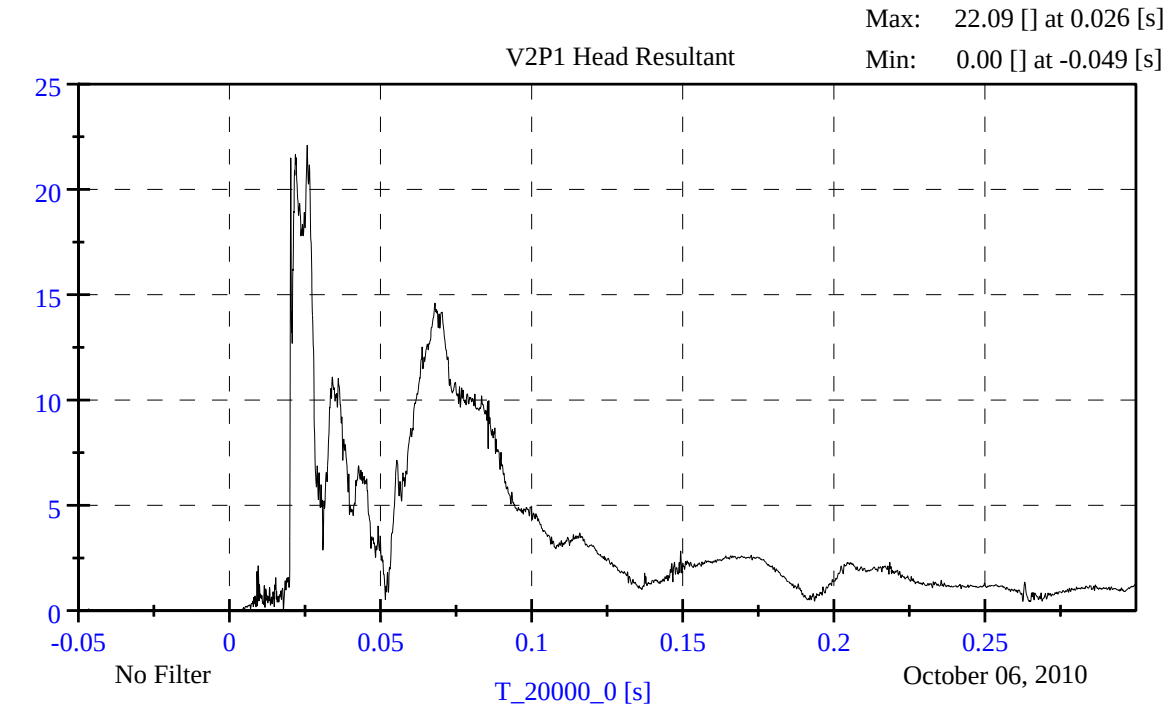
MB0301 SNCAP 2011 Ram 1500 Crew Cab



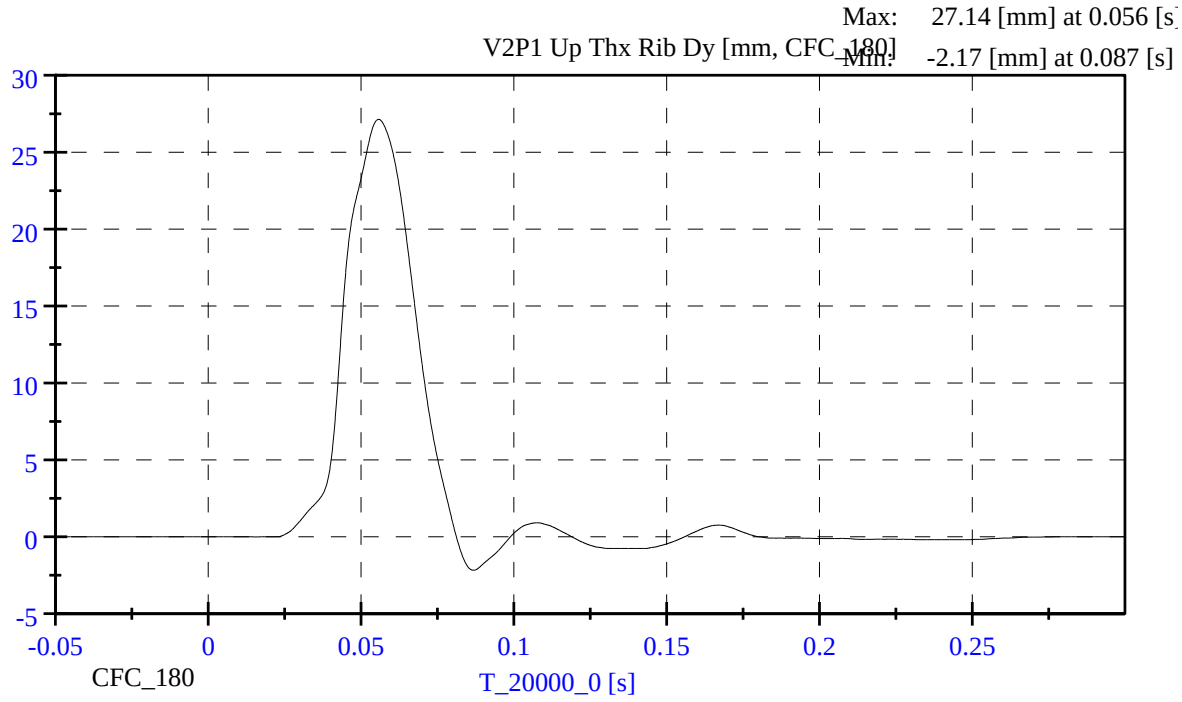


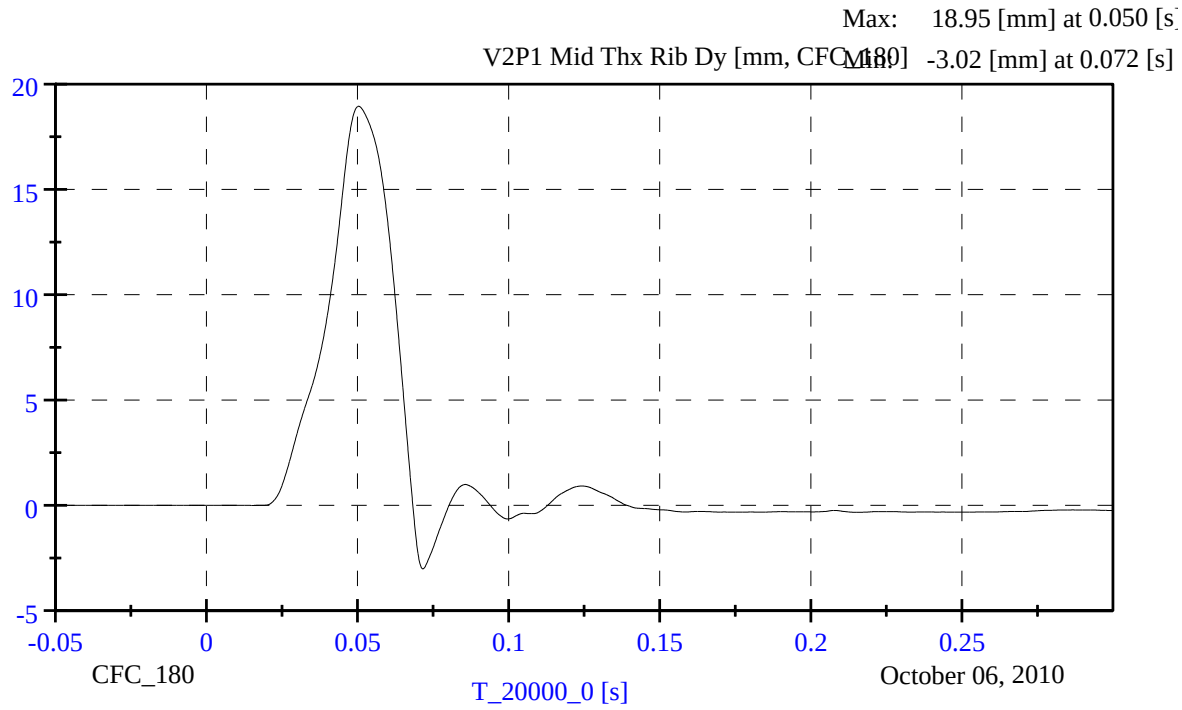
MB0301 SNCAP 2011 Ram 1500 Crew Cab



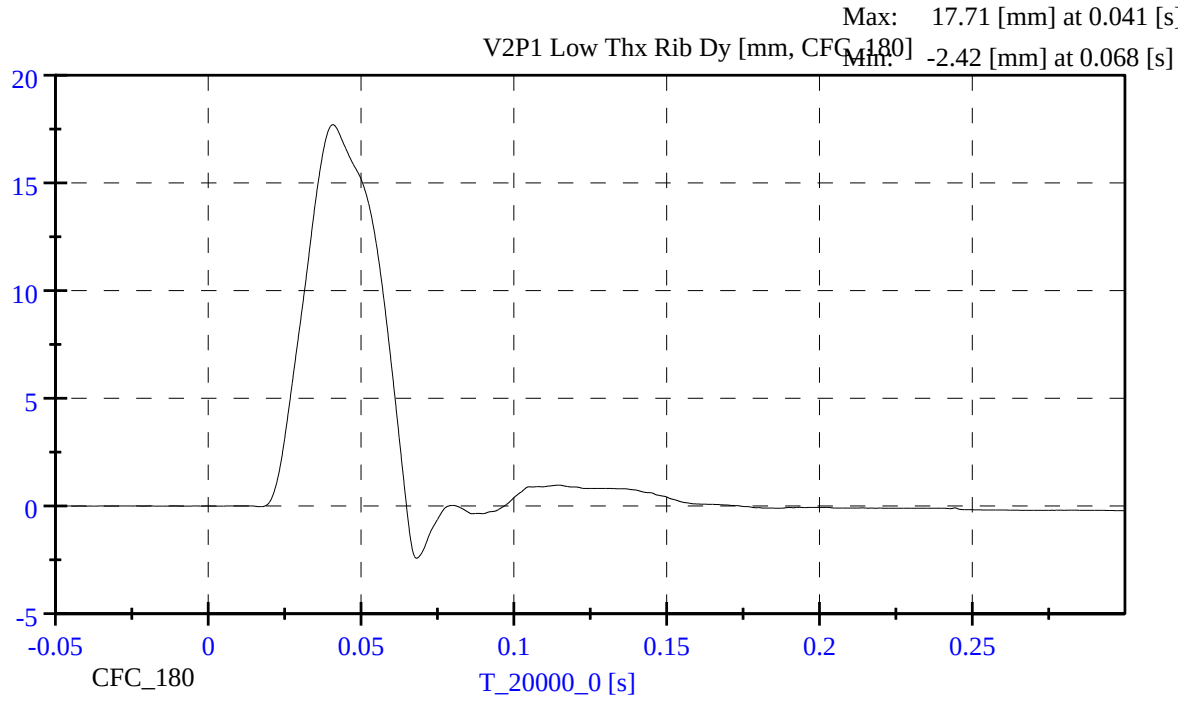


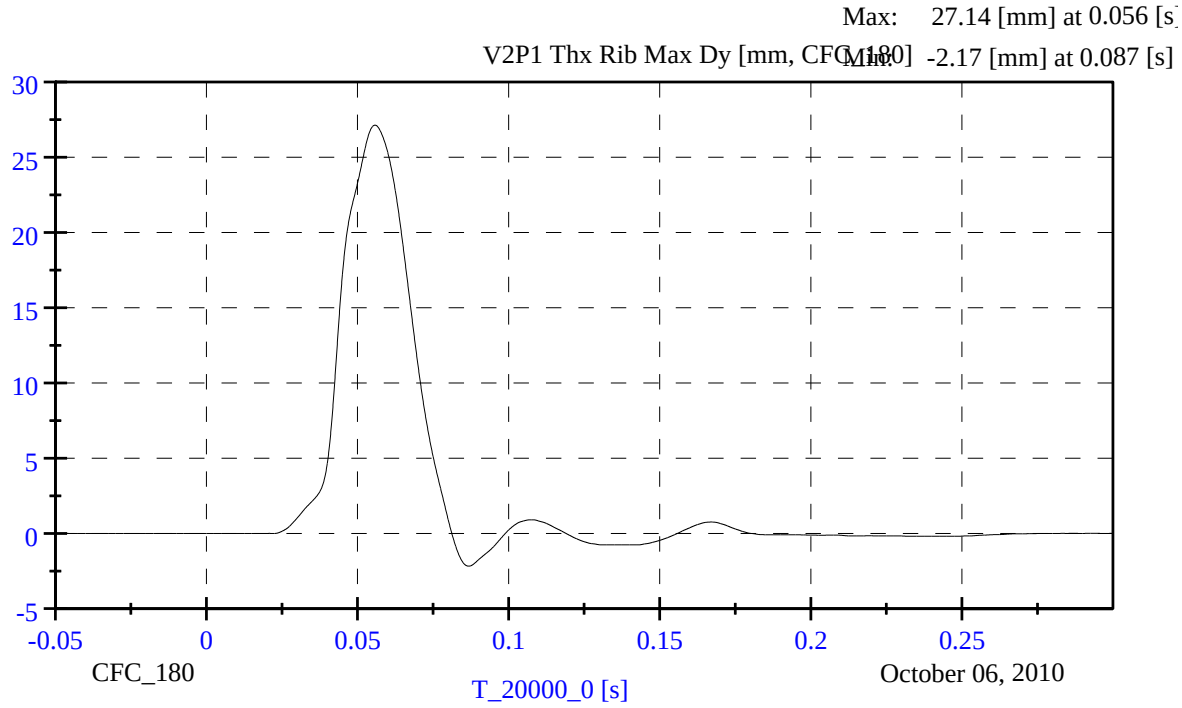
MB0301 SNCAP 2011 Ram 1500 Crew Cab



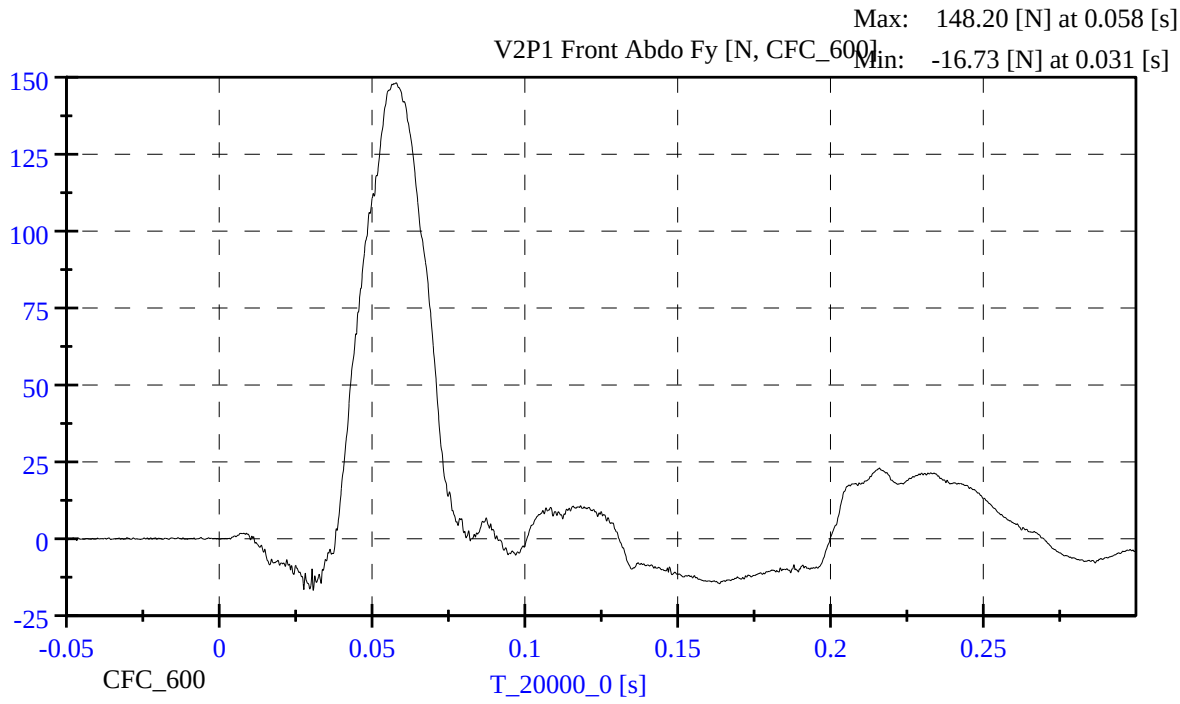


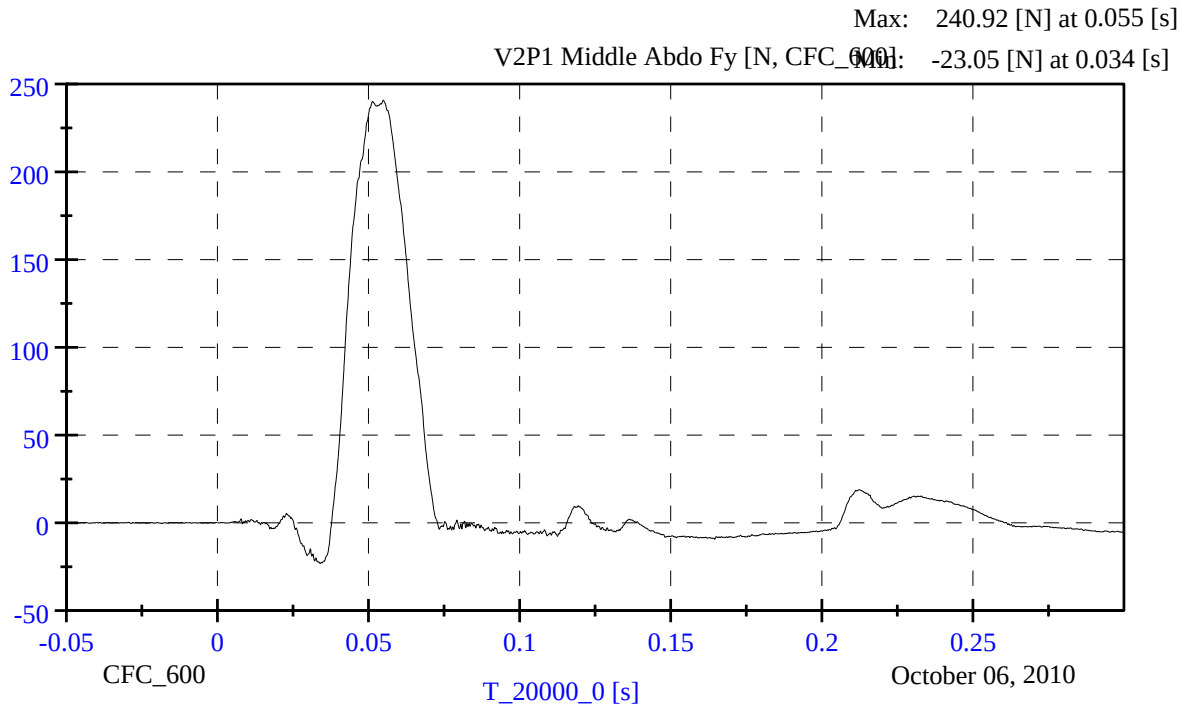
MB0301 SNCAP 2011 Ram 1500 Crew Cab



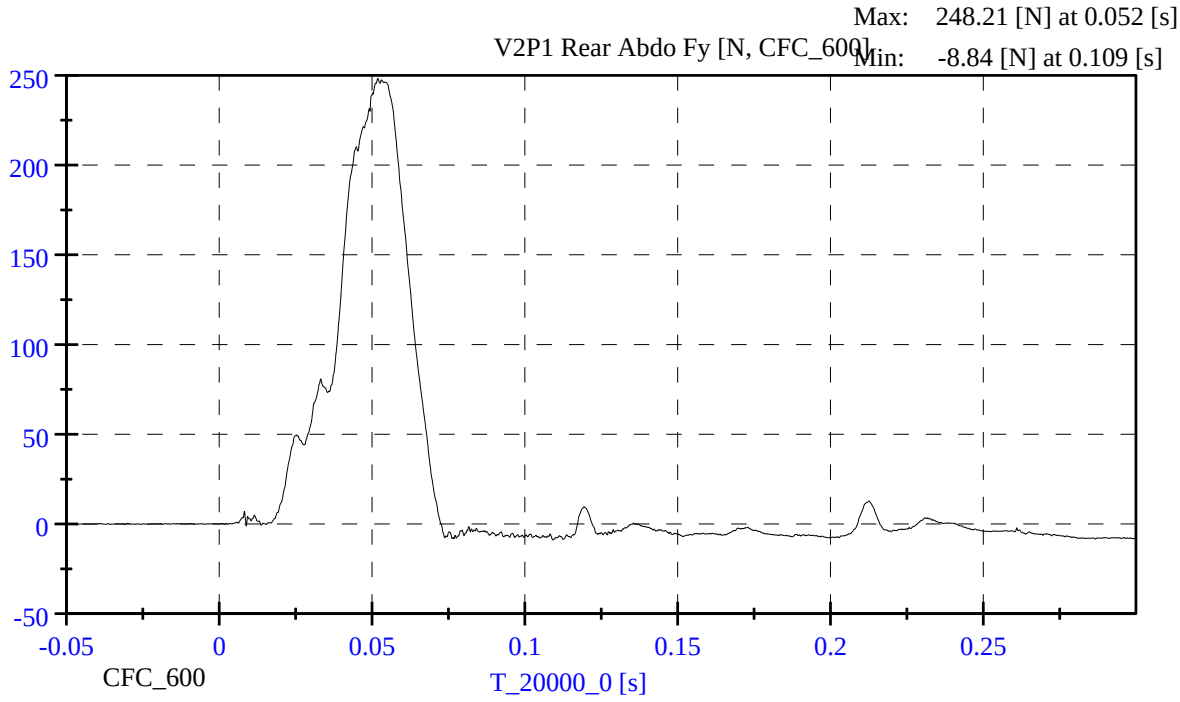


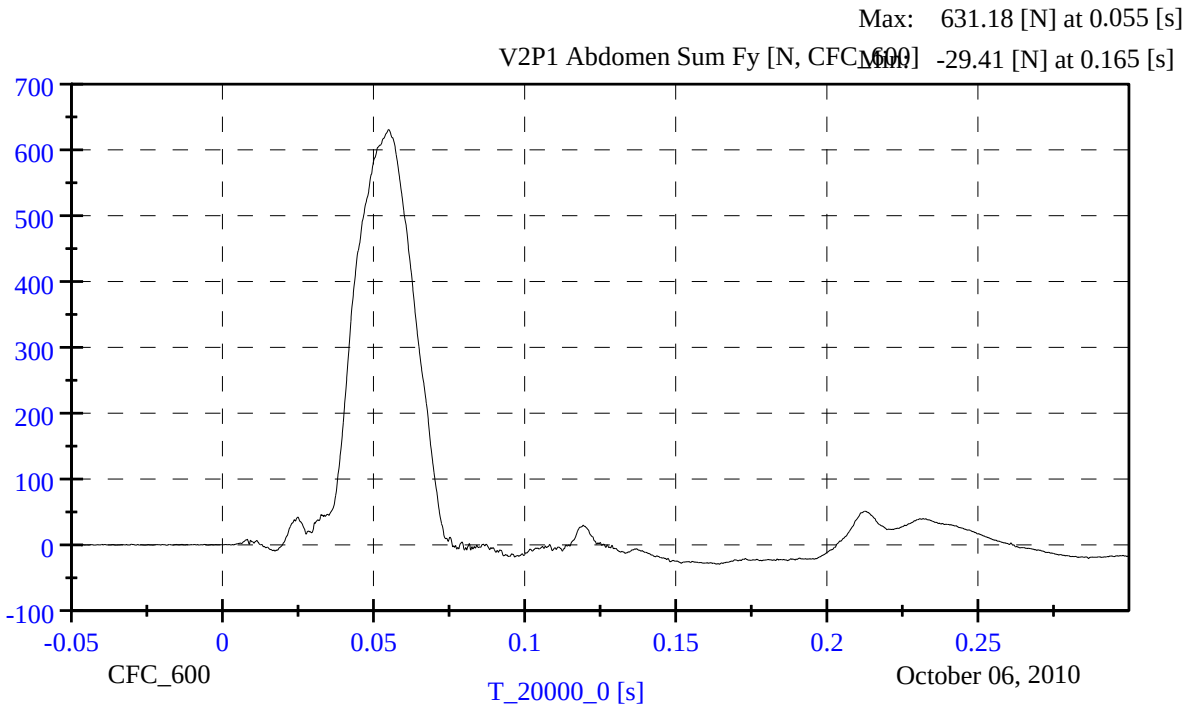
MB0301 SNCAP 2011 Ram 1500 Crew Cab



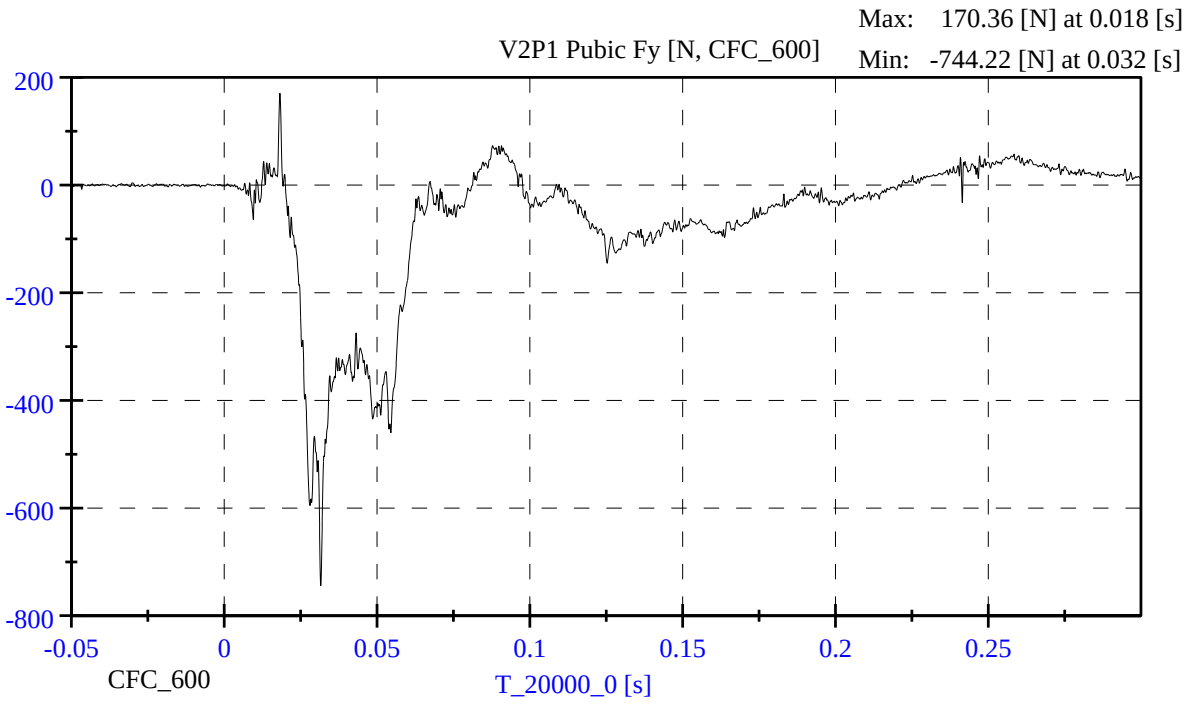


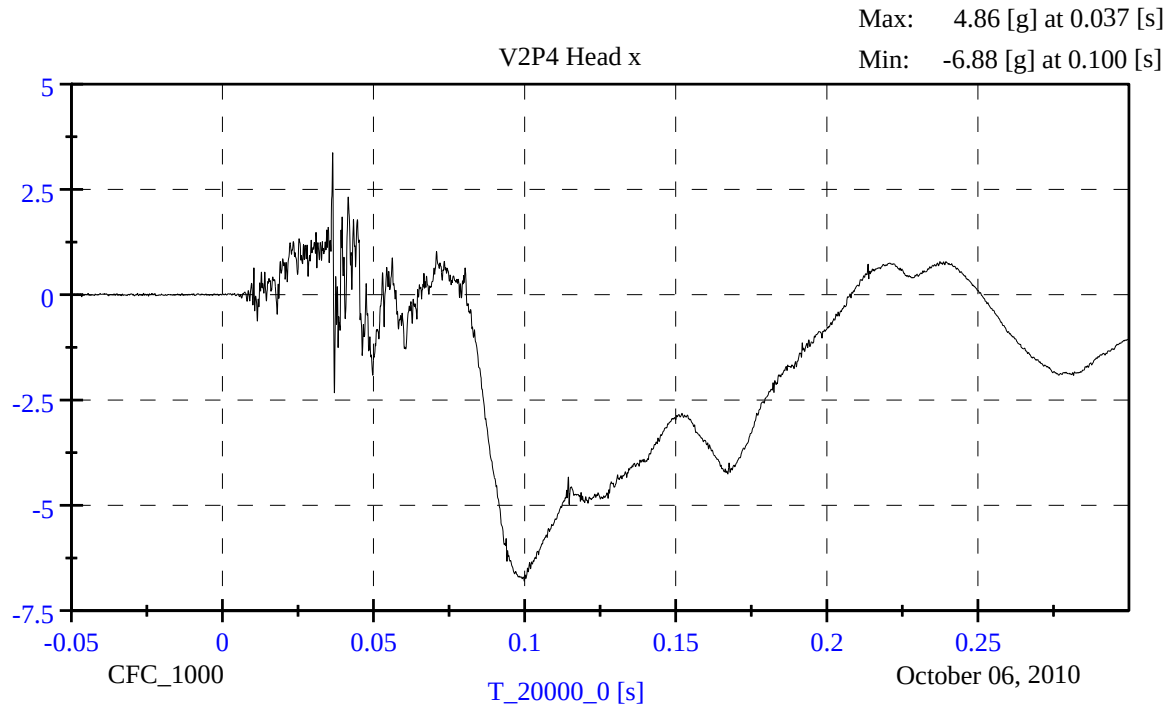
MB0301 SNCAP 2011 Ram 1500 Crew Cab



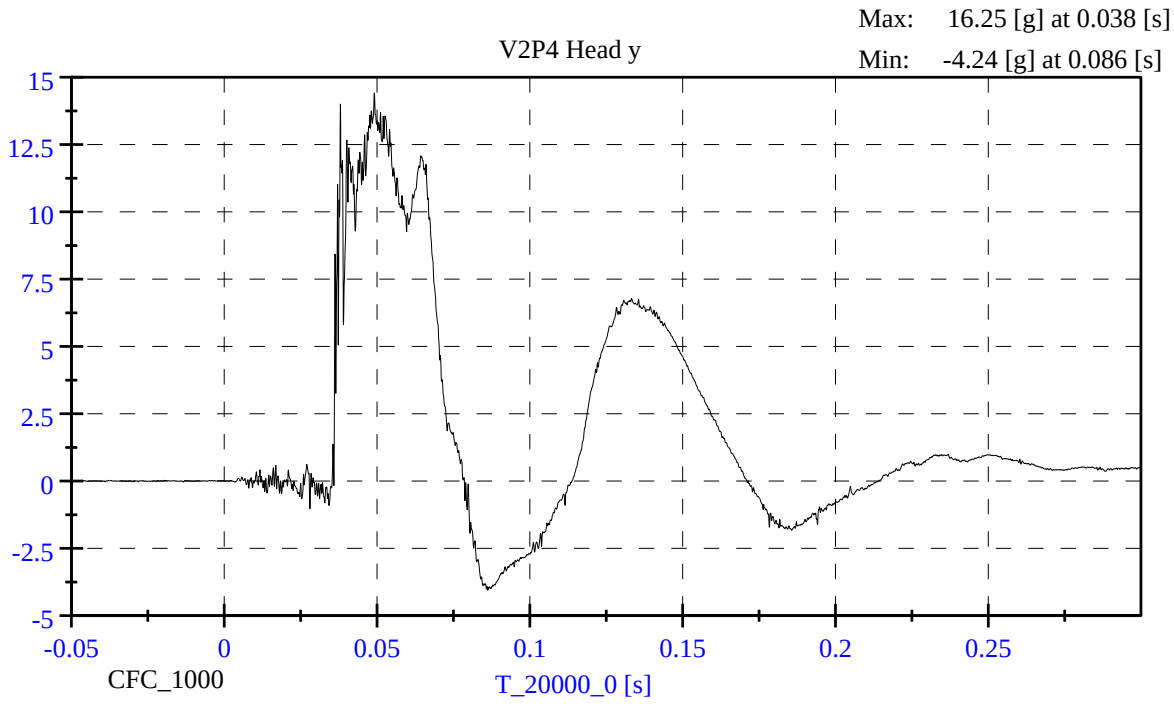


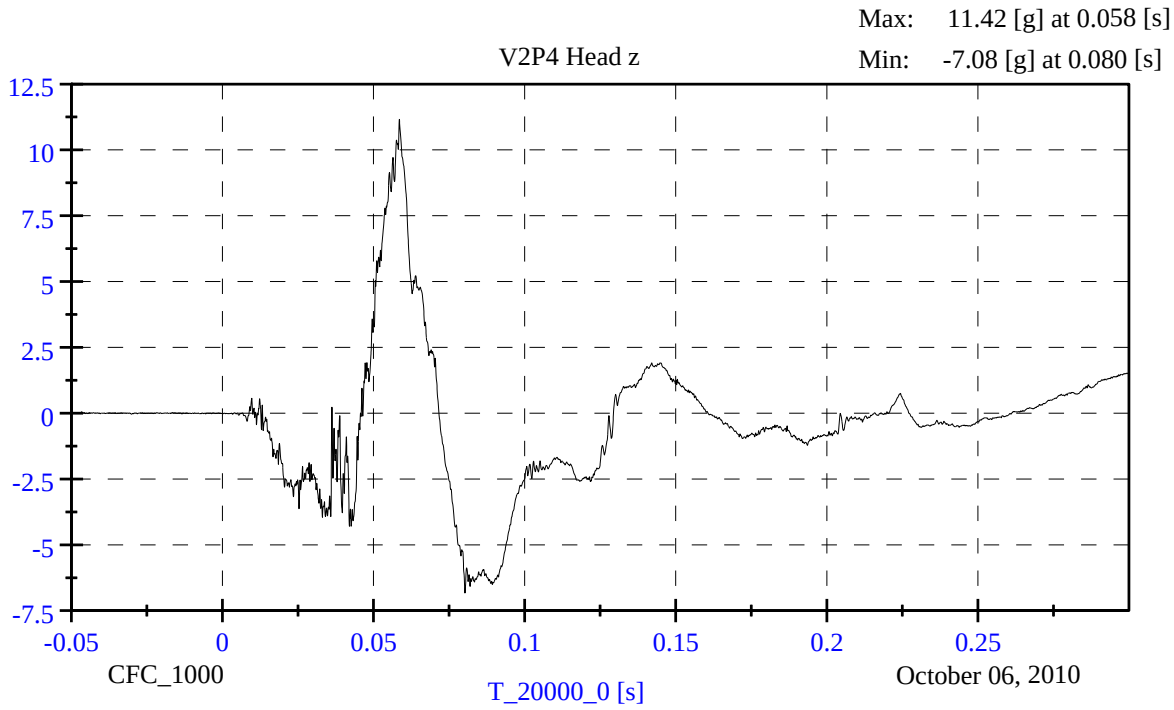
MB0301 SNCAP 2011 Ram 1500 Crew Cab



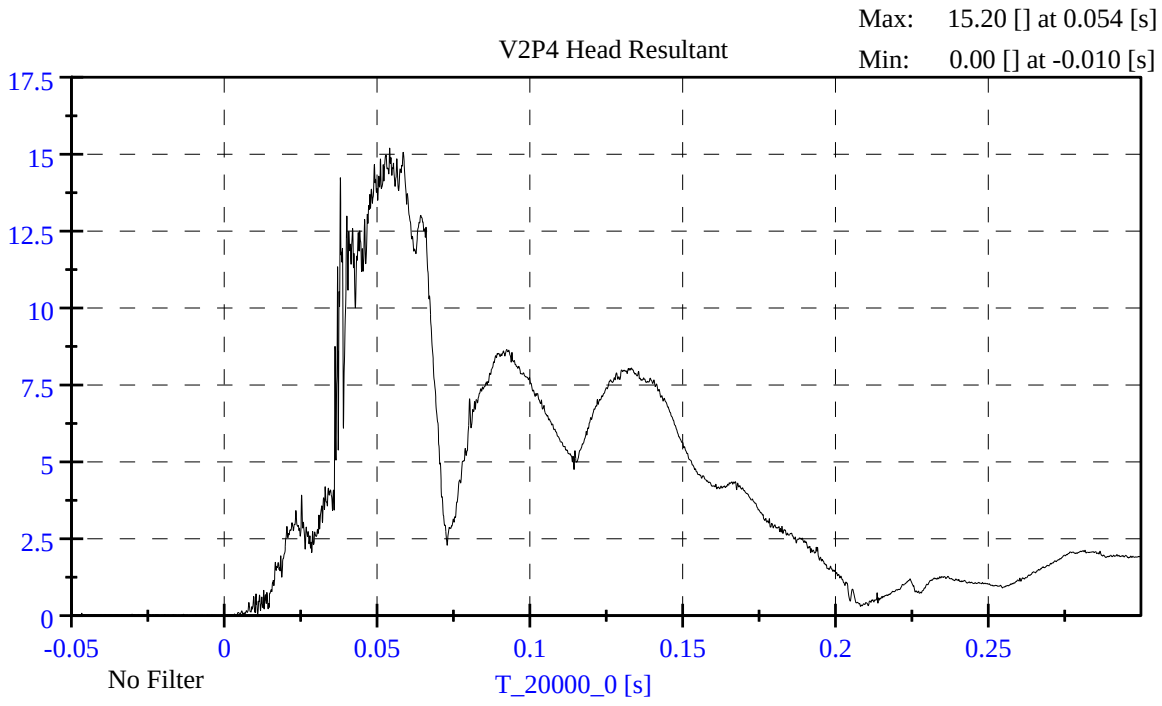


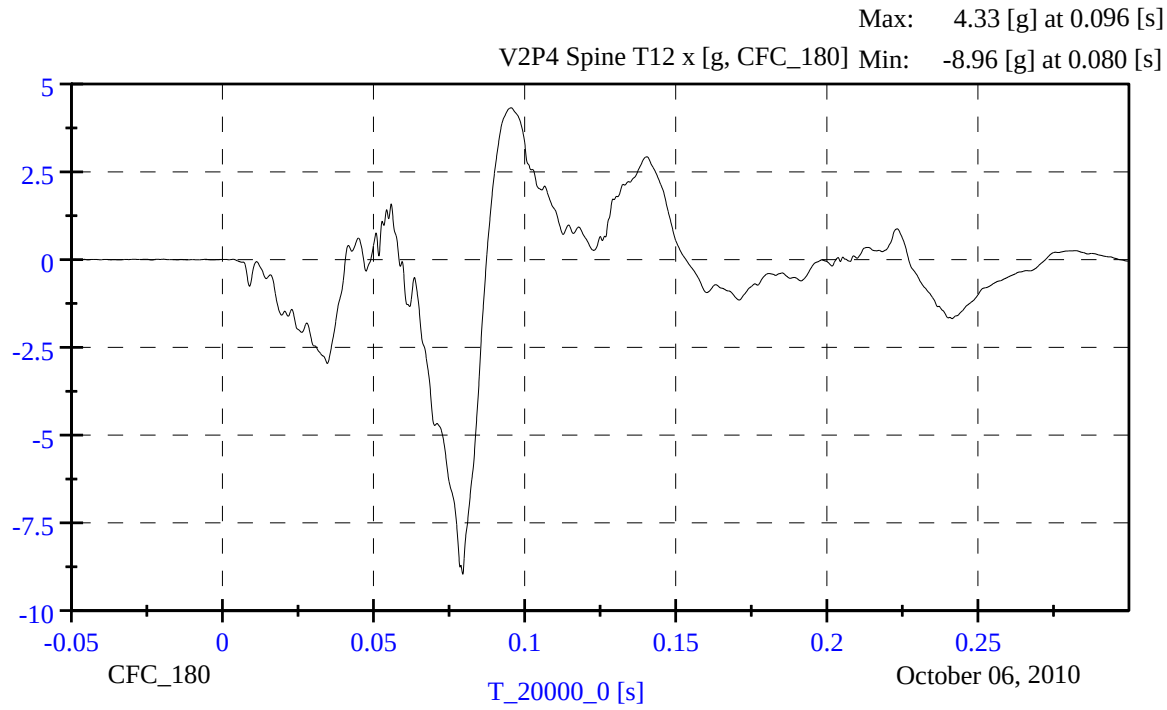
MB0301 SNCAP 2011 Ram 1500 Crew Cab



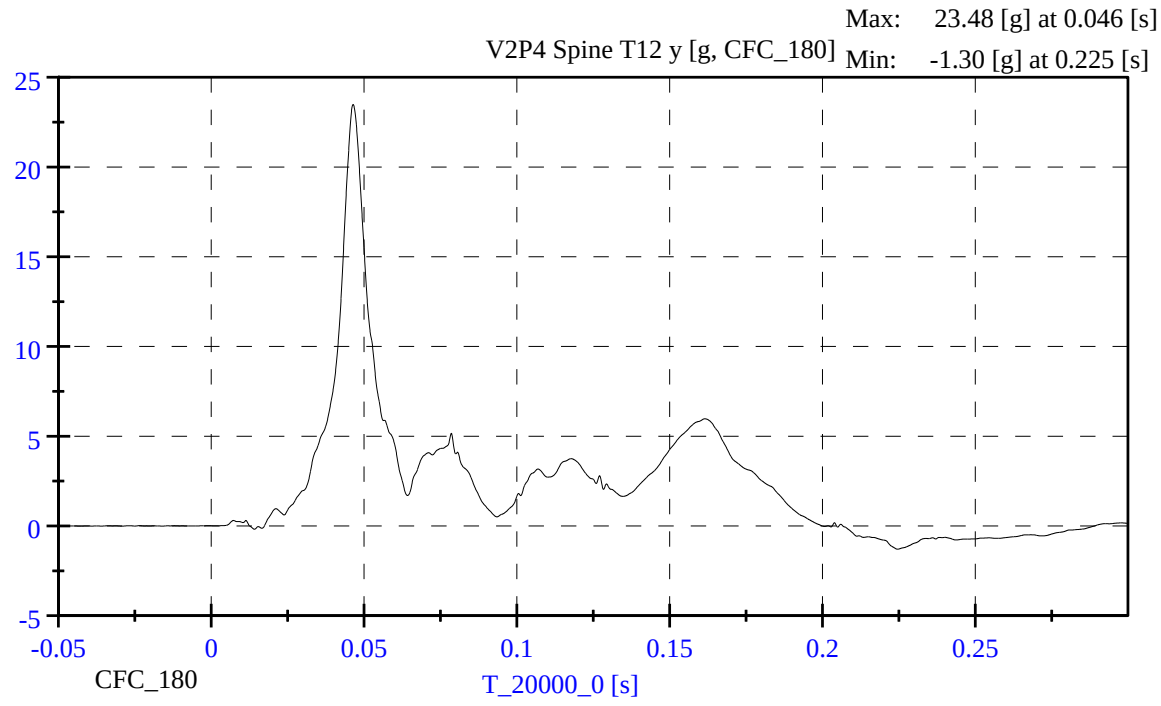


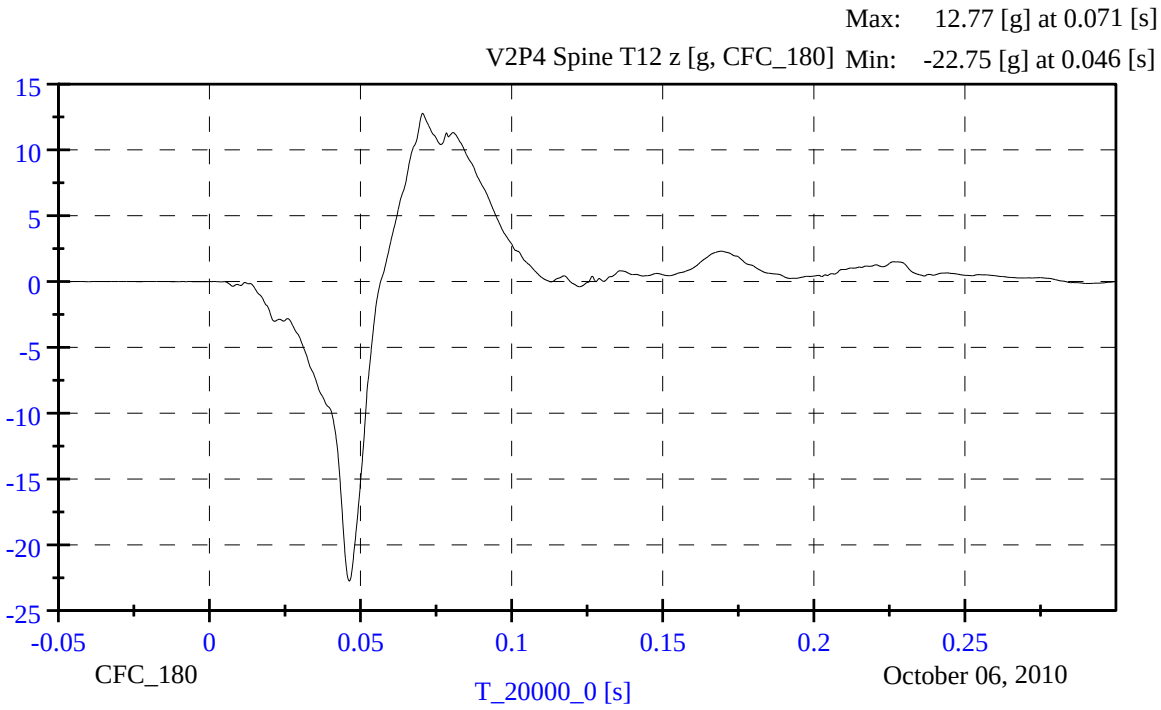
MB0301 SNCAP 2011 Ram 1500 Crew Cab



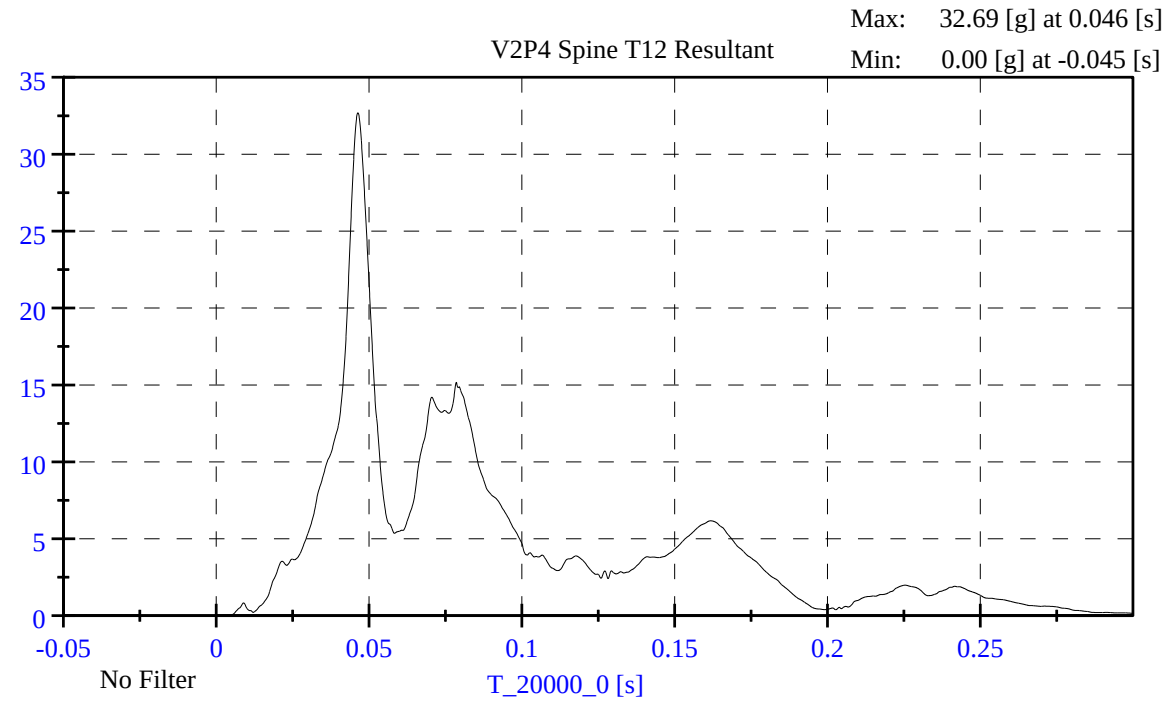


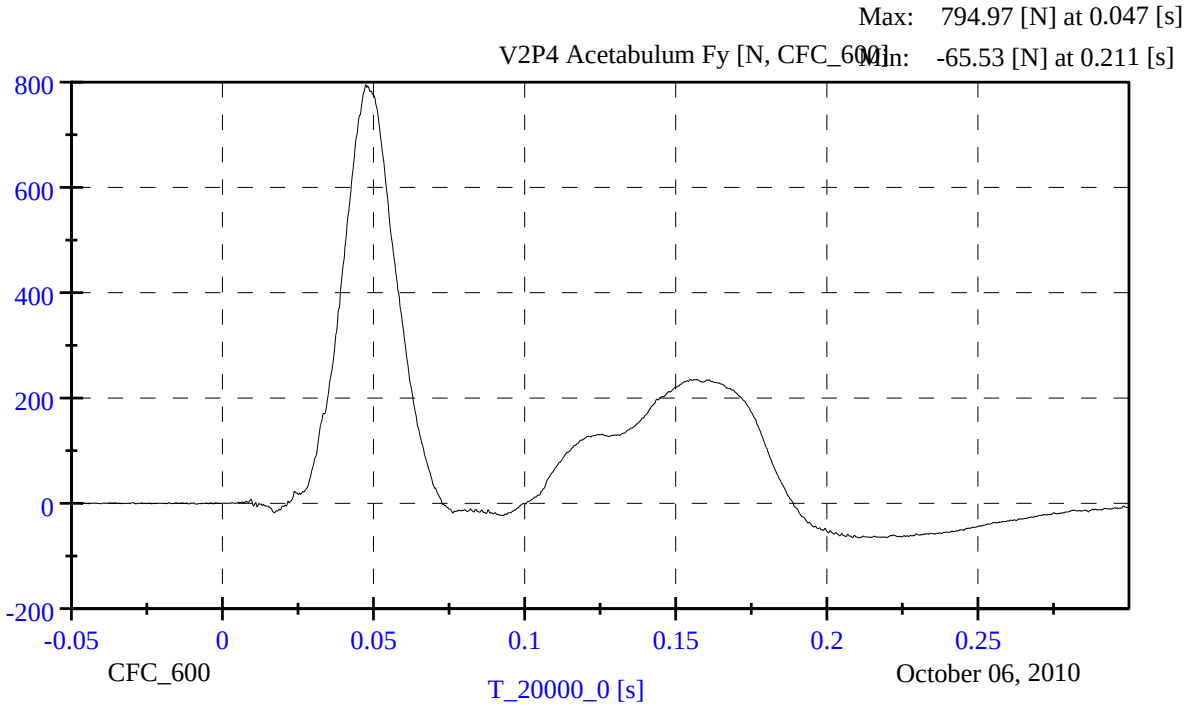
MB0301 SNCAP 2011 Ram 1500 Crew Cab





MB0301 SNCAP 2011 Ram 1500 Crew Cab





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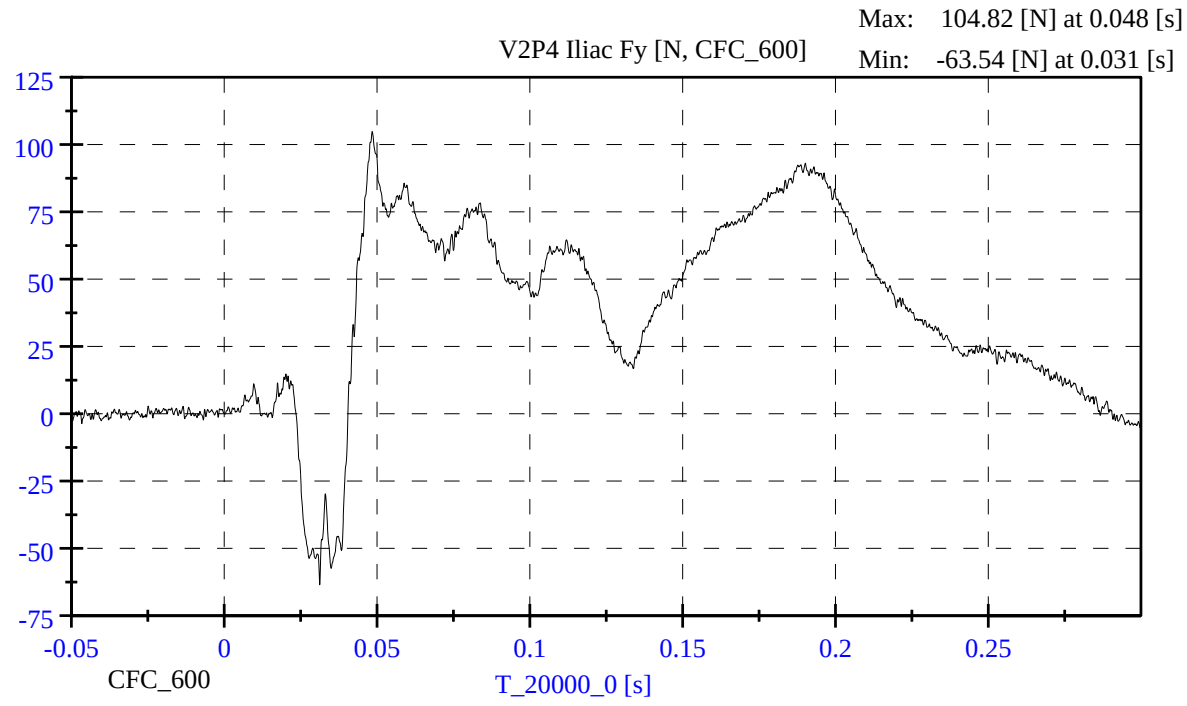

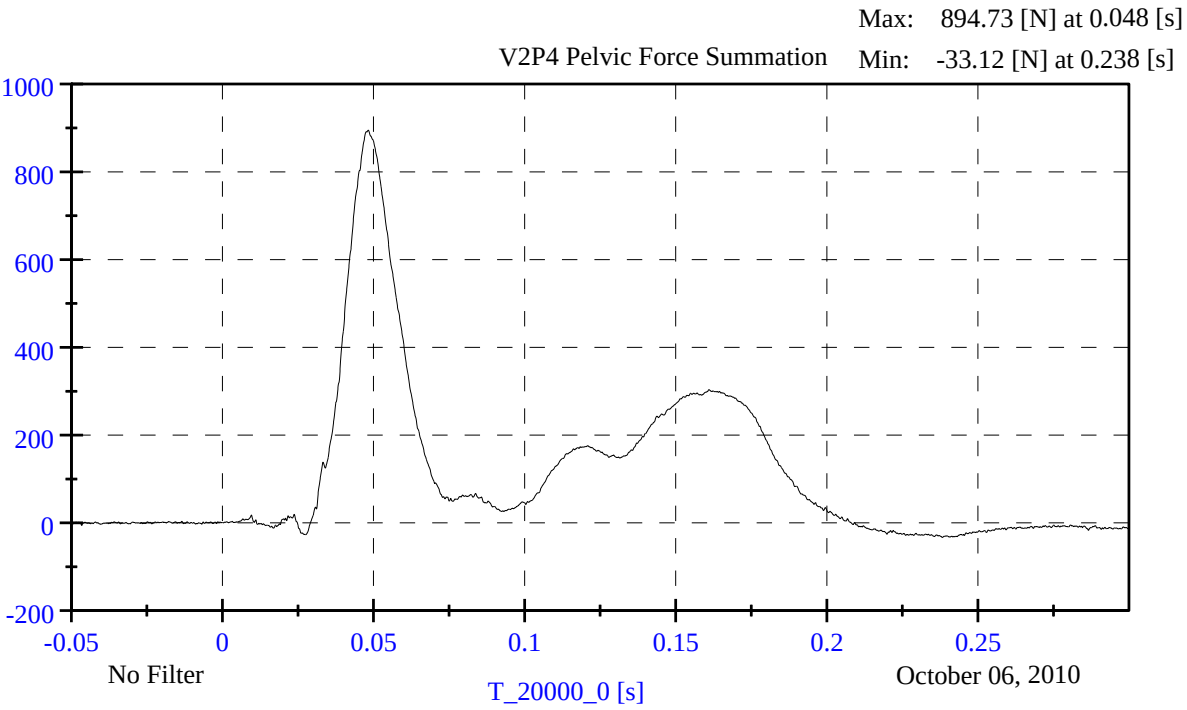

APPENDIX C

DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

Es-2re No: 033

CONFIGURED FOR LEFT SIDE IMPACT

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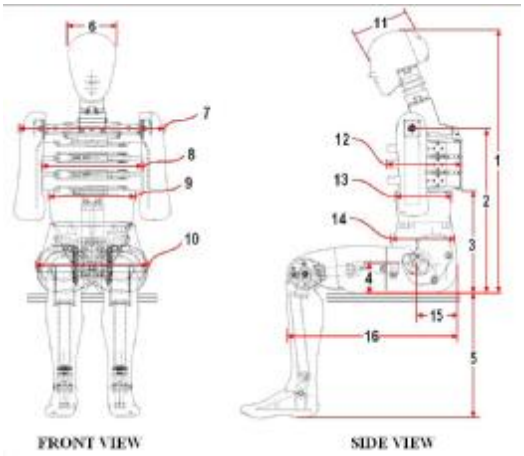
ES-2re External Measurements

NHTSA SN F033



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	909	Pass
2	Seat to Shoulder Joint	558-572	564	Pass
3	Seat to Lower Face of Thoracic Spine Box	346-356	354	Pass
4	Seat to Hip Joint (center of bolt)	97-103	100	Pass
5	Sole to Seat, Sitting	433-451	444	Pass
6	Head Width	152-158	159	Pass
7	Shoulder/Arm Width	461-479	470	Pass
8	Thorax Width	322-332	323	Pass
9	Abdomen Width	273-287	281	Pass
10	Pelvis Lap Width	359-373	370	Pass
11	Head Depth	196-206	201	Pass
12	Thorax Depth	262-272	269	Pass
13	Abdomen Depth	194-204	201	Pass
14	Pelvis Depth	235-245	238	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	154	Pass
16	Back of Buttocks to Front Knee	597-615	603	Pass

Technician: SZ

Date: 10/05/2010

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Head Drop**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**5:18:14 PM**

Component Part Number	Component Serial Number
455-1007	**8473**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**40**	%RH	P
Resultant Acceleration	125	--	155	**153**	g	P
Oscillation	0.0	--	15.0	**5.6**	%	P
Fore-Aft Acceleration	-15.00	--	15.00	**5.29**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51681**	**9/20/2010**
Endevco	**7264-2000**	**P51949**	**5/26/2010**
Endevco	**7264-2000**	**P51695**	**9/20/2010**

Test ID: **Head Drop** Test Time: **5:18:14 PM** Test Date: **10/4/2010**

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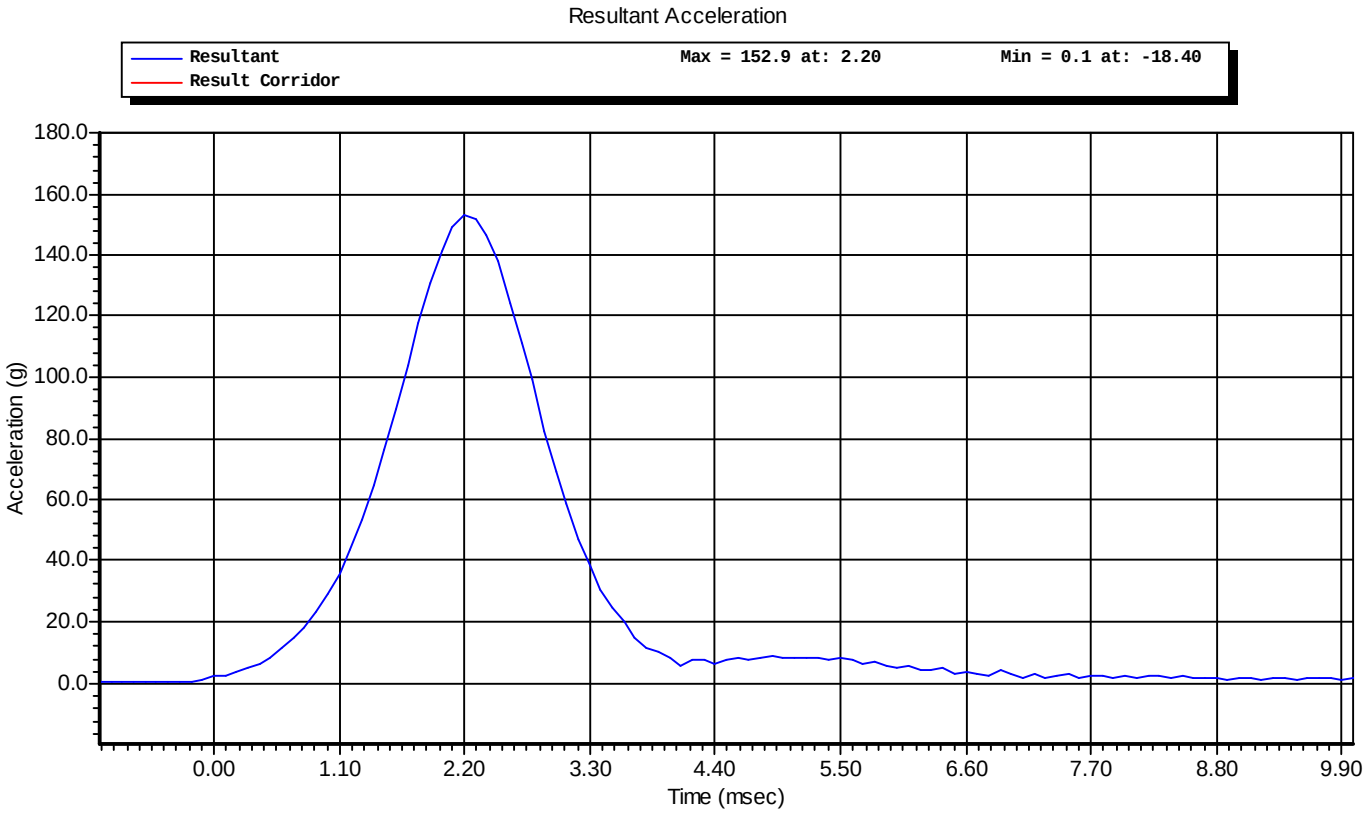
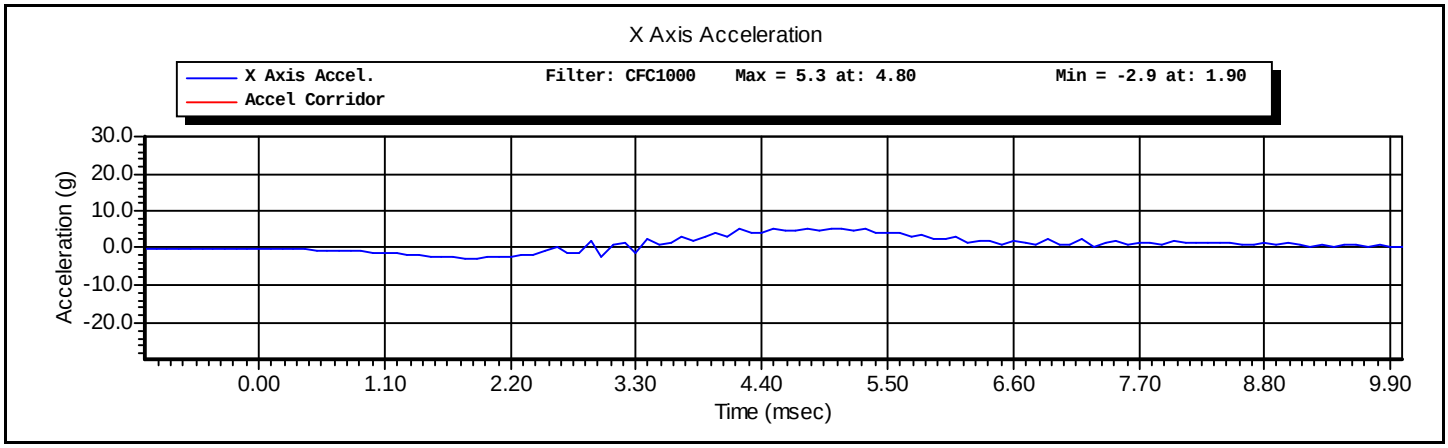
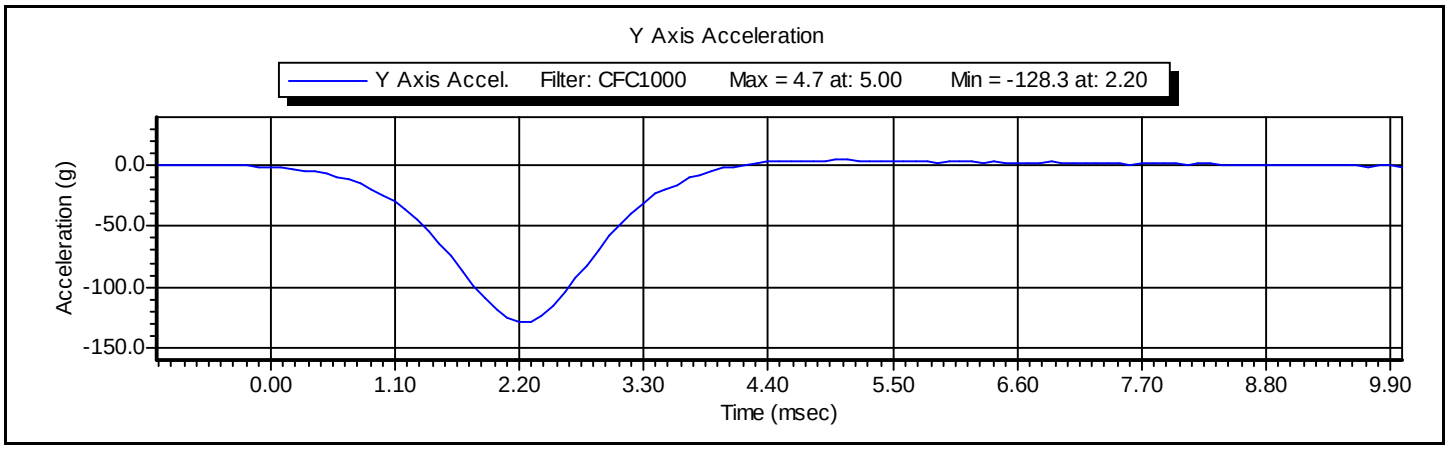
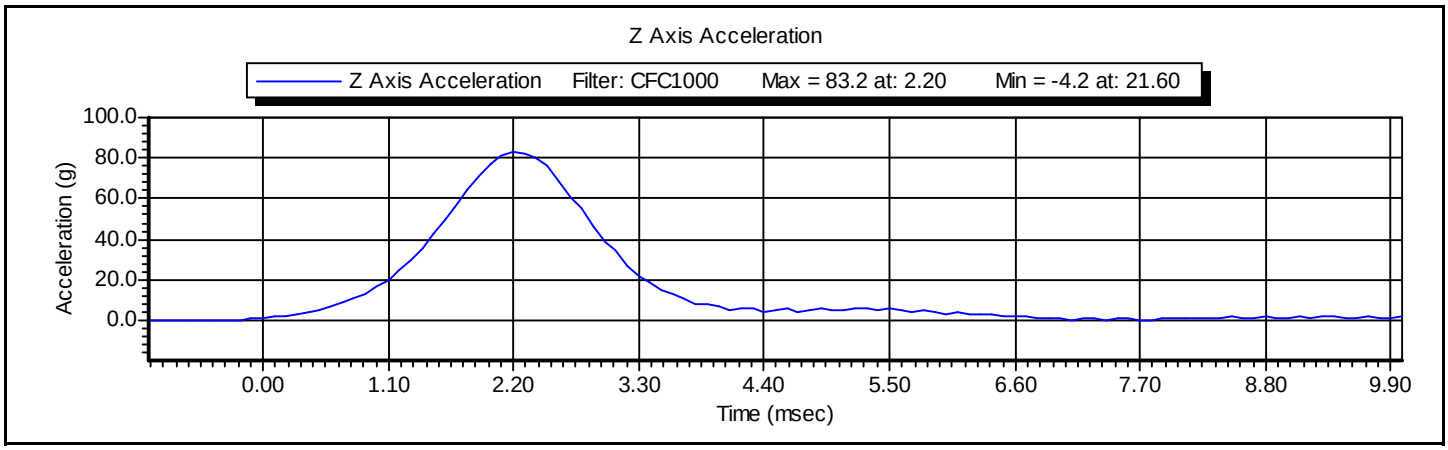
Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Head Drop**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**5:18:14 PM**









Test ID: **Head Drop** Test Time: **5:18:14 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Neck Flexion**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**3:29:53 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**41**	%RH	P
Velocity	3.30	--	3.50	**3.42**	m/s	P
Maximum Neck Flexion Angle	49.0	--	59.0	**51.3**	degrees	P
Time At Maximum Neck Flexion	54.0	--	66.0	**60.8**	ms	P
Decay to Zero Degrees	53.0	--	88.0	**55.3**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

Test ID: **Neck Flexion** Test Time: **3:29:53 PM** Test Date: **10/4/2010**

Calspan - Transportation Research Group
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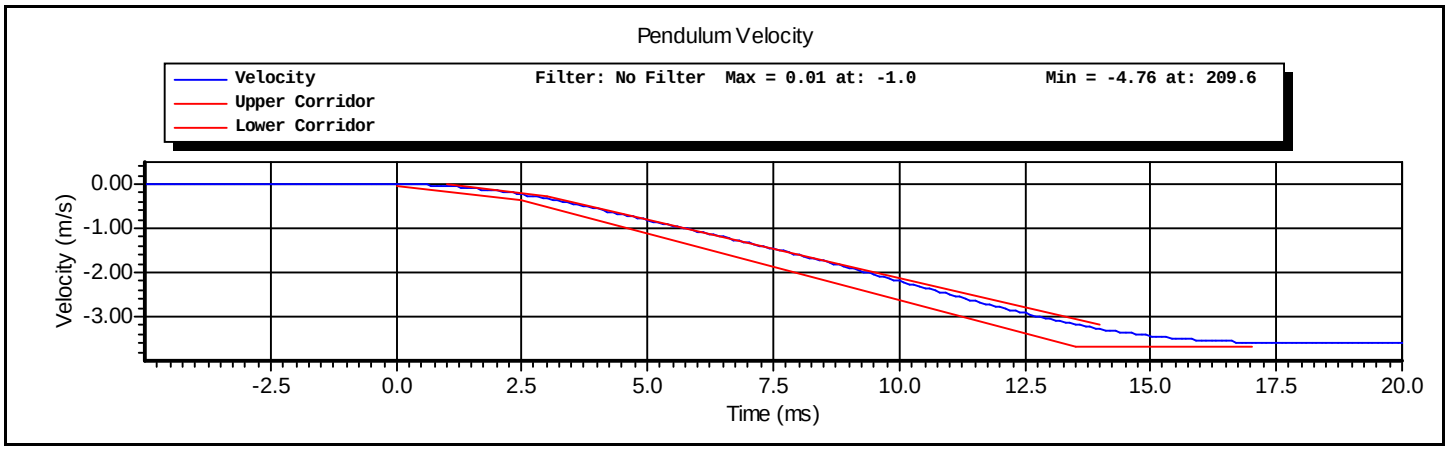
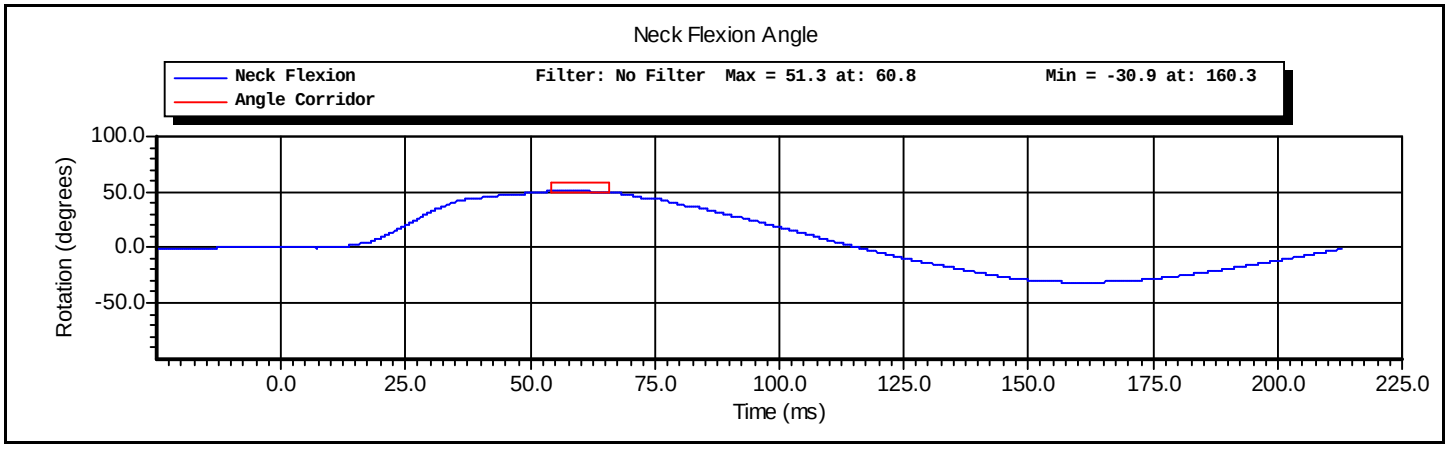
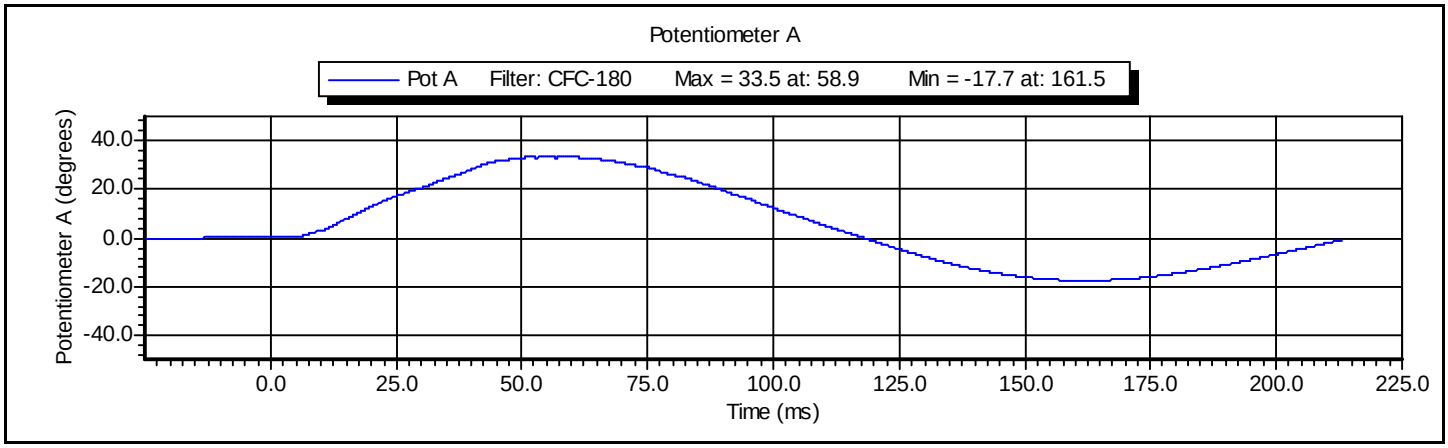
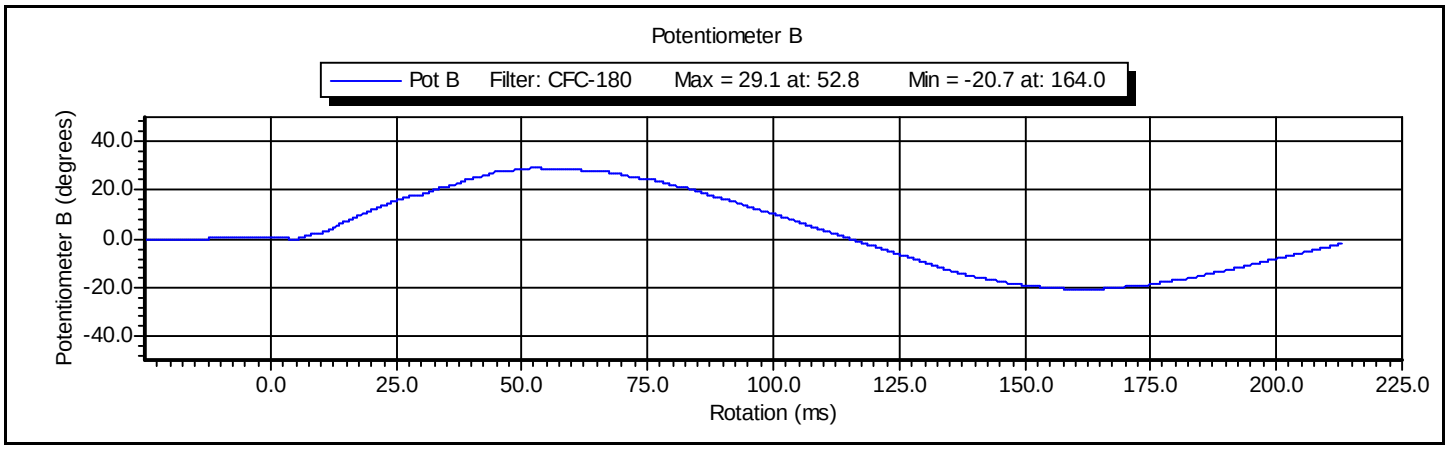
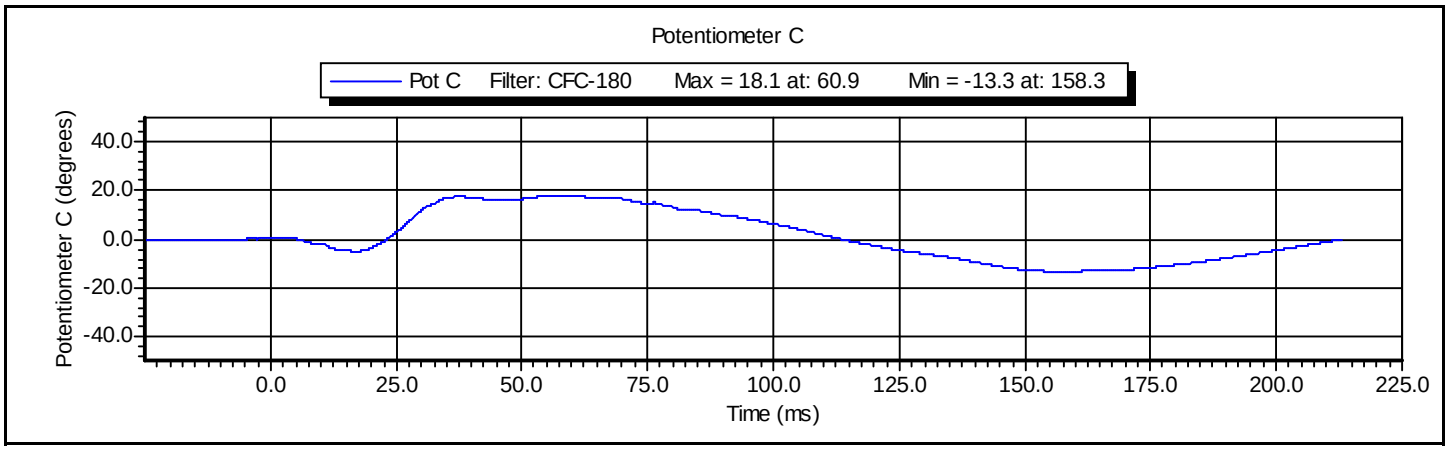
Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Neck Flexion**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**3:29:53 PM**











Test ID: **Neck Flexion** Test Time: **3:29:53 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Shoulder**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:58:35 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**42.0**	%RH	P
Velocity	4.20	--	4.40	**4.34**	m/s	P
Pendulum Acceleration	-10.50	--	-7.50	**-10.34**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**

Test ID: **Shoulder** Test Time: **10:58:35 AM** Test Date: **10/5/2010**

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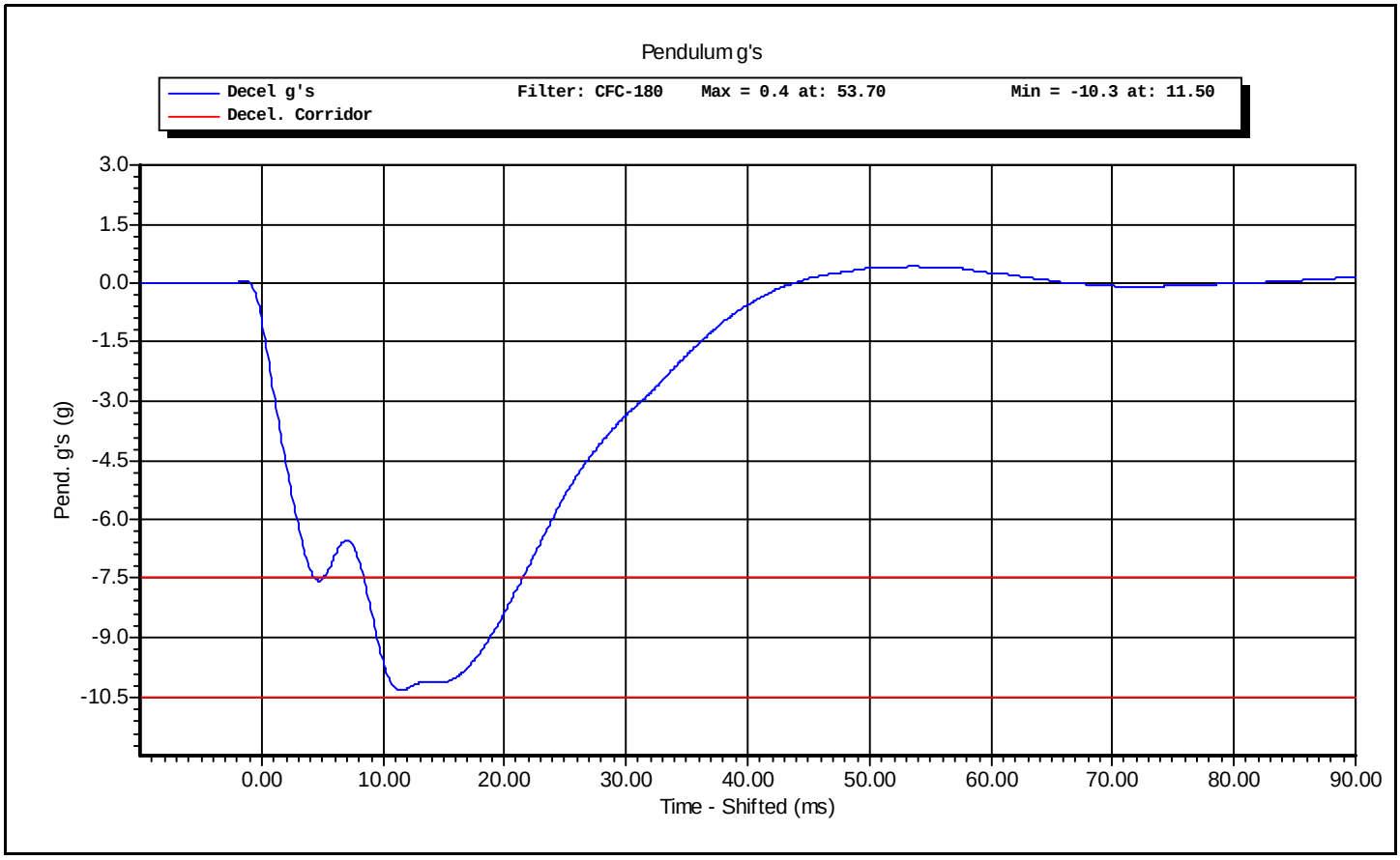
Test Name:	**Shoulder Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Shoulder**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:58:35 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 4.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:45:35 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	3.90	--	4.10	**3.96**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.07**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Lower Rib 4.0 m/s** Test Time: **9:45:35 AM** Test Date: **10/5/2010**

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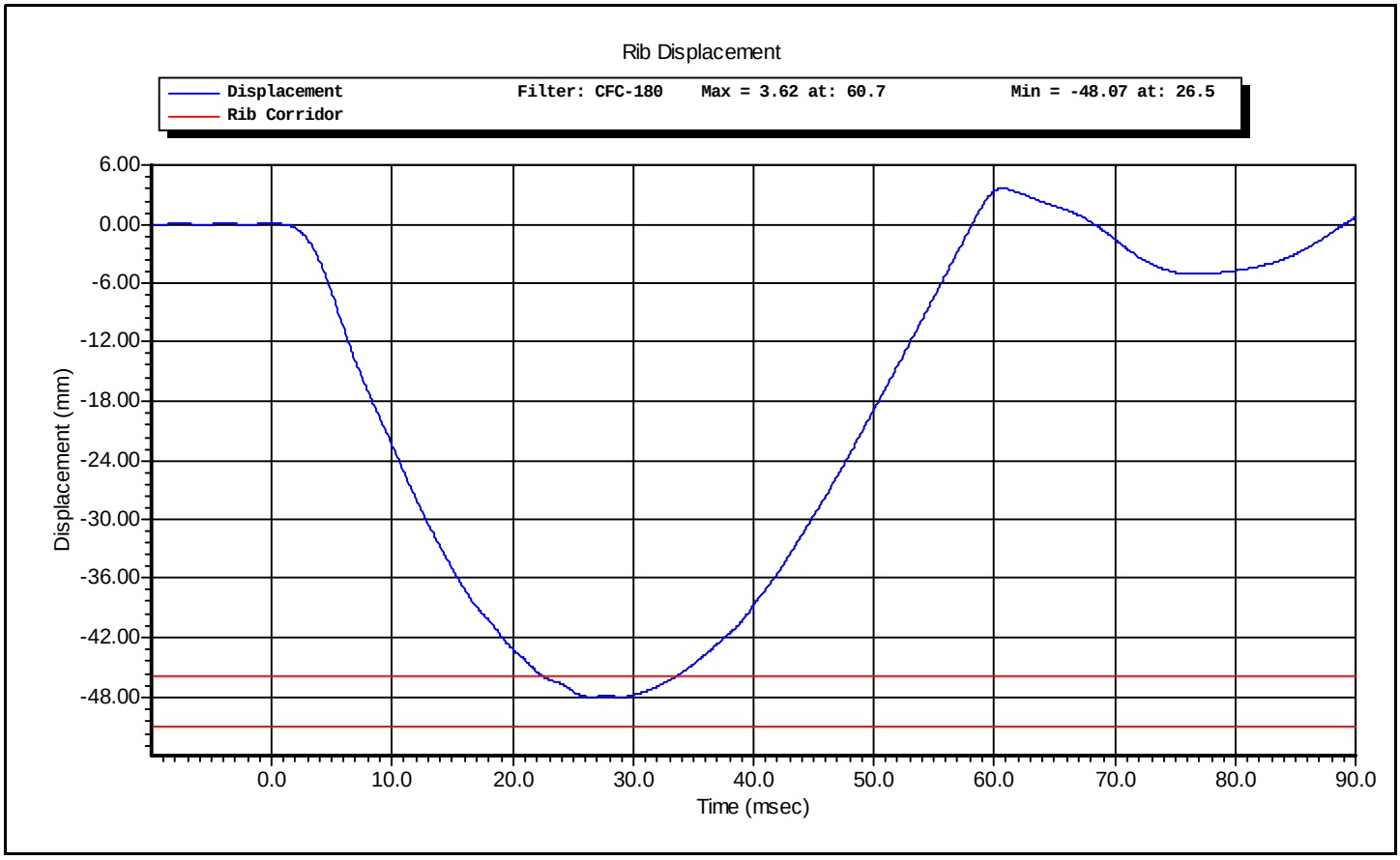
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 4.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:45:35 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:53:06 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	2.90	--	3.10	**2.97**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.97**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Lower 3.0 m/s** Test Time: **9:53:06 AM** Test Date: **10/5/2010**

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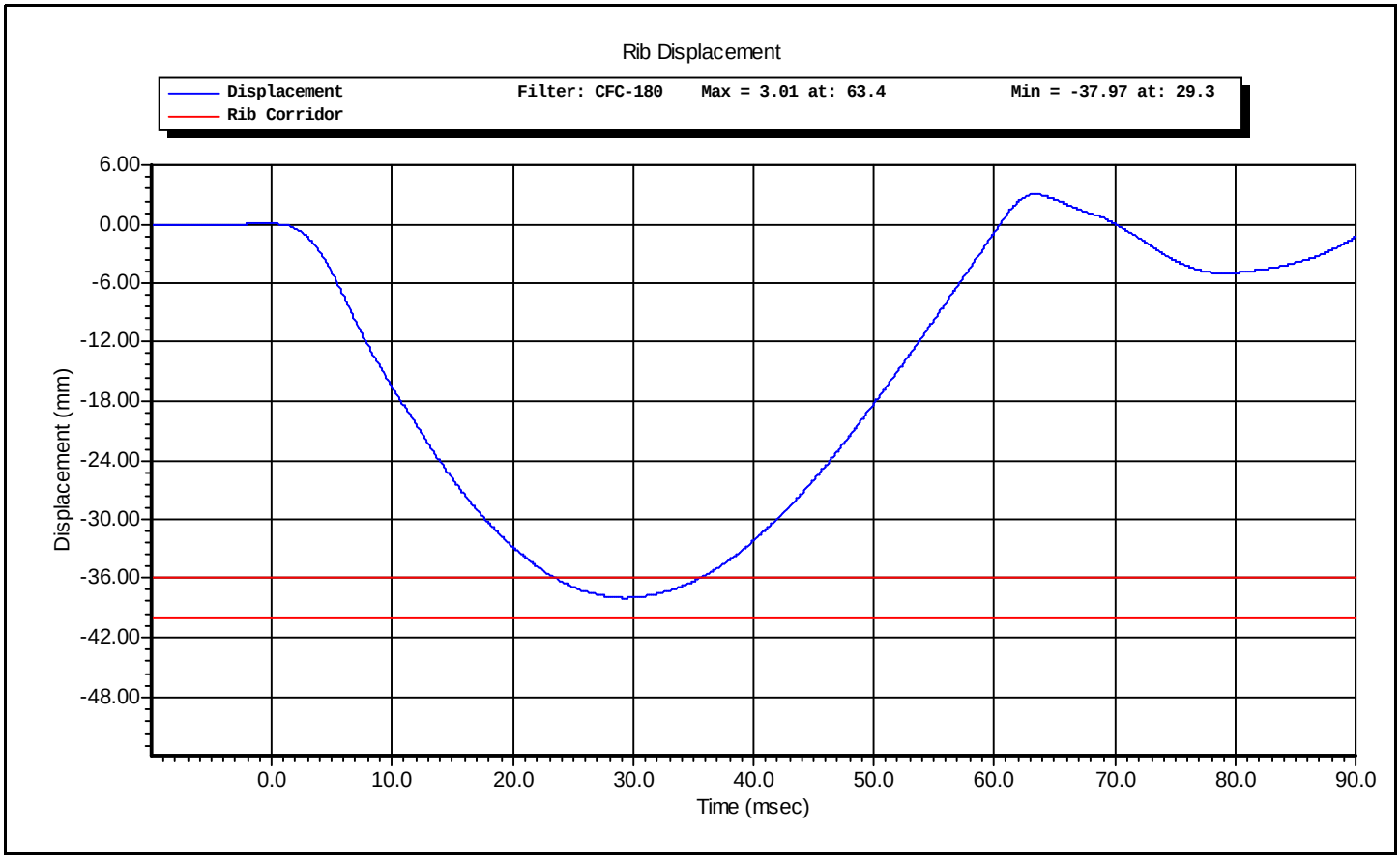
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:53:06 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle 4.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:24:02 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	3.90	--	4.10	**3.96**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-47.93**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Middle 4.0 m/s** Test Time: **9:24:02 AM** Test Date: **10/5/2010**

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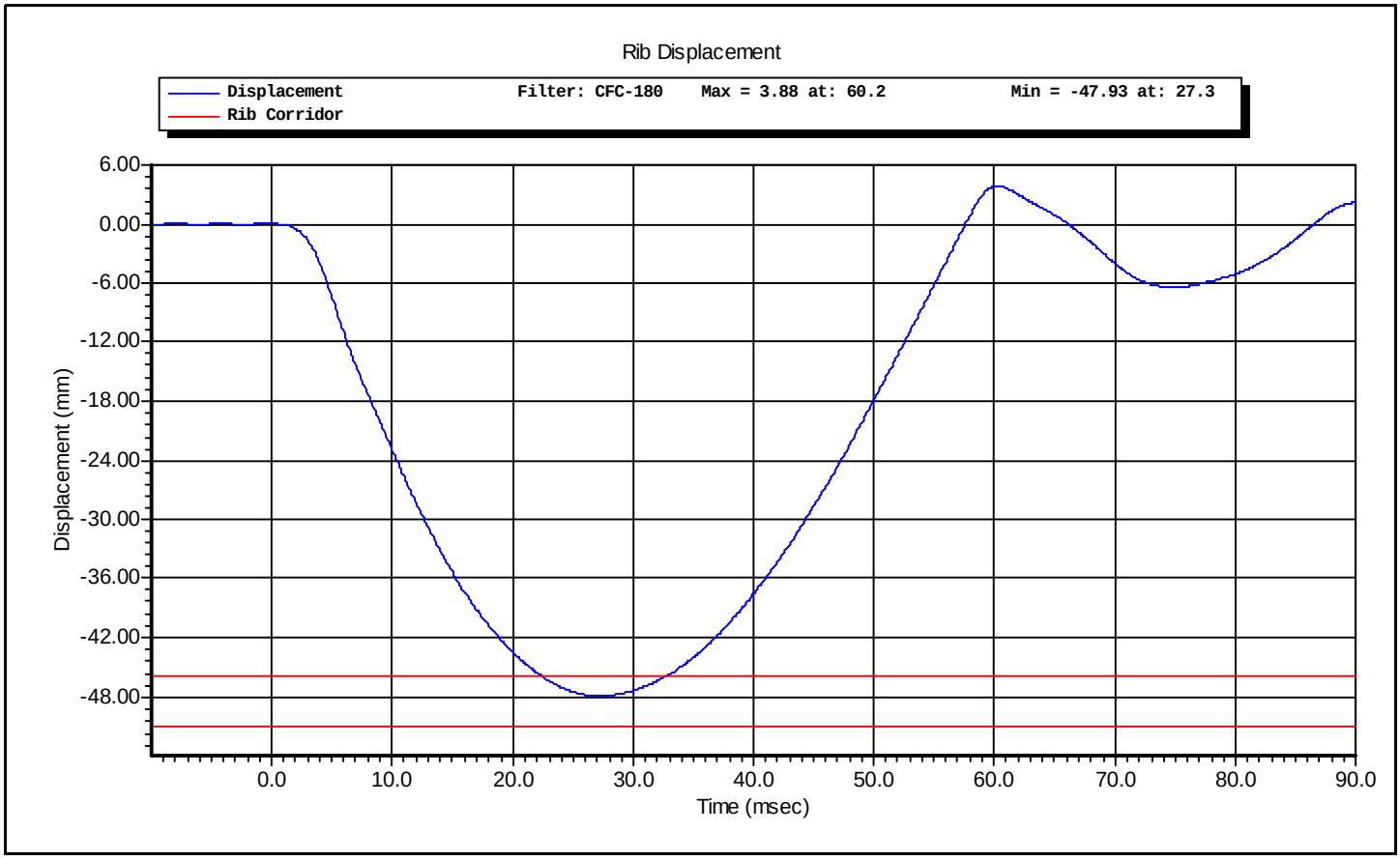
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle 4.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:24:02 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:30:29 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.44**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Middle 3.0 m/s** Test Time: **9:30:29 AM** Test Date: **10/5/2010**

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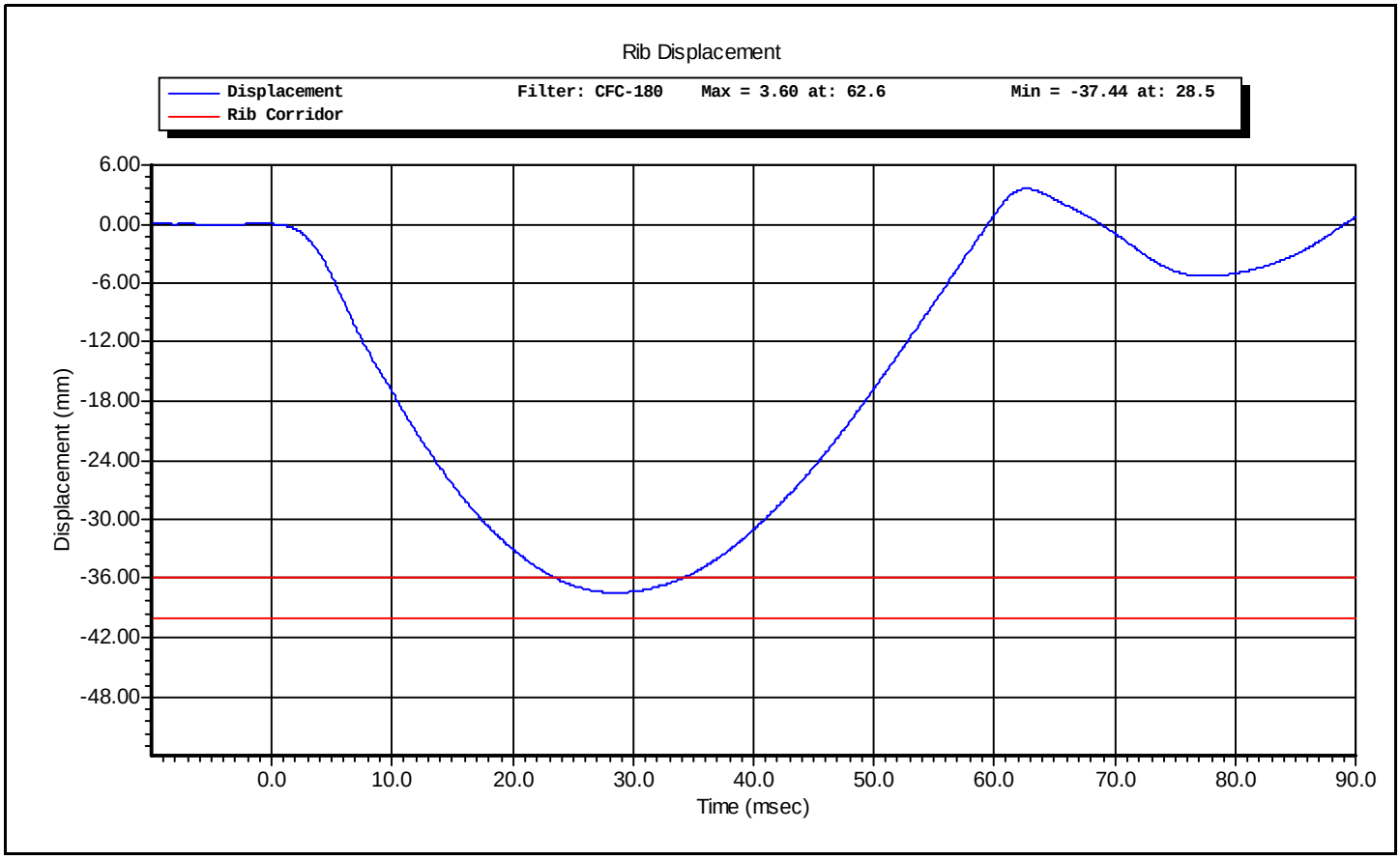
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:30:29 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:02:22 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	3.90	--	4.10	**3.97**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.75**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Upper Rib 4 m/s** Test Time: **9:02:22 AM** Test Date: **10/5/2010**

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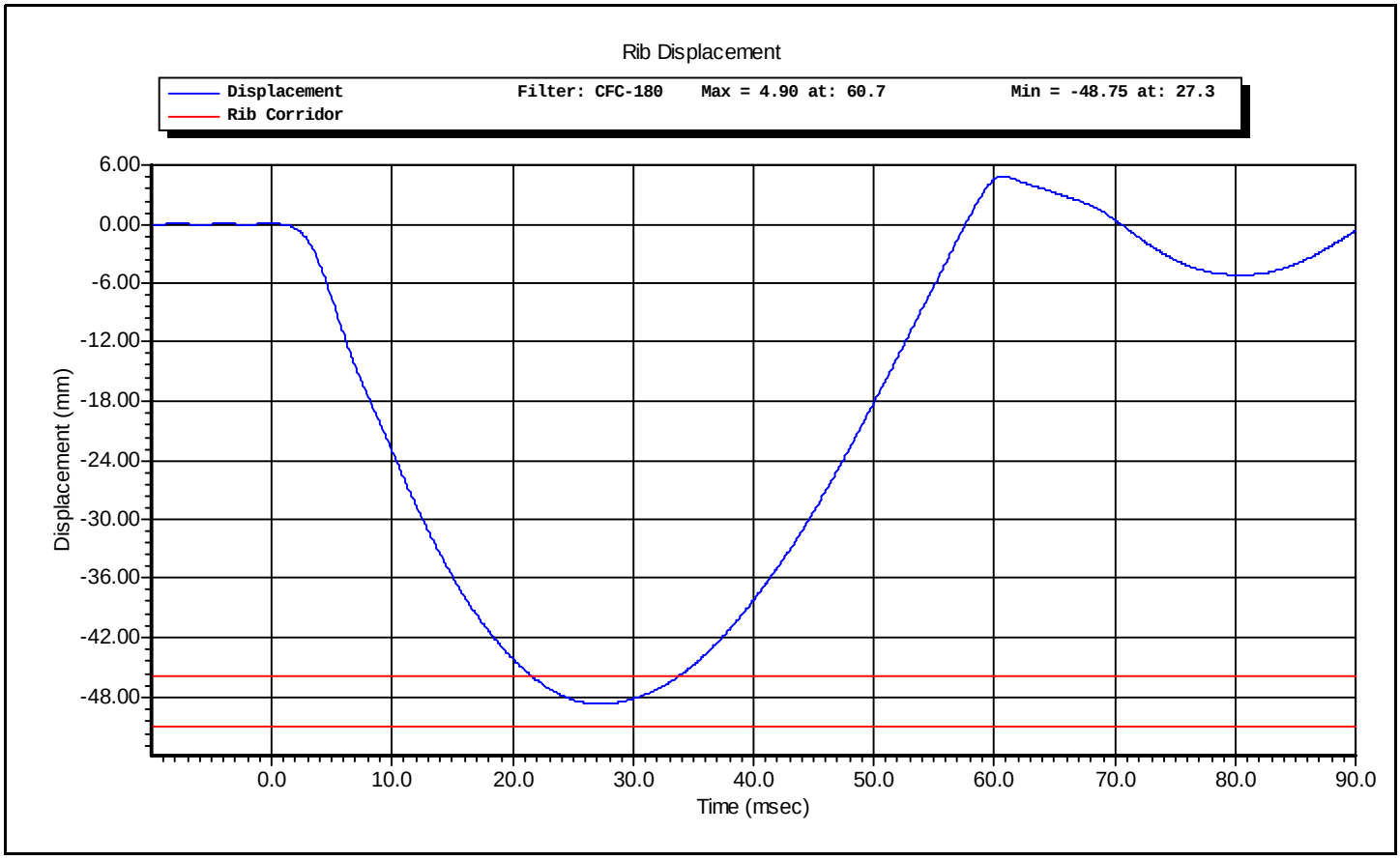
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:02:22 AM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:14:31 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	2.90	--	3.10	**2.97**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-38.01**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Upper Rib 3.0 m/s** Test Time: **9:14:31 AM** Test Date: **10/5/2010**

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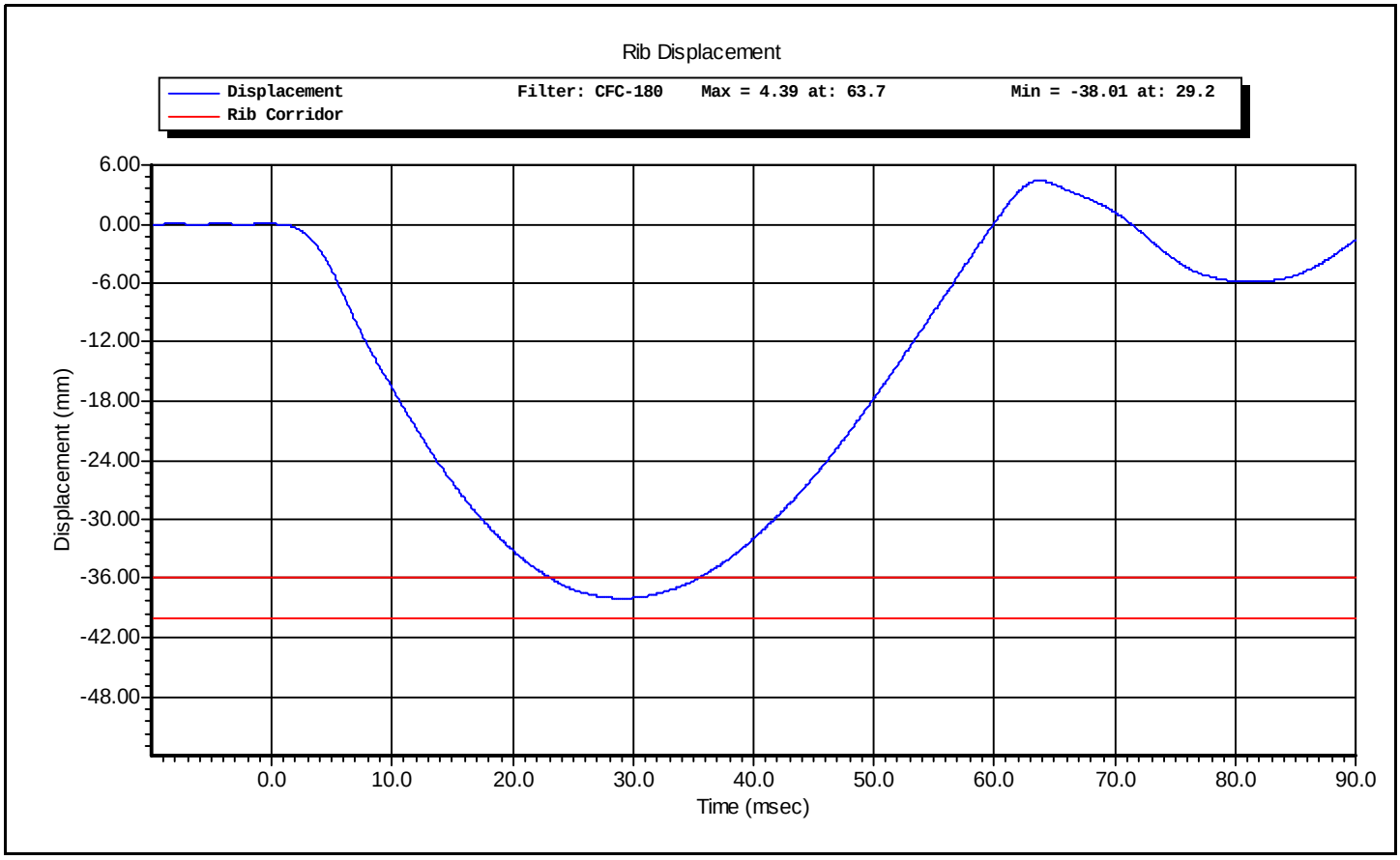
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 3.0 m/s**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**9:14:31 AM**



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VERIFICATION REPORT

Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**11:22:23 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**42.0**	%RH	P
Velocity	5.40	--	5.60	**5.50**	m/s	P
Upper Rib Displacement	34.0	--	41.0	**37.2**	mm	P
Middle Rib Displacement	37.0	--	45.0	**40.9**	mm	P
Lower Rib Displacement	37.0	--	44.0	**40.7**	mm	P
Impactor Force	5100	--	6200	**5324**	N	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**

Test ID: **Thorax** Test Time: **11:22:23 AM** Test Date: **10/5/2010**

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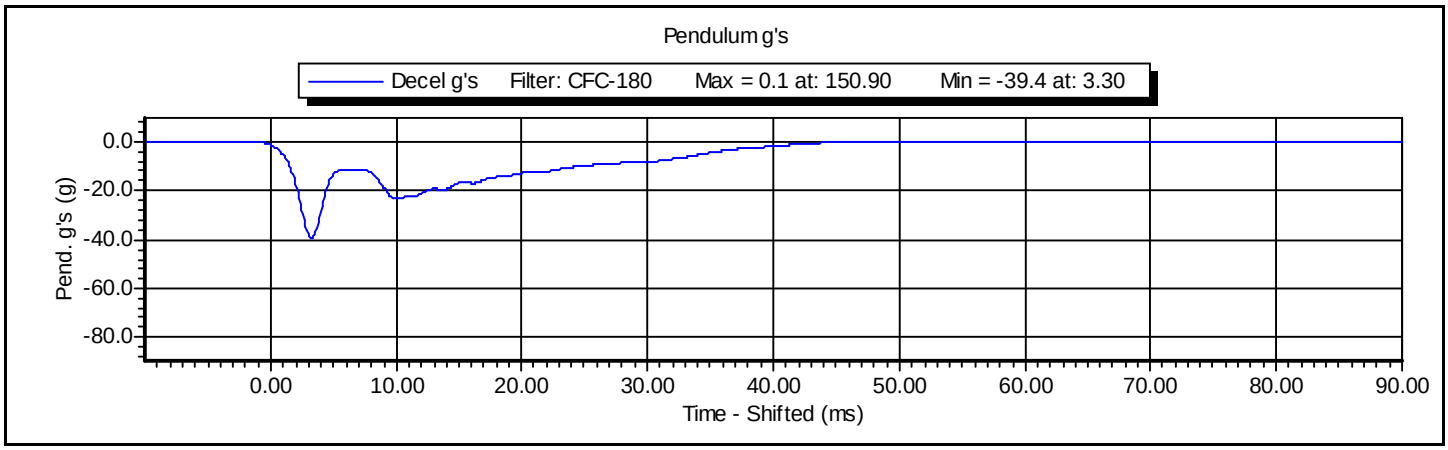
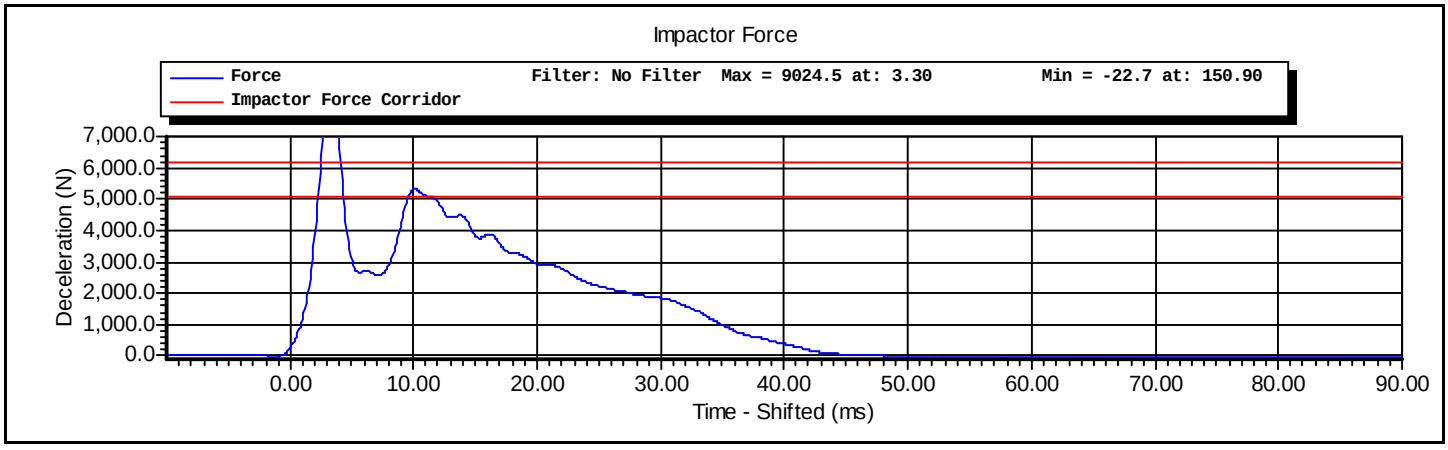
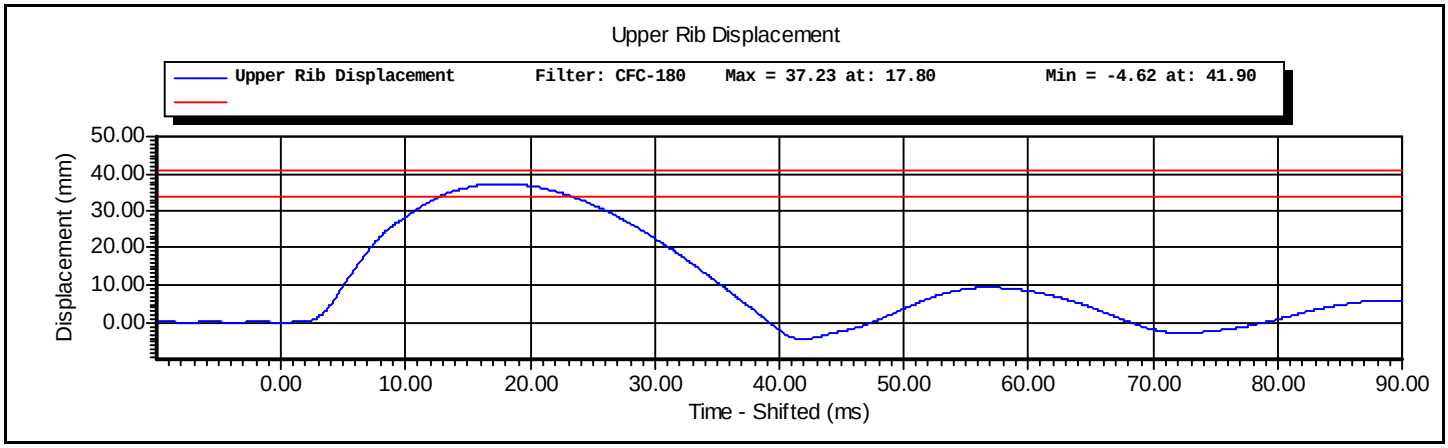
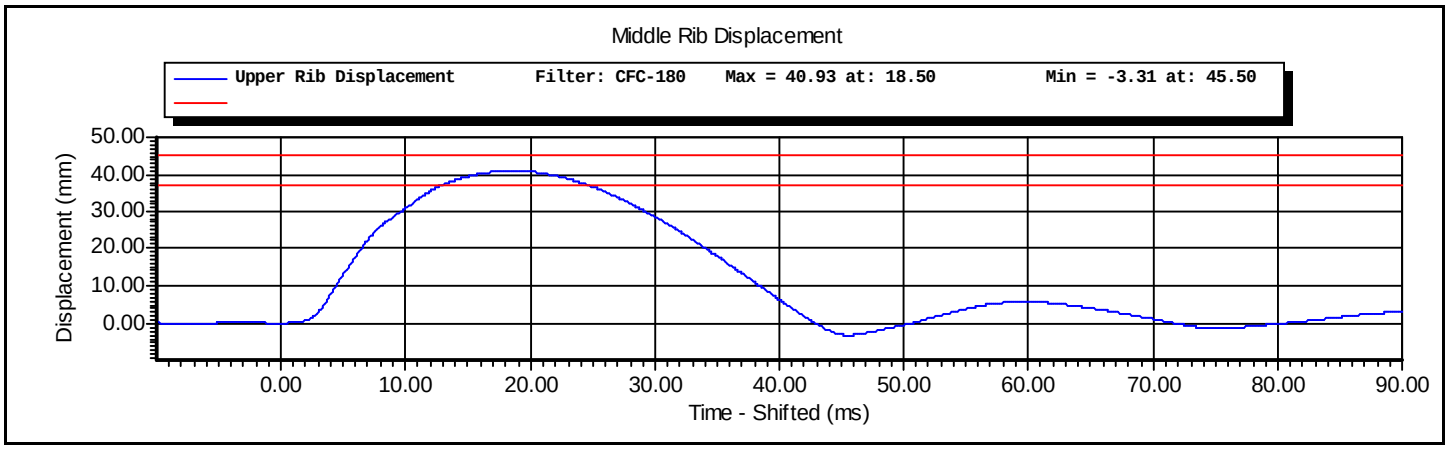
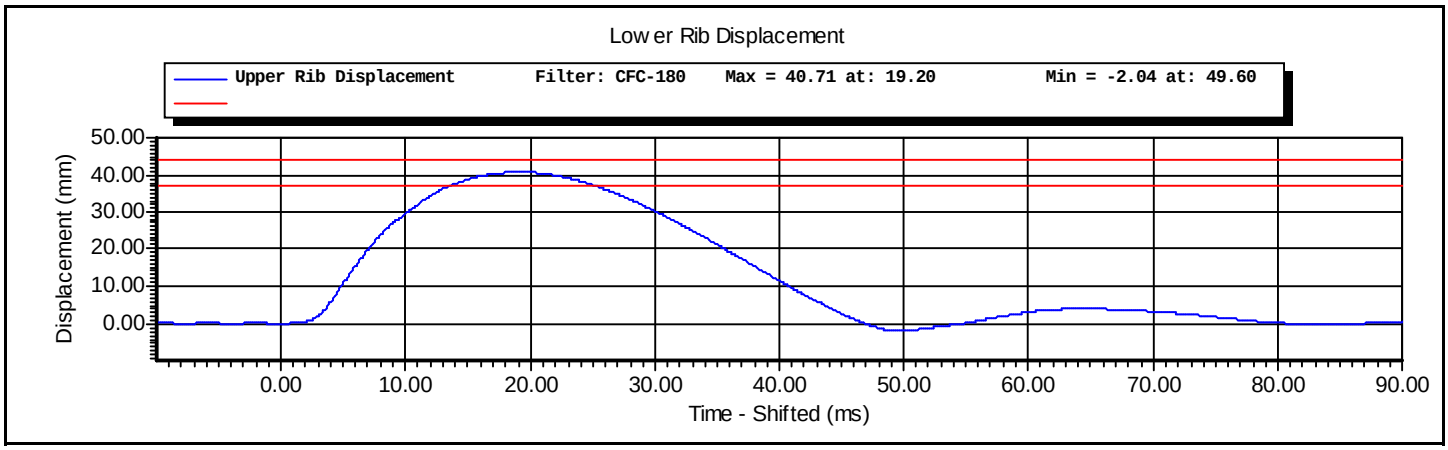
Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**11:22:23 AM**











Test ID: **Thorax** Test Time: **11:22:23 AM** Test Date: **10/5/2010**

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VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdomen**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:37:00 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**41**	%RH	P
Velocity	3.90	--	4.10	**4.03**	m/s	P
Peak Abdominal Force	-2.70	--	-2.20	**-2.45**	kN	P
Time At Peak Abdominal Force	10.0	--	12.3	**11.1**	ms	P
Maximum Pendulum Force	-4.80	--	-4.00	**-4.34**	kN	P
Time at Peak Pendumlum Force	10.6	--	13.0	**11.2**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Denton	**2631**	**LC-1524**	**4/22/2010**
Denton	**2631**	**LC-1523**	**4/22/2010**
Denton	**2631**	**LC-1530**	**4/22/2010**

Test ID: **Abdomen** Test Time: **10:37:00 AM** Test Date: **10/5/2010**

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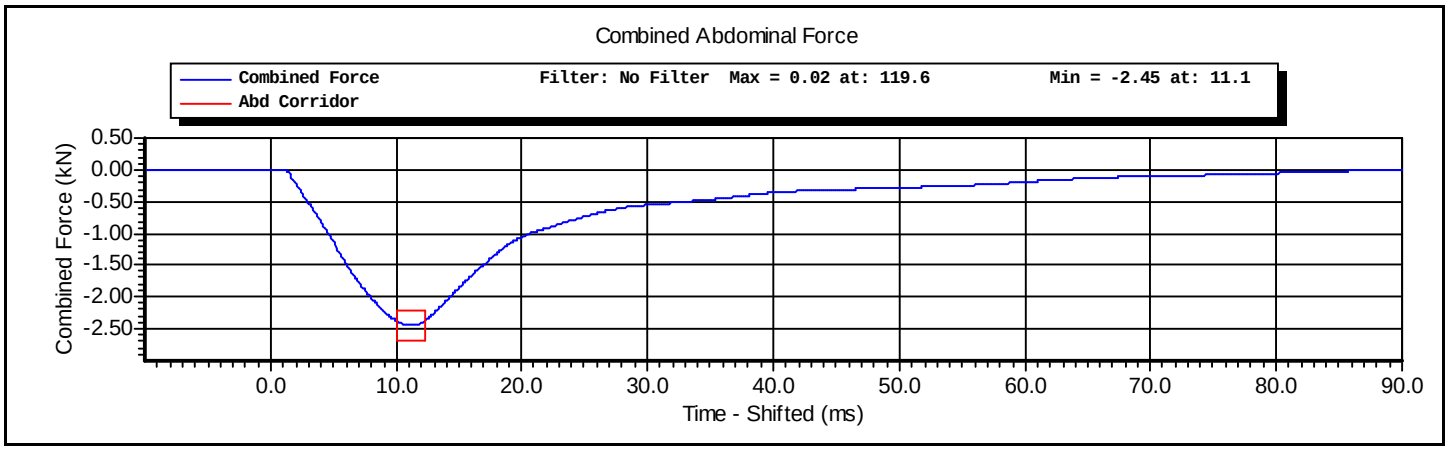
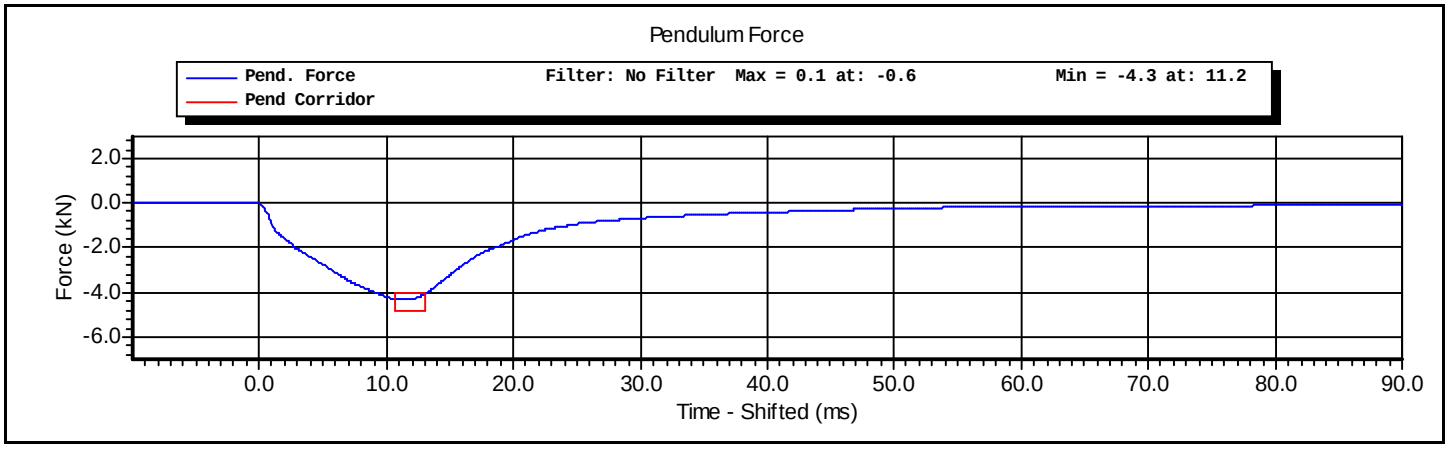
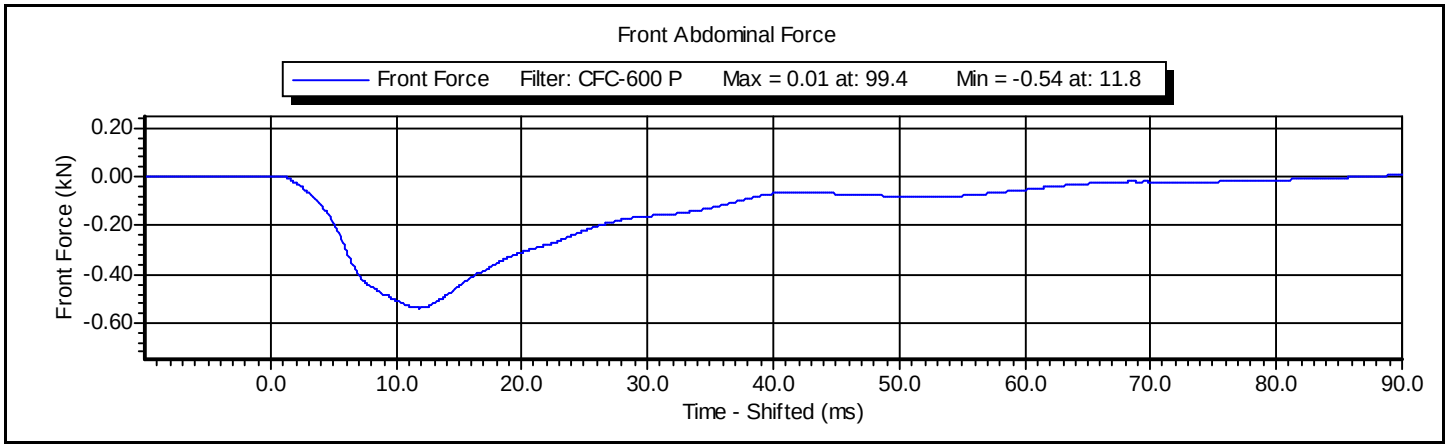
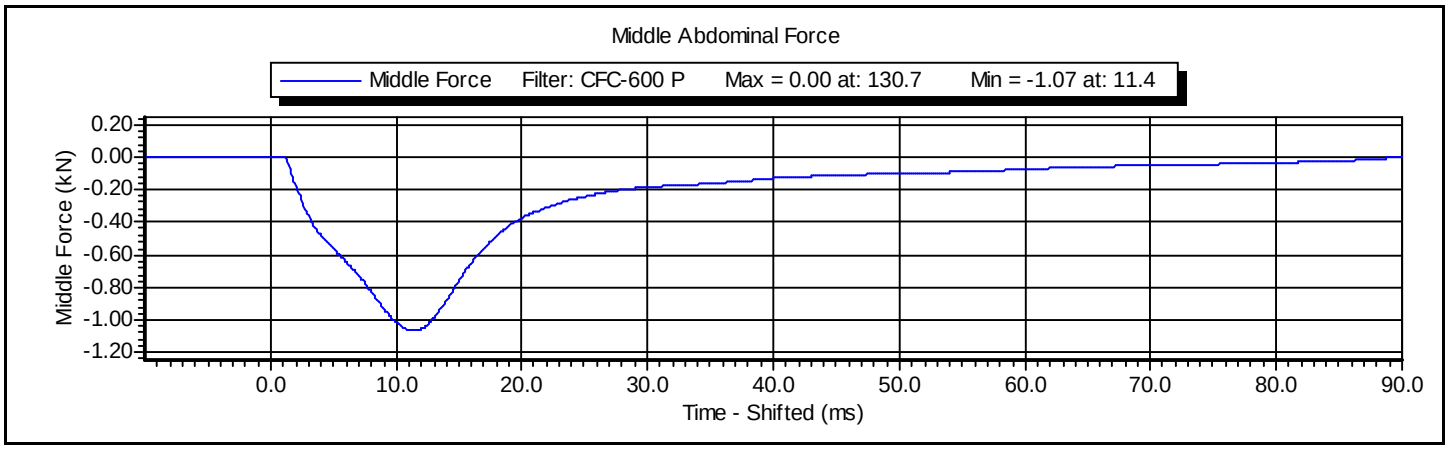
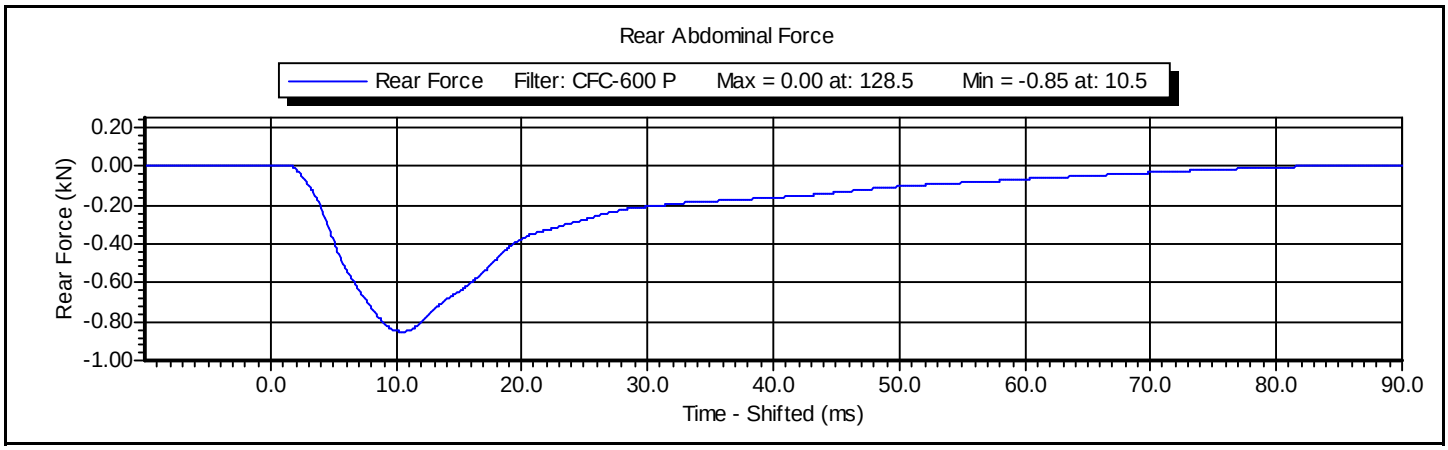
Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdomen**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:37:00 AM**











Test ID: **Abdomen** Test Time: **10:37:00 AM** Test Date: **10/5/2010**

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VERIFICATION REPORT

Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Spine Flexion**	Test Date:	**10/4/2010**
Test Number:	**2**	Test Time:	**4:23:28 PM**

Component Part Number	Component Serial Number
175-5501	**15-0545**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**39**	%RH	P
Velocity	5.95	--	6.15	**6.14**	m/s	P
Maximum Headform Flexion Angle	45.0	--	55.0	**47.9**	degrees	P
Time at Maximum Headform Flexion Angle	39.0	--	53.0	**43.5**	ms	P
Decay to Zero Degrees	37.0	--	57.0	**38.9**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

Test ID: **Spine Flexion** Test Time: **4:23:28 PM** Test Date: **10/4/2010**

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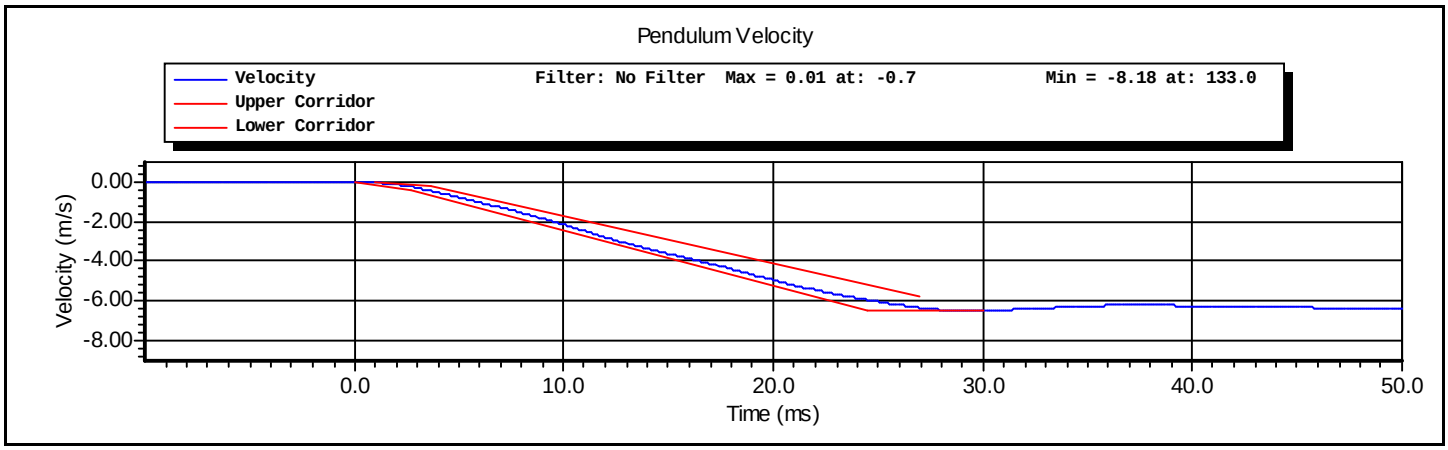
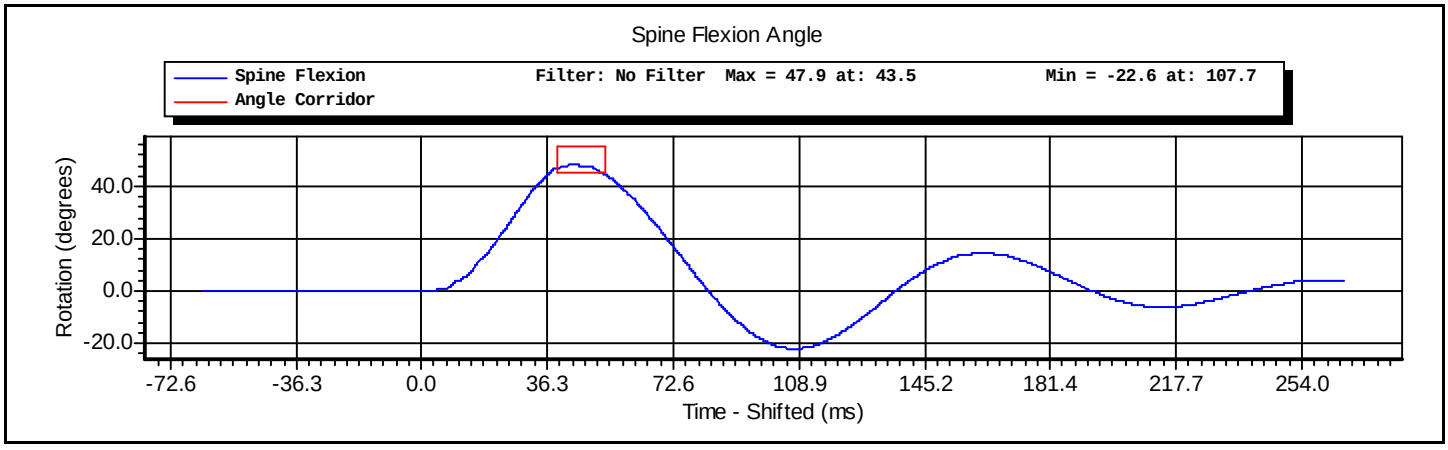
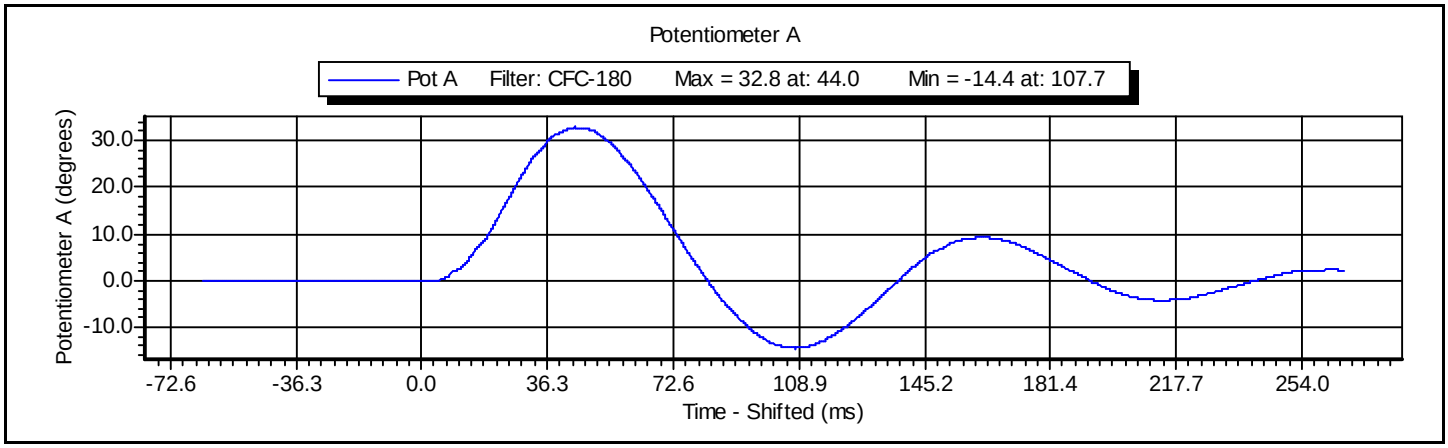
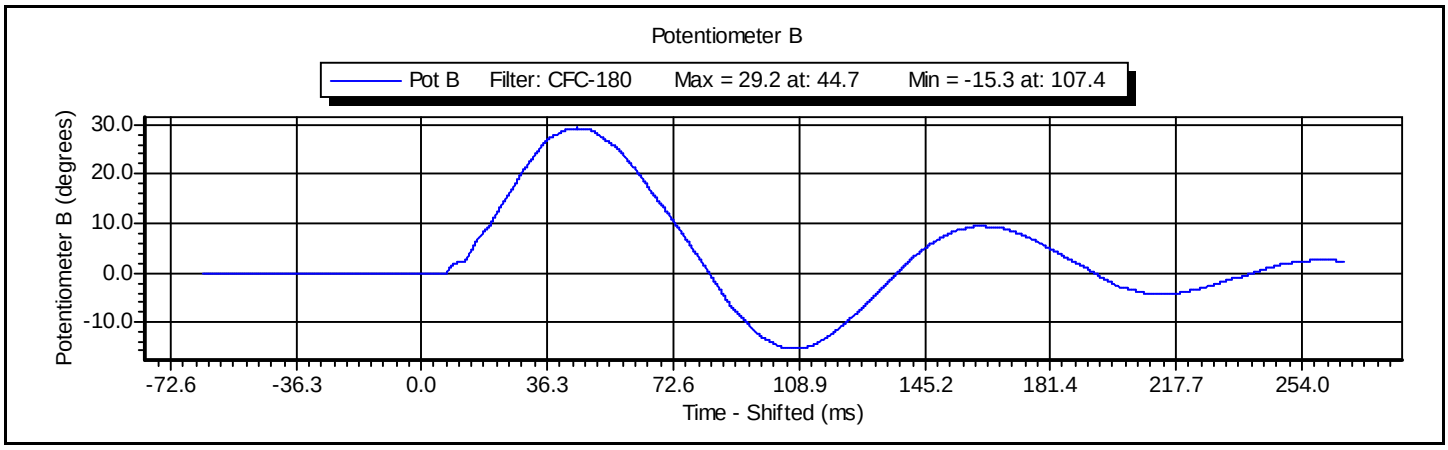
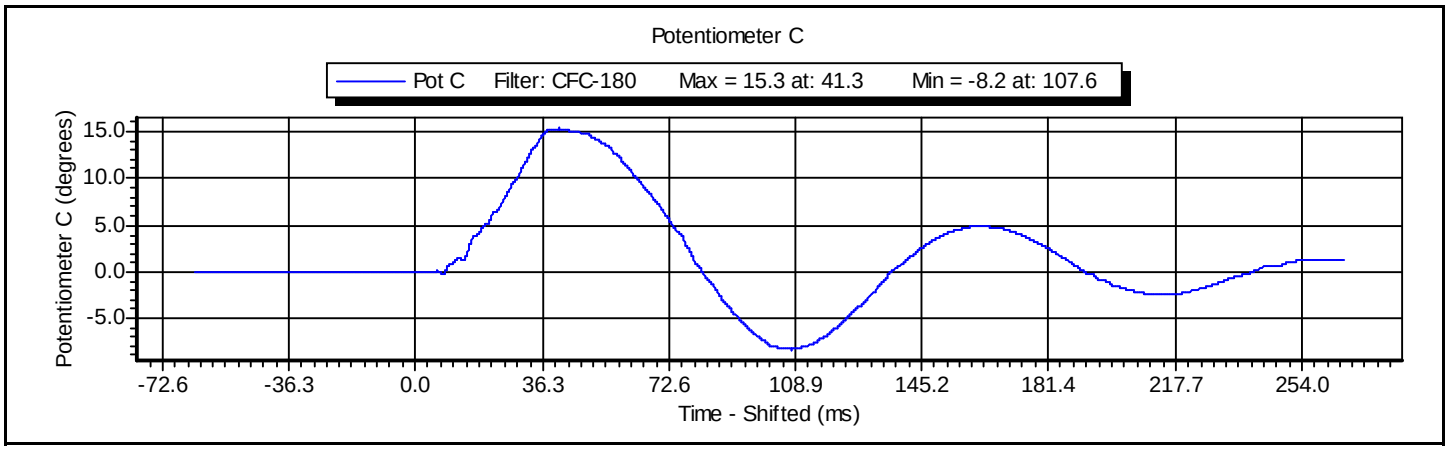
Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Spine Flexion**	Test Date:	**10/4/2010**
Test Number:	**2**	Test Time:	**4:23:28 PM**











Test ID: **Spine Flexion** Test Time: **4:23:28 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Pelvis Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Pelvis**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:10:44 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**41**	%RH	P
Velocity	4.20	--	4.40	**4.32**	m/s	P
Peak Pendulum Force	-5.40	--	-4.70	**-4.92**	kN	P
Time at Peak Pendulum Force	11.80	--	16.10	**13.77**	ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	**-1.39**	kN	P
Time at Peak Pubic Symphysis Force	12.20	--	17.00	**15.17**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Denton	**3096**	**LC-456Fy**	**4/22/2010**

Test ID: **Pelvis** Test Time: **10:10:44 AM** Test Date: **10/5/2010**

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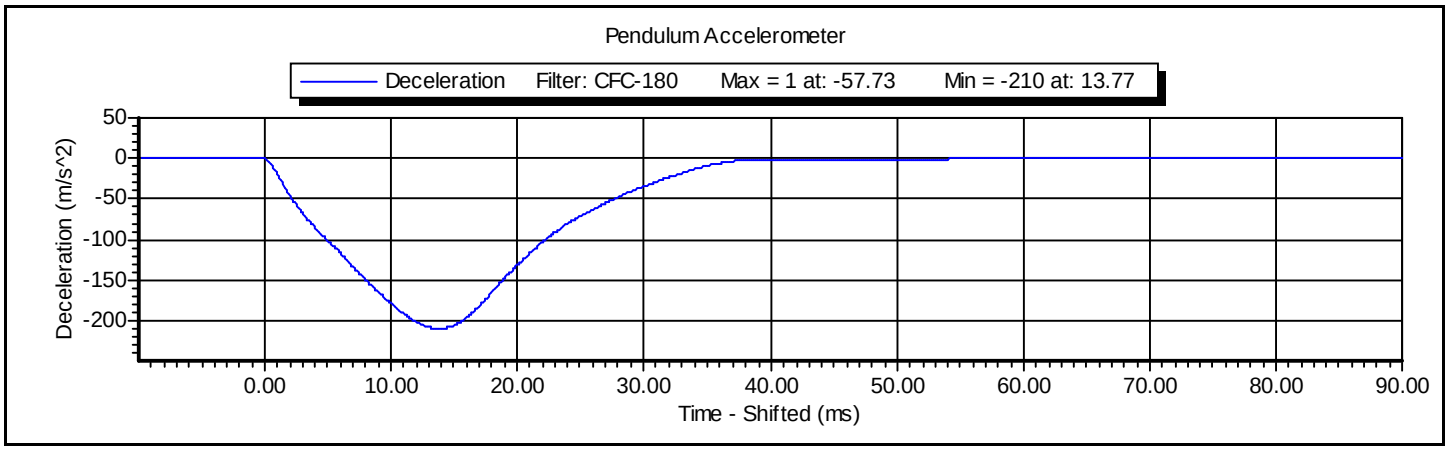
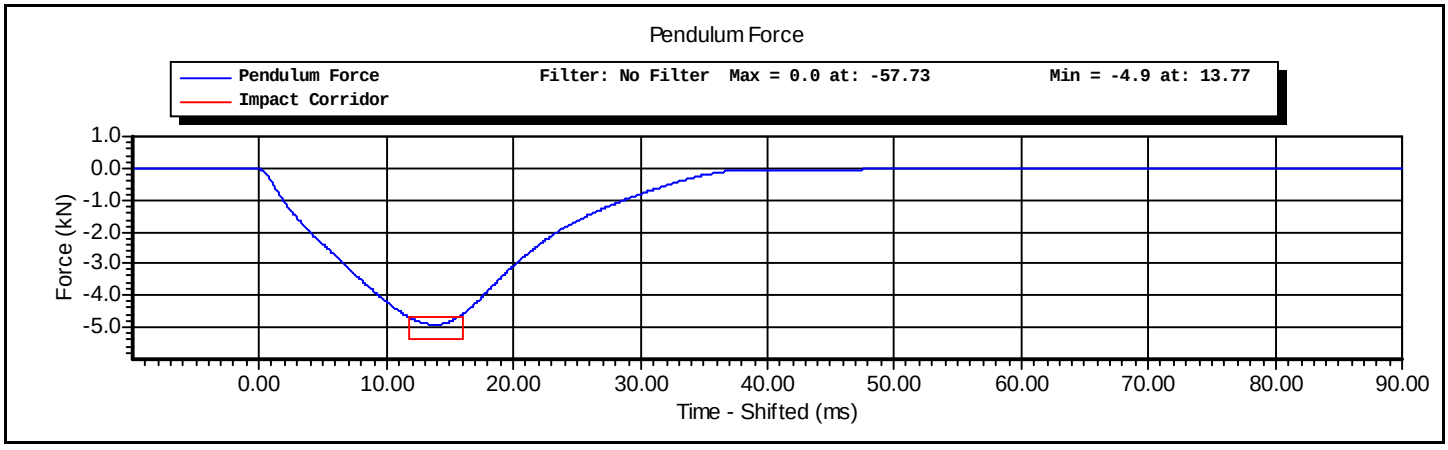
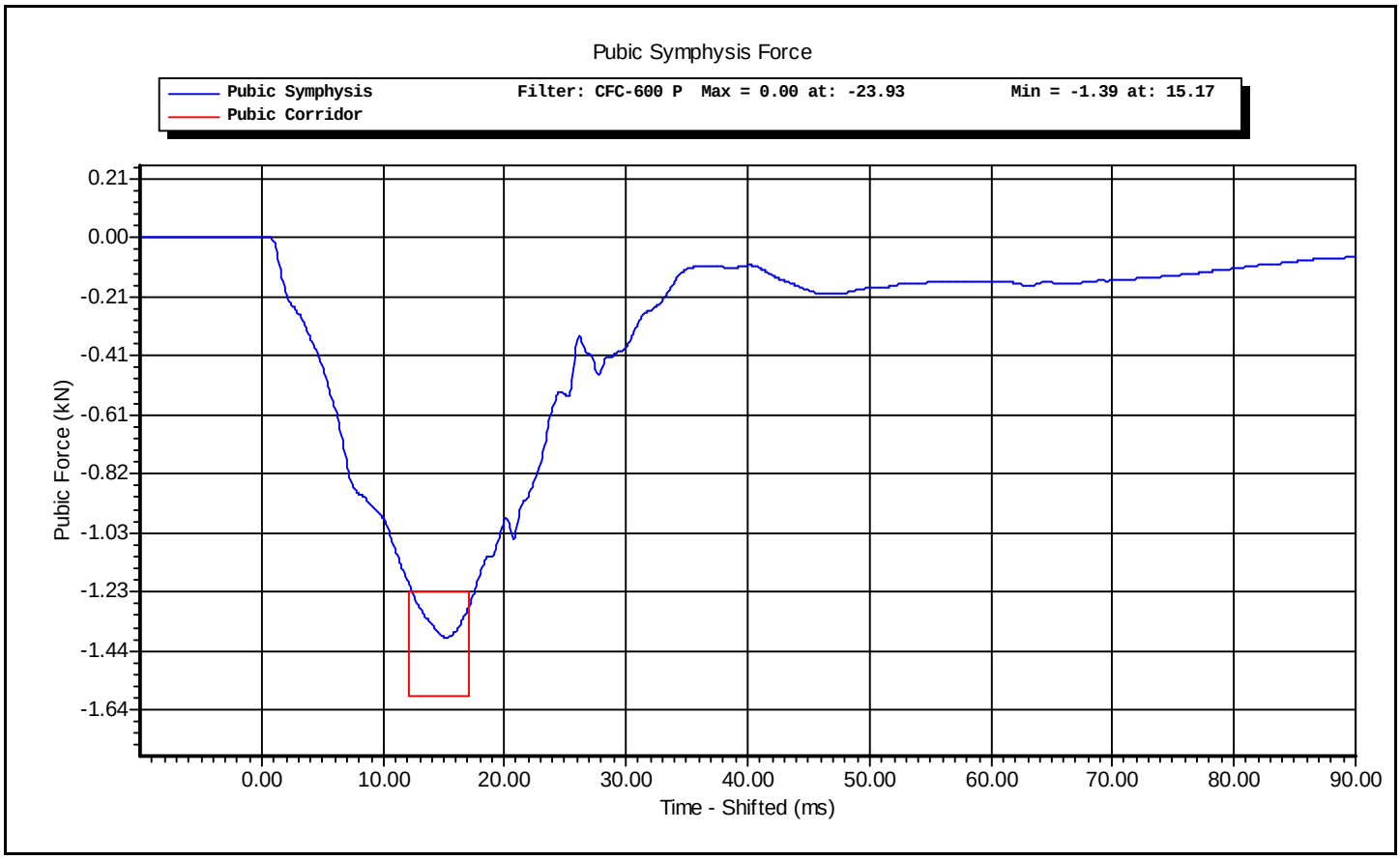
Test Name:	**Pelvis Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Pelvis**	Test Date:	**10/5/2010**
Test Number:	**1**	Test Time:	**10:10:44 AM**







Test ID: **Pelvis** Test Time: **10:10:44 AM** Test Date: **10/5/2010**

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT

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SID-IIsD External Measurements

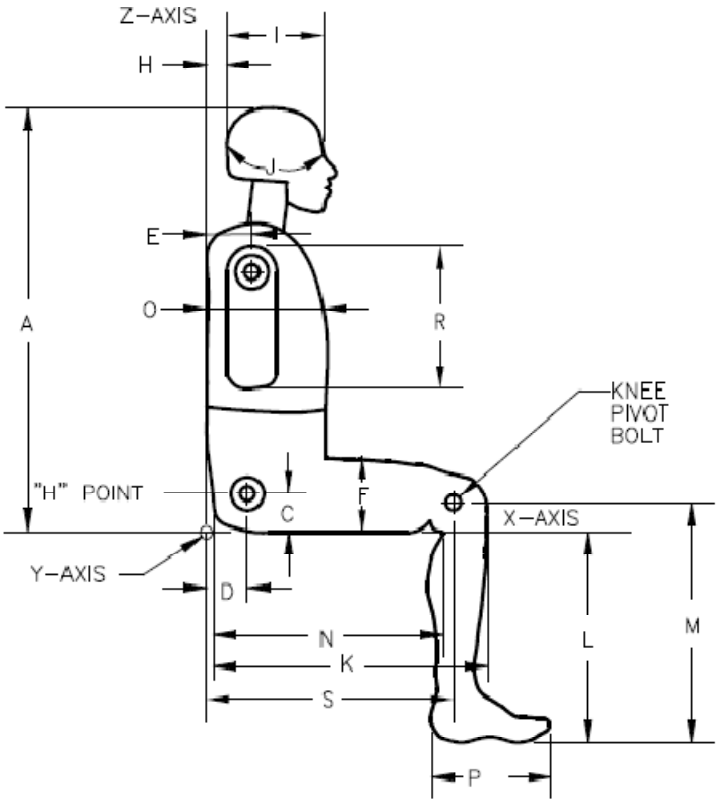
NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	785	Yes
B	Shoulder Pivot Height	437.0 - 453.0	450	Yes
C	H-Point Height	79.0 - 89.0	87	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	42	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	523	Yes
L	Popliteal Height	343.0 - 369.0	365	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	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	475	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	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	870	Yes
Z	Waist Circumference	761.0 - 791.0	773	Yes

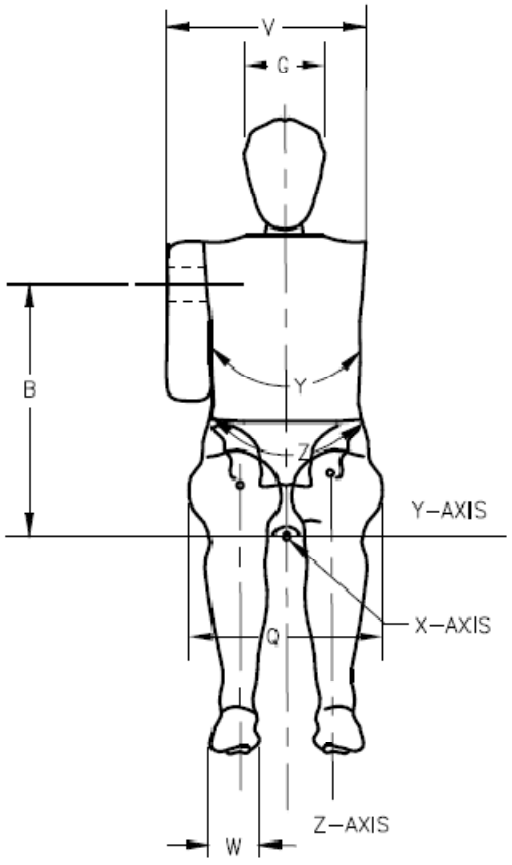
Technician: AR

Date: 10/4/2010

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Head Drop**	Test Date:	**9/28/2010**
Test Number:	**1**	Test Time:	**4:26:36 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**60**	%RH	P
Resultant Acceleration	115.0	--	137.0	**132.0**	g	P
Oscillation	0.0	--	15.0	**2.5**	%	P
Fore-Aft Acceleration	-15.0	--	15.0	**7.5**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51685**	**4/7/2010**
Endevco	**7264-2000**	**P51682**	**4/7/2010**
Endevco	**7264-2000**	**P51699**	**4/7/2010**

Test ID: **Head Drop** Test Time: **4:26:36 PM** Test Date: **9/28/2010**

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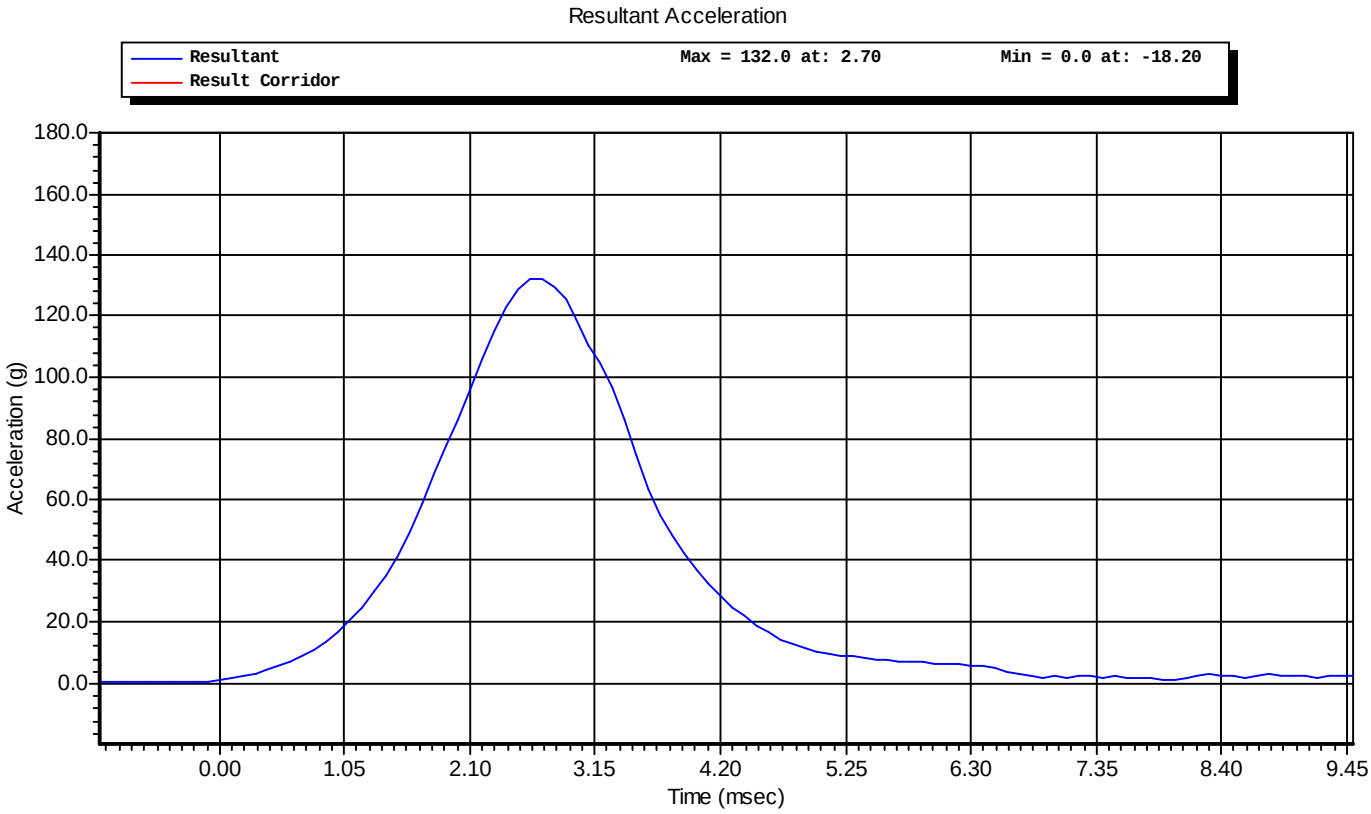
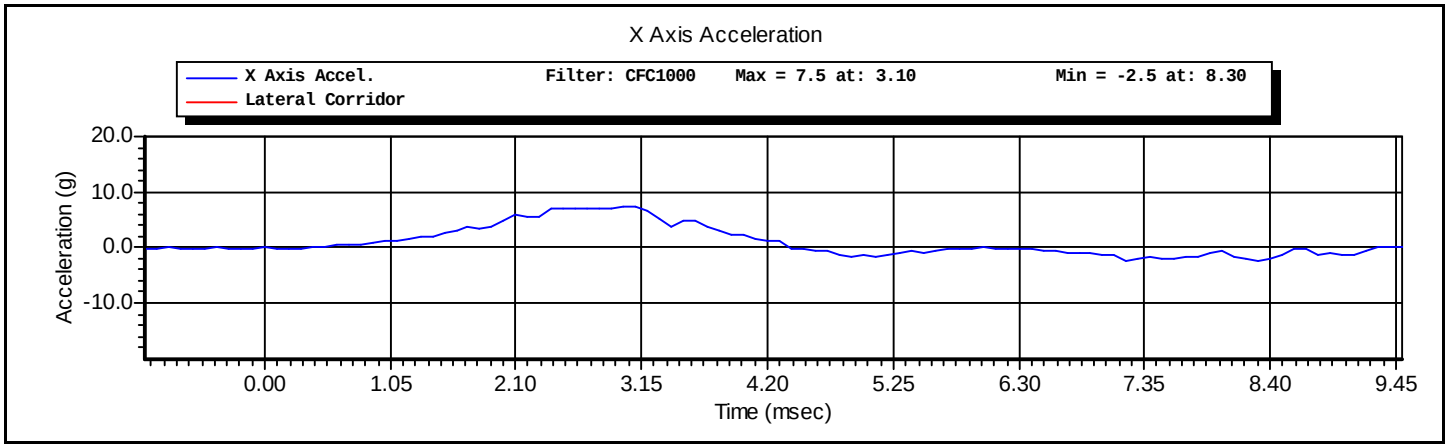
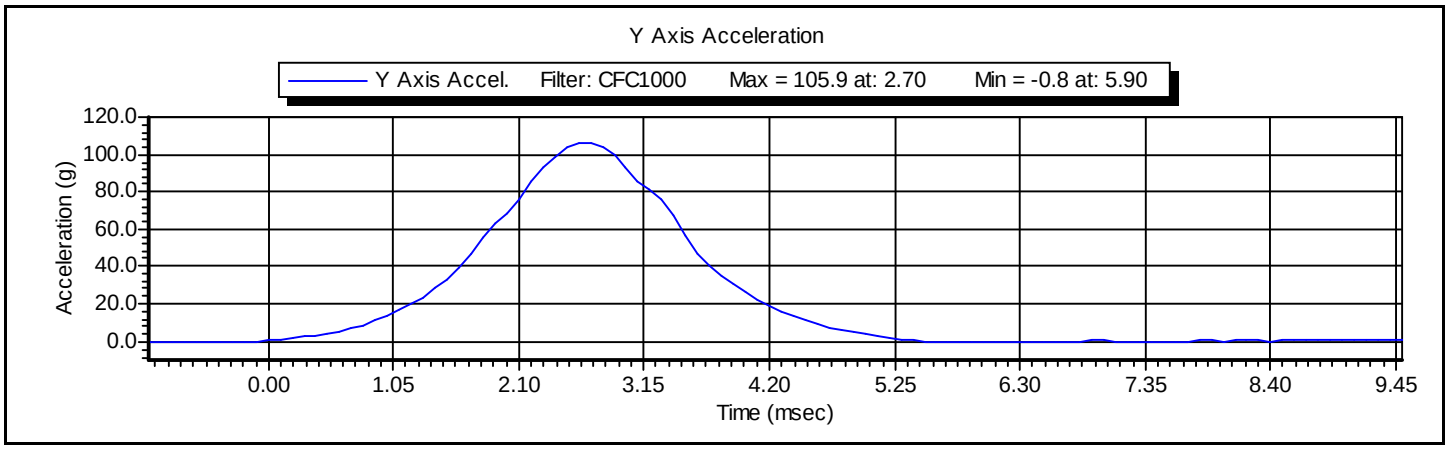
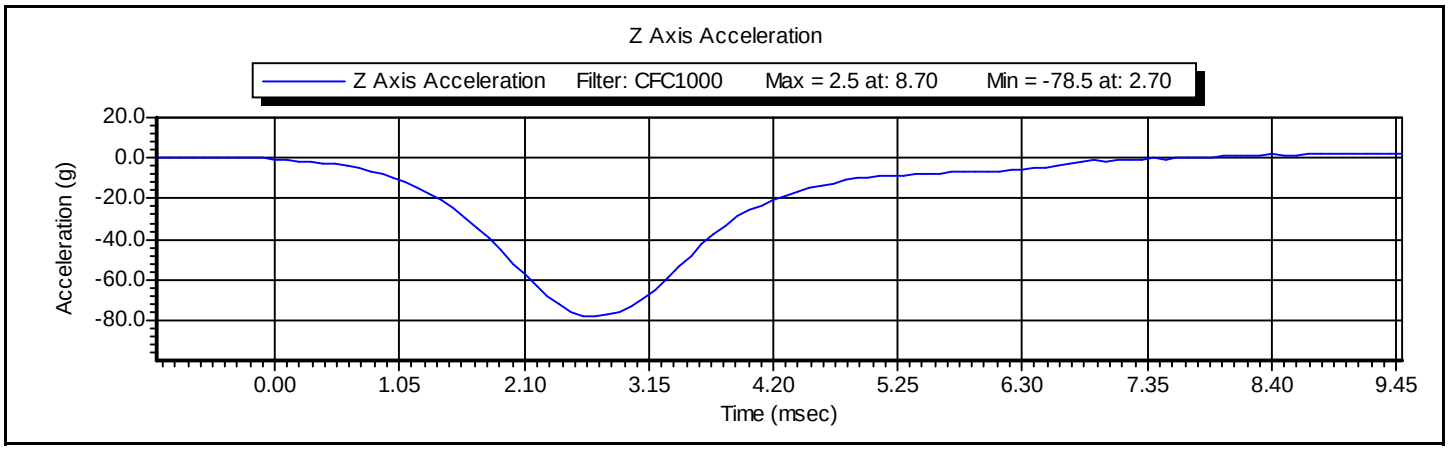
Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Head Drop**	Test Date:	**9/28/2010**
Test Number:	**1**	Test Time:	**4:26:36 PM**









Test ID: **Head Drop** Test Time: **4:26:36 PM** Test Date: **9/28/2010**

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VERIFICATION REPORT

Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Neck Flexion**	Test Date:	**9/28/2010**
Test Number:	**1**	Test Time:	**3:21:13 PM**

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

Test Parameters	Test Specifications	Test Results	
Temperature	20.6 -- 22.2	**22.2** deg C	P
Humidity	10 -- 70	**60** %RH	P
Velocity	5.51 -- 5.63	**5.55** m/s	P
Pendulum Impulse at 10 ms	2.20 -- 2.80	**2.57** m/s	P
Pendulum Impulse at 15 ms	3.30 -- 4.10	**3.80** m/s	P
Pendulum Impulse at 20 ms	4.40 -- 5.40	**5.24** m/s	P
Pendulum Impulse at 25 ms	5.40 -- 6.10	**5.86** m/s	P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	**5.90** m/s	P
Max D Plane Rotation	71.0 -- 81.0	**74.2** degrees	P
Time at Max Rotation	50.0 -- 70.0	**60.3** ms	P
Moment about OC	-44.0 -- -36.0	**-43.5** Nm	P
Moment Decay to Zero	102.0 -- 126.0	**114.5** ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
Denton	**1716A**	**LC-576 Fy**	**2/15/2010**
Denton	**1716A**	**LC-576 Mx**	**2/15/2010**
DentonATD	**78051-342**	**184**	**4/30/2010**
DentonATD	**78051-342**	**174**	**4/30/2010**
DentonATD	**78051-342**	**185**	**4/30/2010**

Test ID: **Neck Flexion** Test Time: **3:21:13 PM** Test Date: **9/28/2010**

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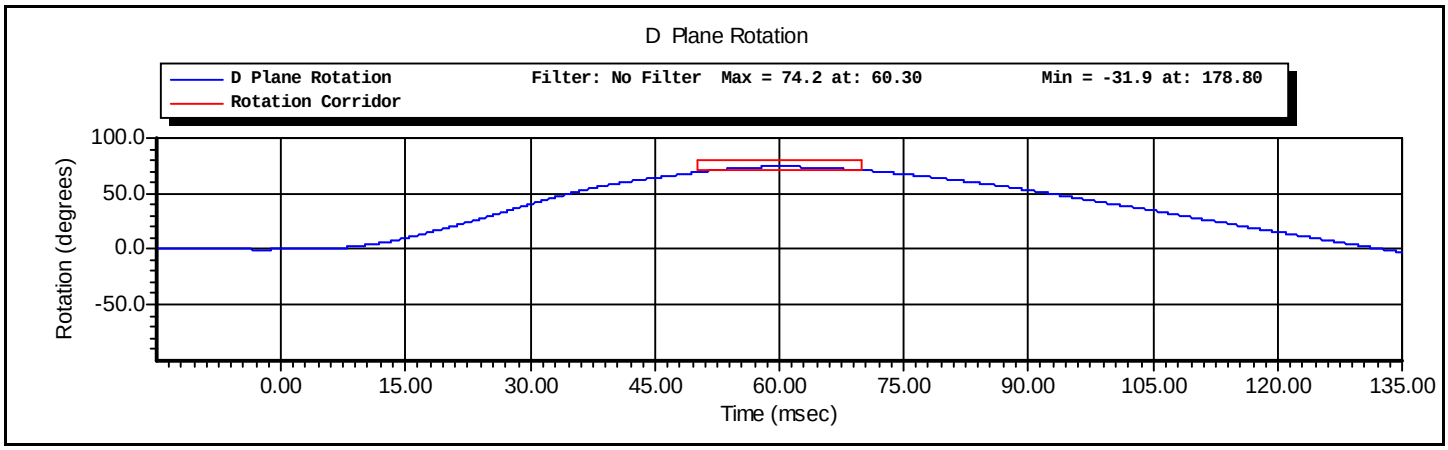
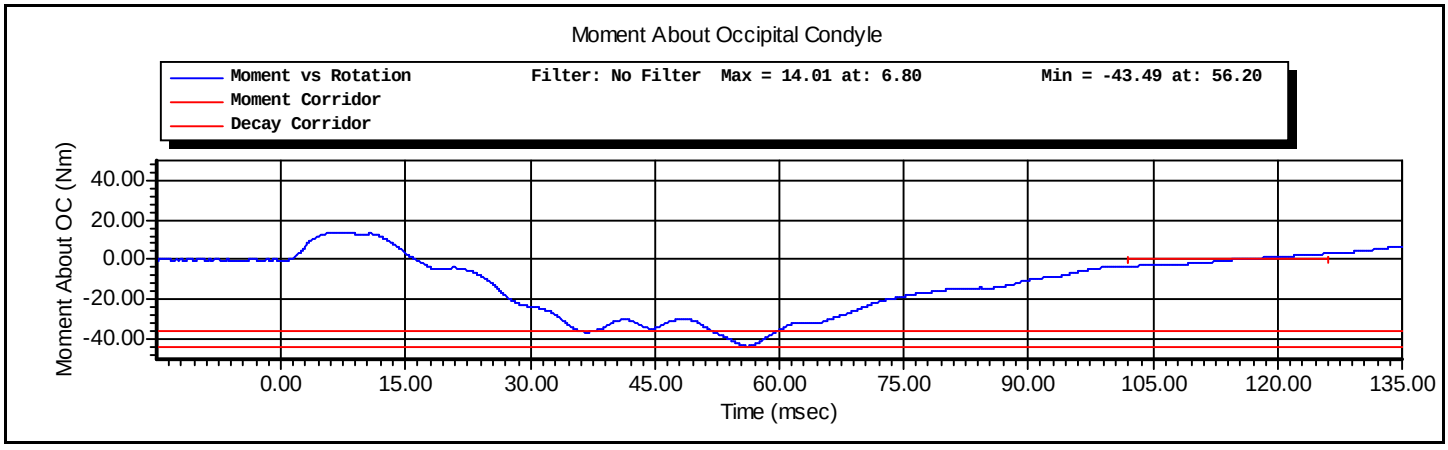
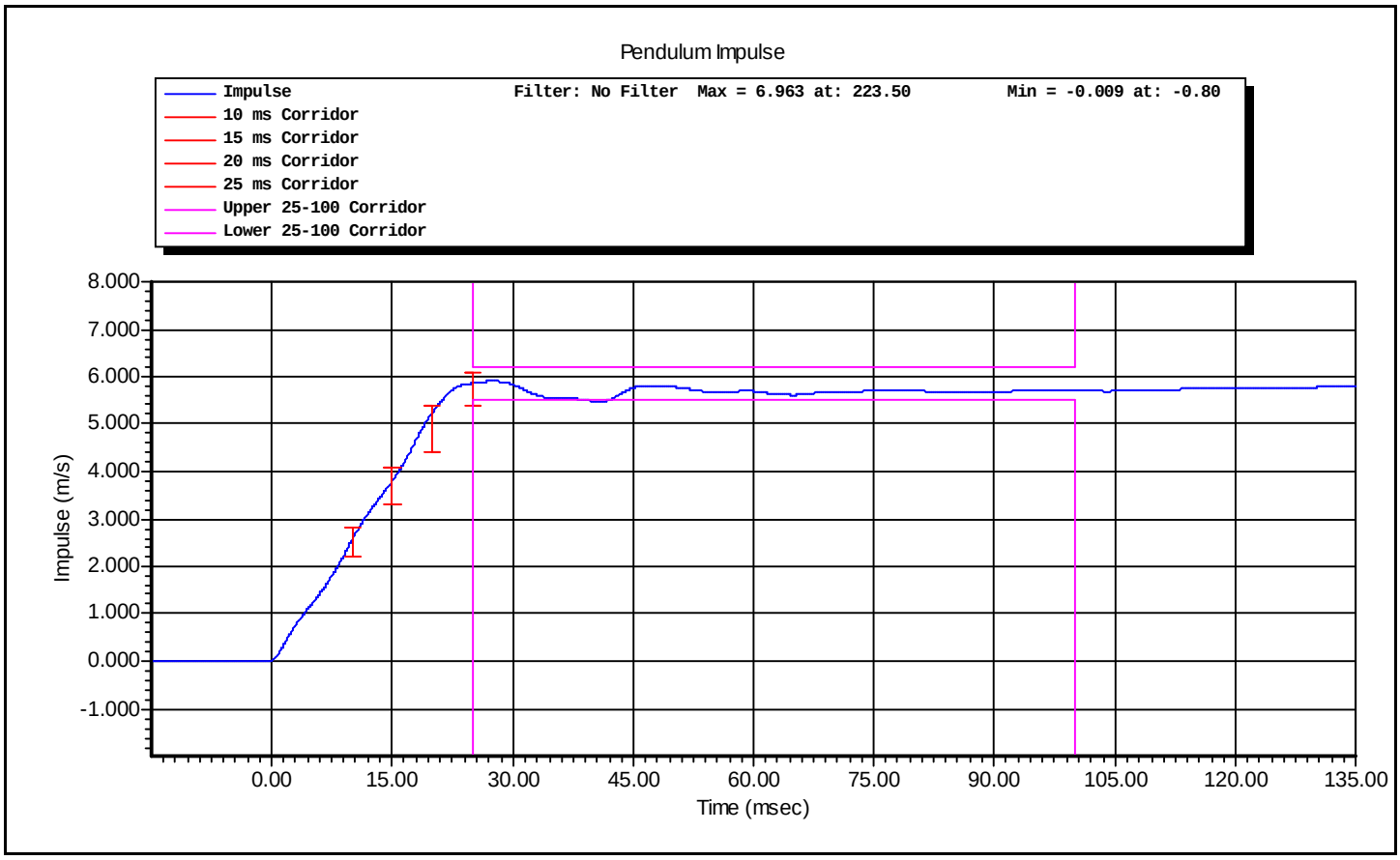
Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Neck Flexion**	Test Date:	**9/28/2010**
Test Number:	**1**	Test Time:	**3:21:13 PM**







Test ID: **Neck Flexion** Test Time: **3:21:13 PM** Test Date: **9/28/2010**

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VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Shoulder**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:13:19 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.20**	deg C	P
Humidity	10.0	--	70.0	**41.0**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Probe Acceleration	13.0	--	18.0	**16.4**	g	P
Shoulder Deflection	28.0	--	37.0	**31.8**	mm	P
T1 Acceleration	17.0	--	22.0	**20.1**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Servo	**180-3885**	**DS-1063**	**4/7/2010**
Endevco	**7264-2000**	**P26269**	**10/1/2010**

Test ID: **Shoulder** Test Time: **2:13:19 PM** Test Date: **10/4/2010**

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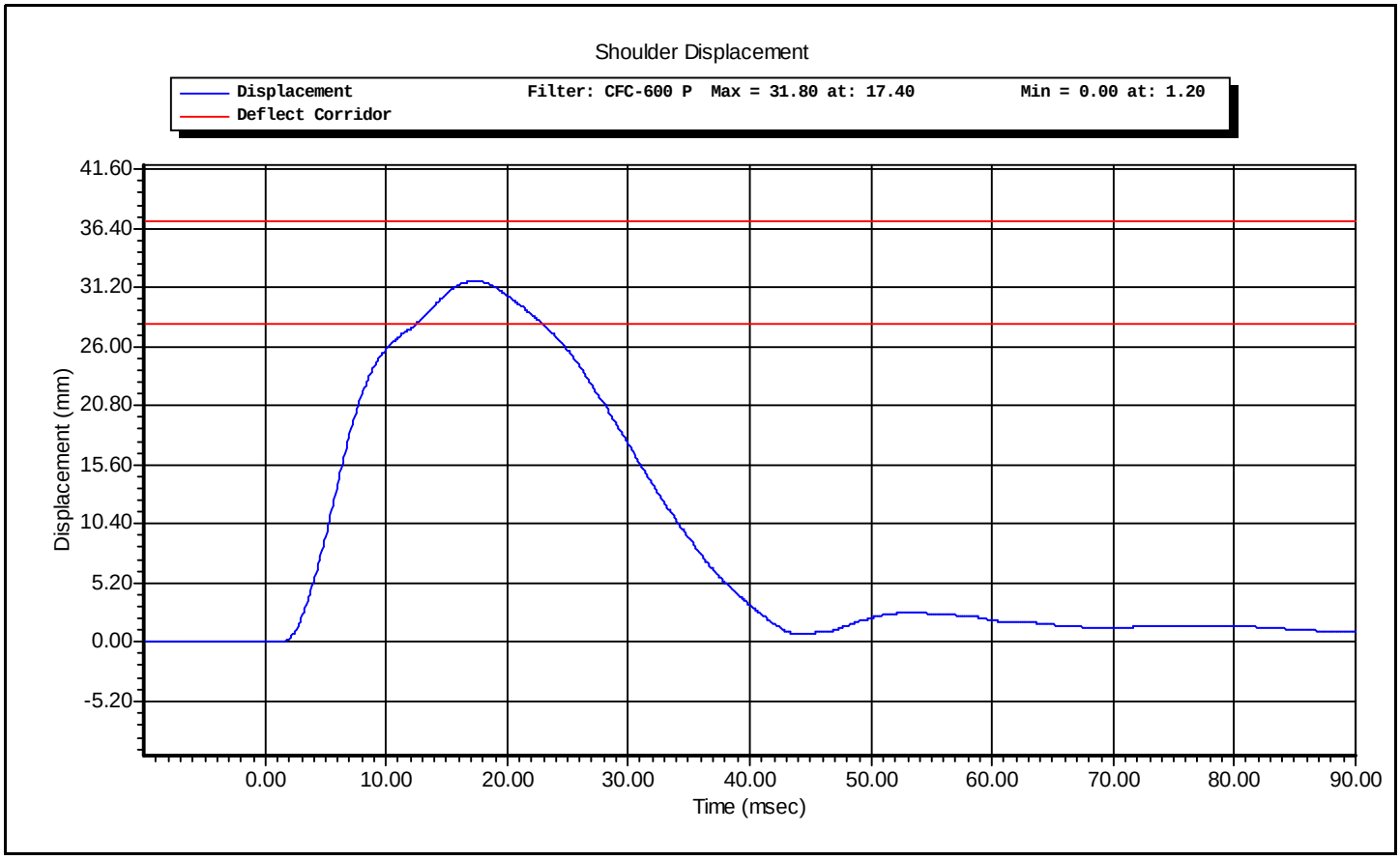
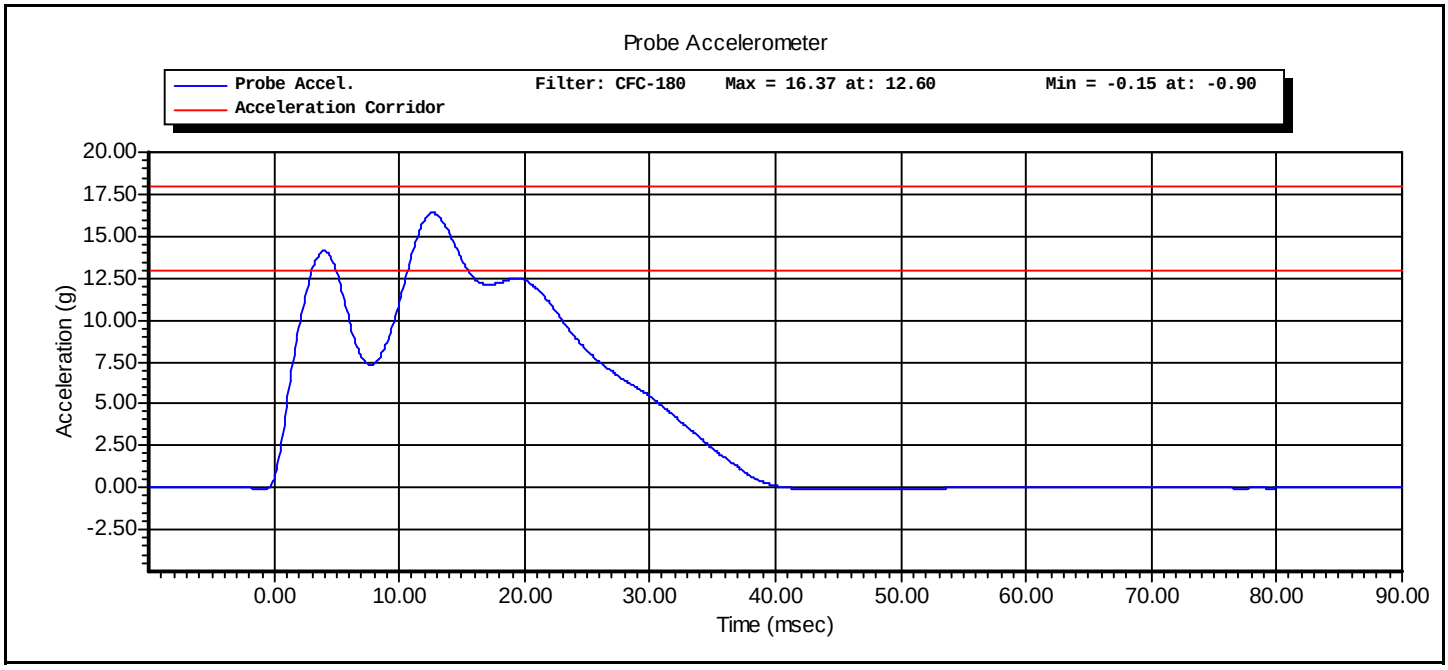
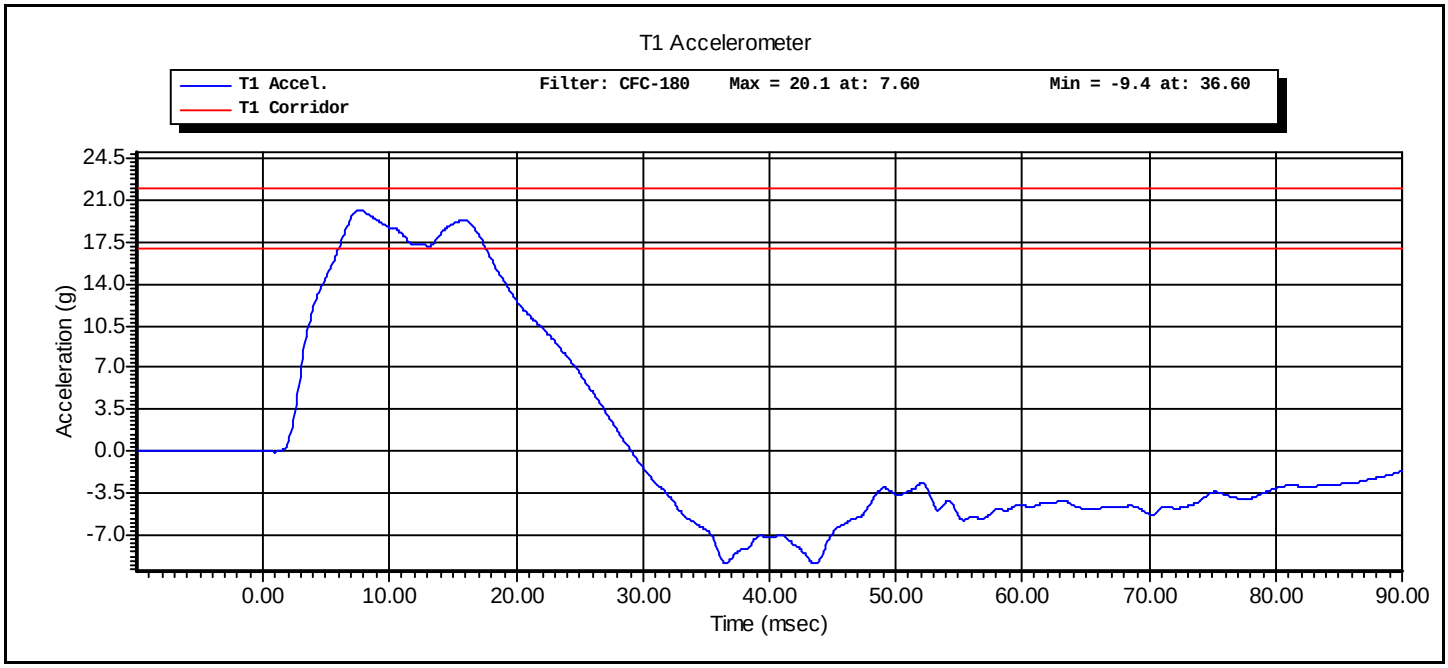
Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Shoulder**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:13:19 PM**







Test ID: **Shoulder** Test Time: **2:13:19 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Thorax With Arm**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:56:40 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**41**	%RH	P
Velocity	6.60	--	6.80	**6.70**	m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	**34.0**	g	P
Upper Thorax Rib Deflection	25.0	--	32.0	**26.7**	mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	**31.3**	mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	**36.5**	mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	**40.6**	g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	**35.6**	g	P
Shoulder Deflection	31.0	--	40.0	**36.7**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Servo	**180-3885**	**DS-1121**	**4/7/2010**
Servo	**180-3885**	**DS-1151**	**4/7/2010**
Servo	**180-3885**	**DS-1156**	**4/7/2010**
Endevco	**7264-2000**	**P26269**	**10/1/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**
Servo	**180-3885**	**DS-1063**	**4/7/2010**

Test ID: **Thorax With Arm** Test Time: **2:56:40 PM** Test Date: **10/4/2010**

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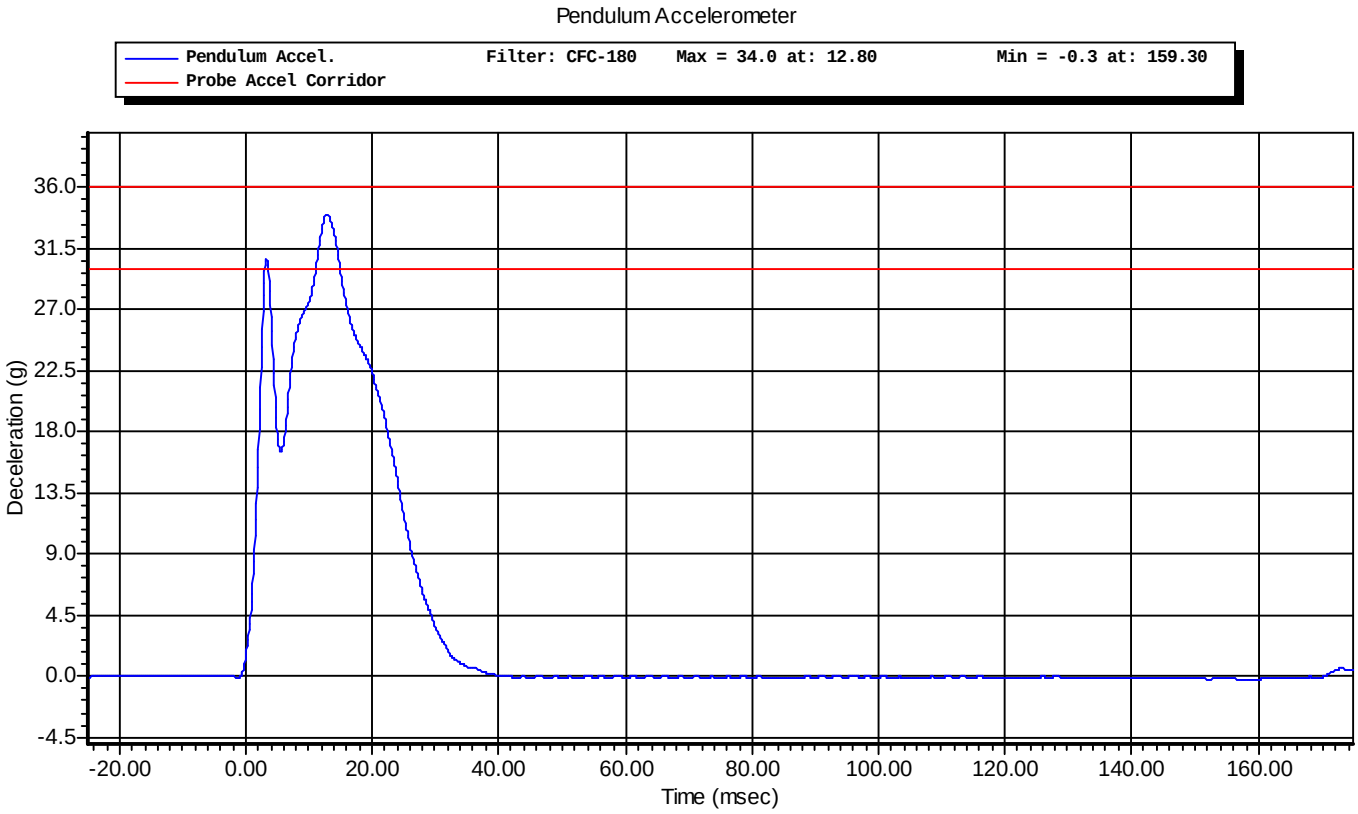
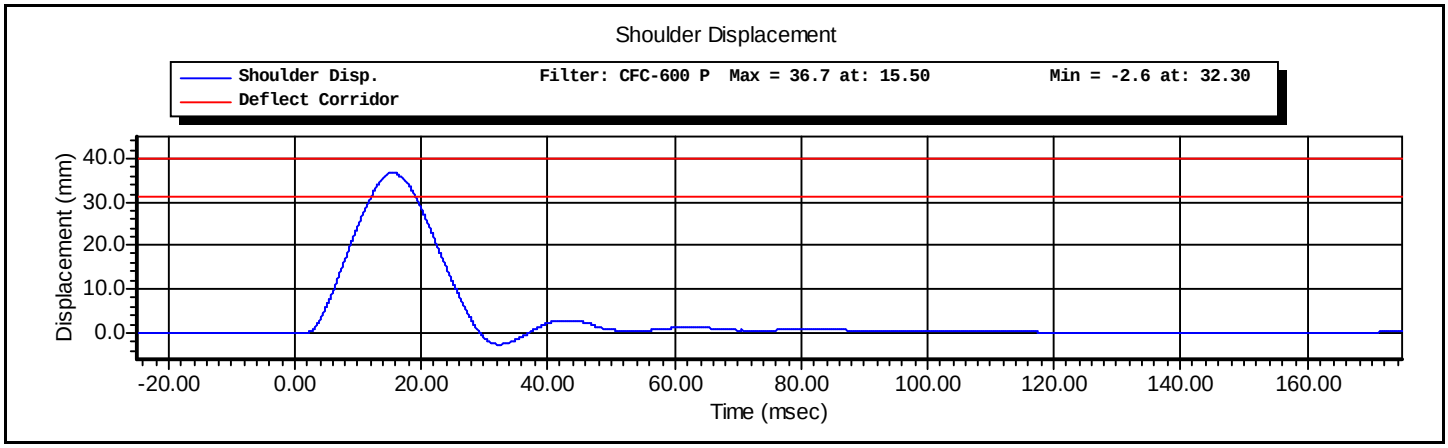
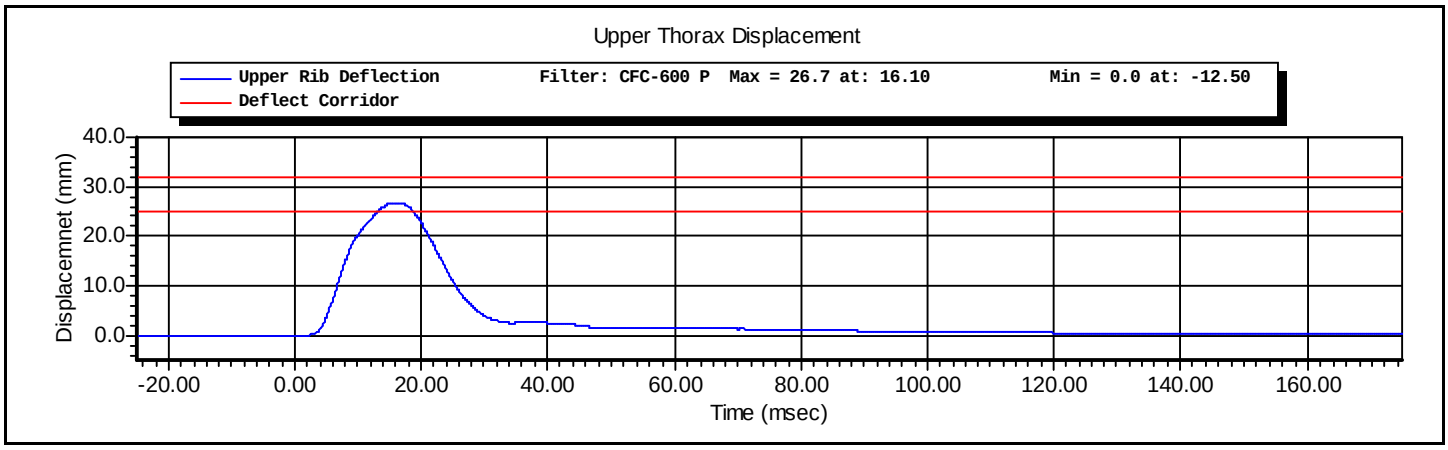
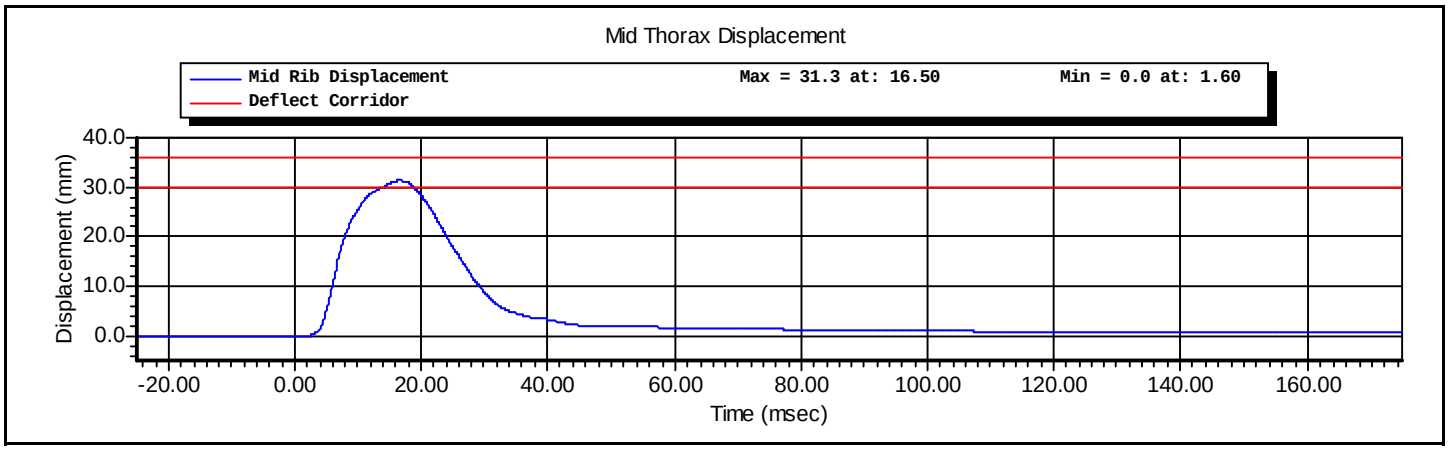
Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Thorax With Arm**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:56:40 PM**

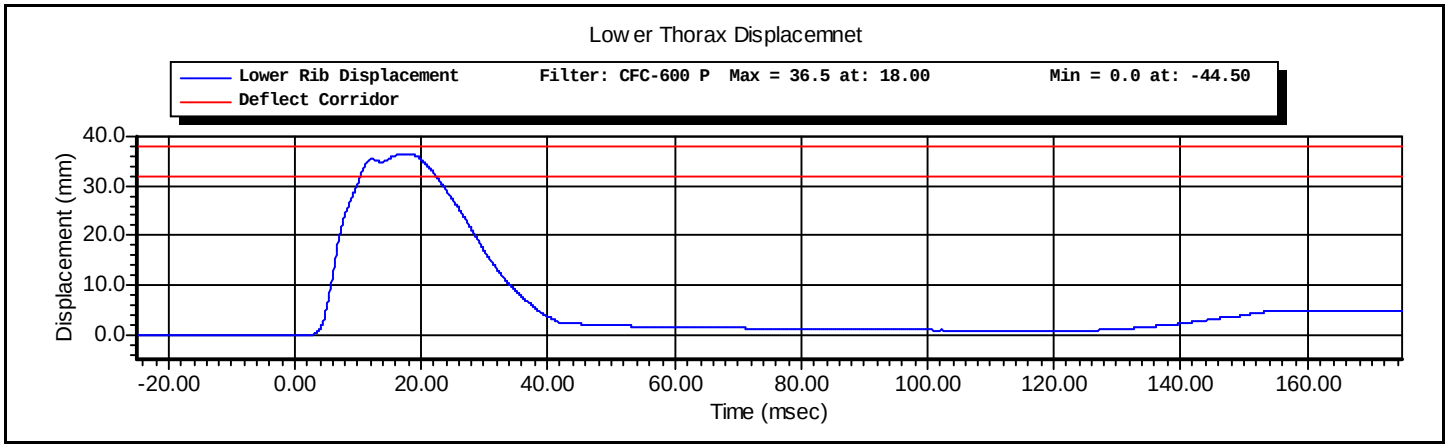


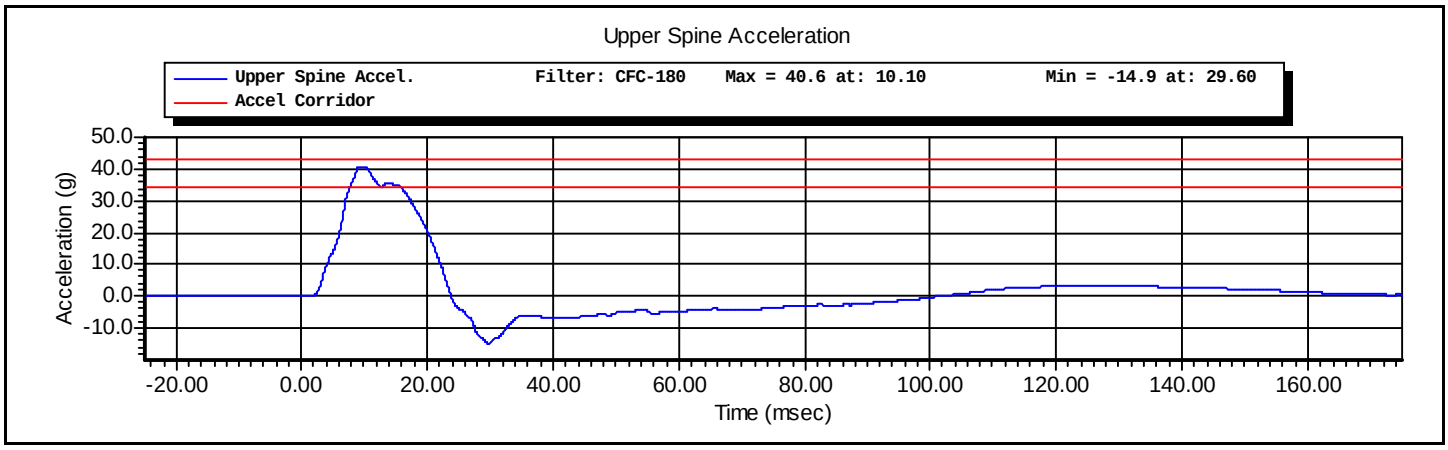


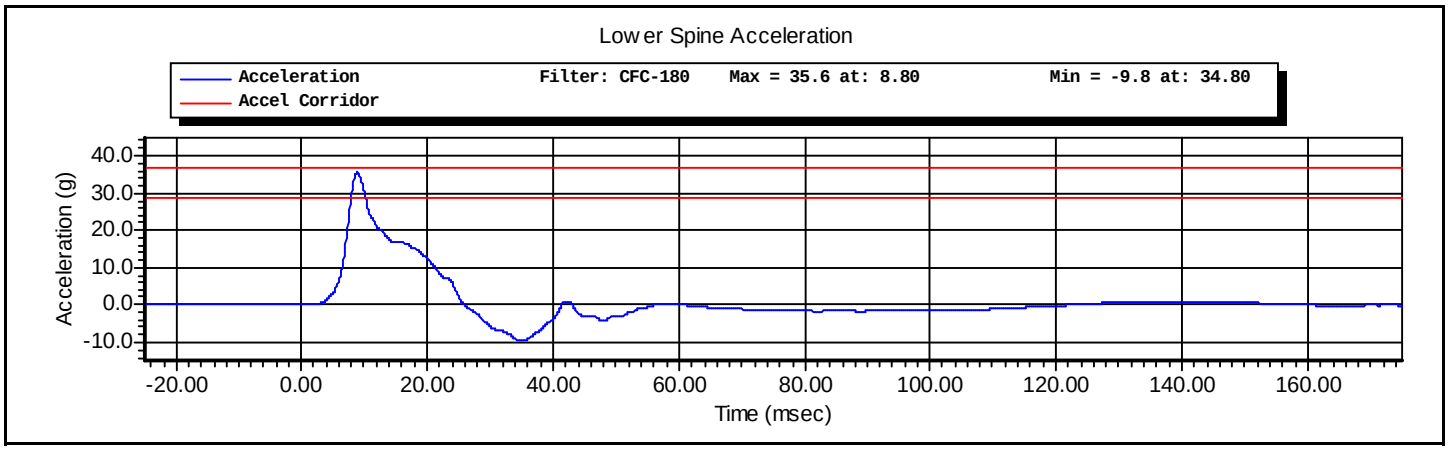




Test ID: **Thorax With Arm** Test Time: **2:56:40 PM** Test Date: **10/4/2010**







Test ID: **Thorax With Arm** Test Time: **2:56:40 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:01:13 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**40**	%RH	P
Velocity	4.20	--	4.40	**4.35**	m/s	P
Probe Acceleration	14.0	--	18.0	**16.0**	g	P
Upper Thorax Rib Deflection	32.0	--	40.0	**35.8**	mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	**41.2**	mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	**40.9**	mm	P
Upper Spine Acceleration T1	13.0	--	17.0	**16.1**	g	P
Lower Spine Acceleration T12	7.0	--	11.0	**10.3**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Servo	**180-3885**	**DS-1121**	**4/7/2010**
Servo	**180-3885**	**DS-1151**	**4/7/2010**
Servo	**180-3885**	**DS-1156**	**4/7/2010**
Endevco	**7264-2000**	**P26269**	**10/1/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**

Test ID: **Thorax Without Arm** Test Time: **2:01:13 PM** Test Date: **10/4/2010**

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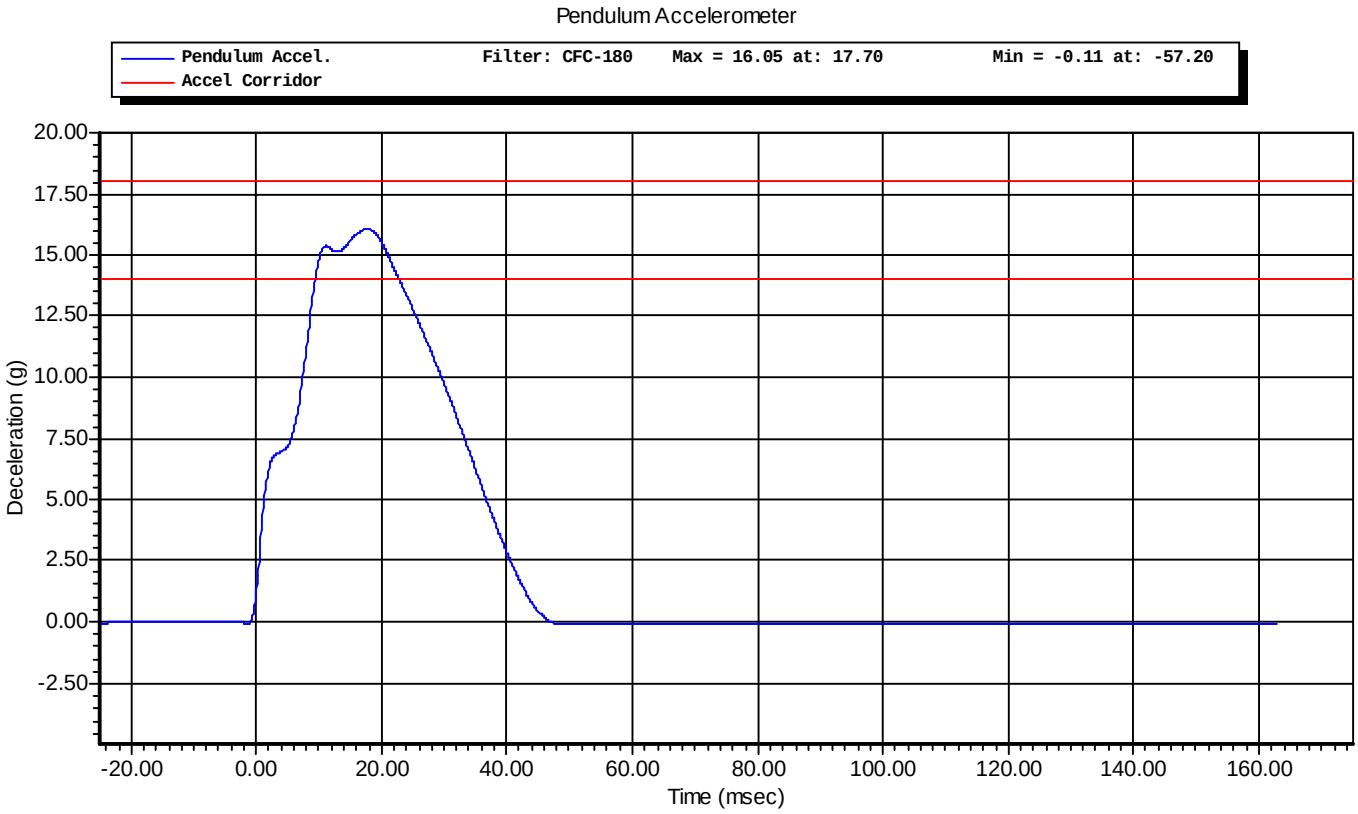
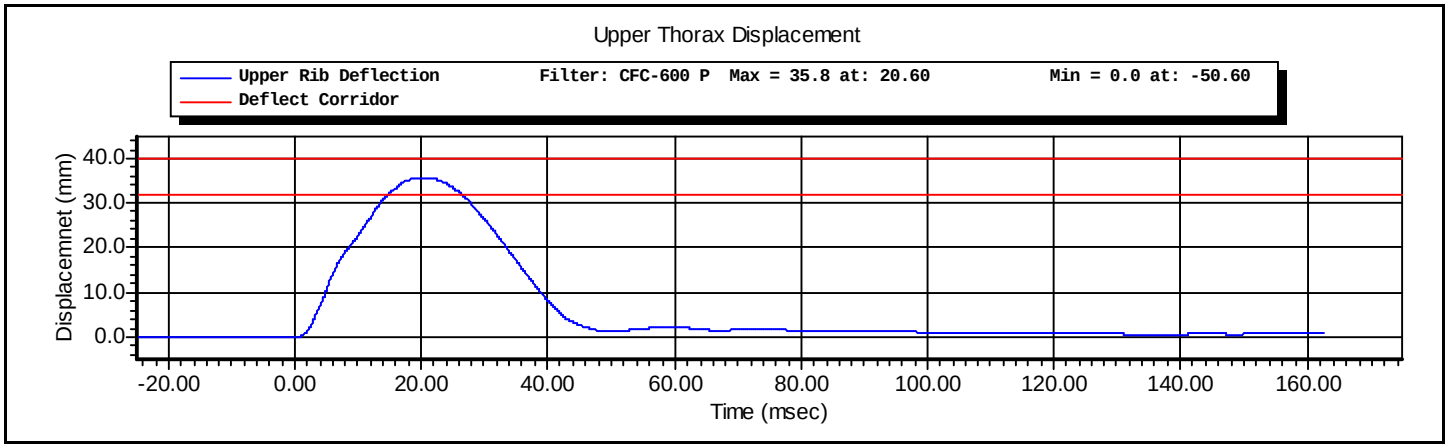
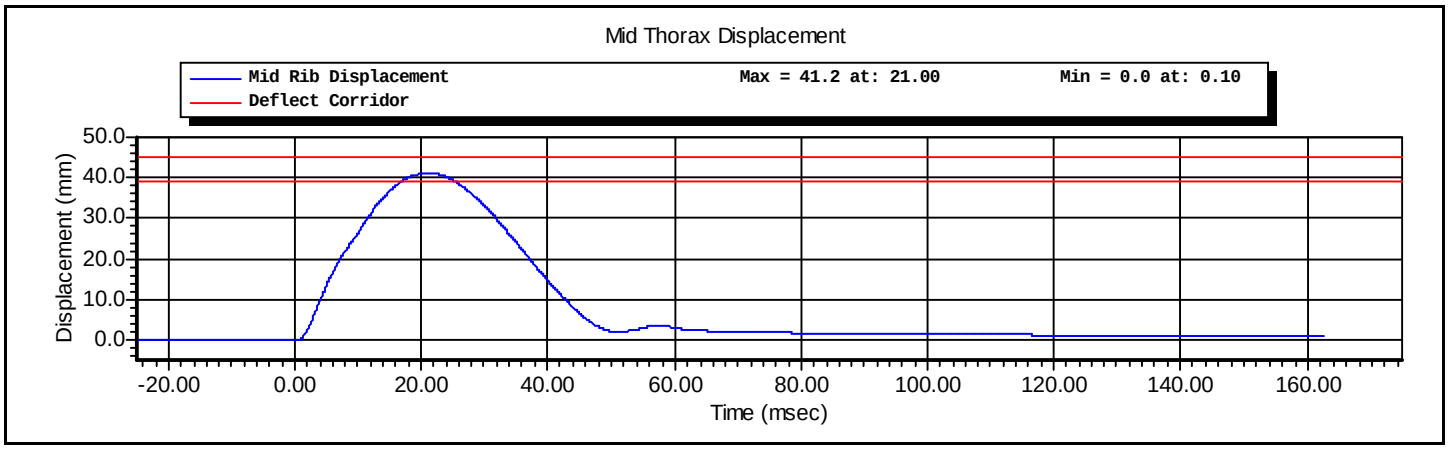
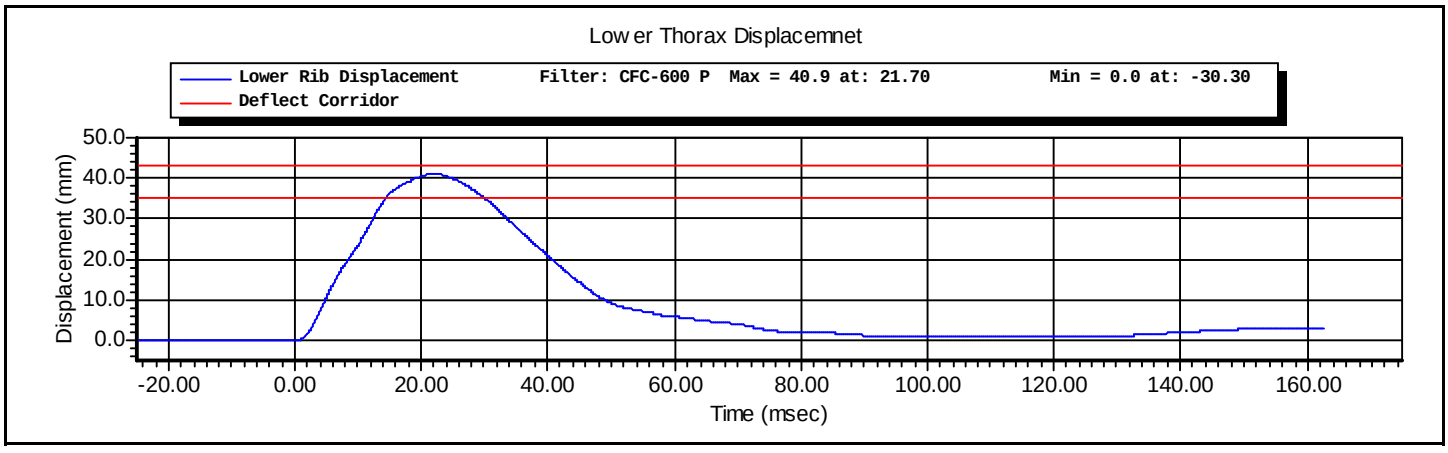
Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:01:13 PM**

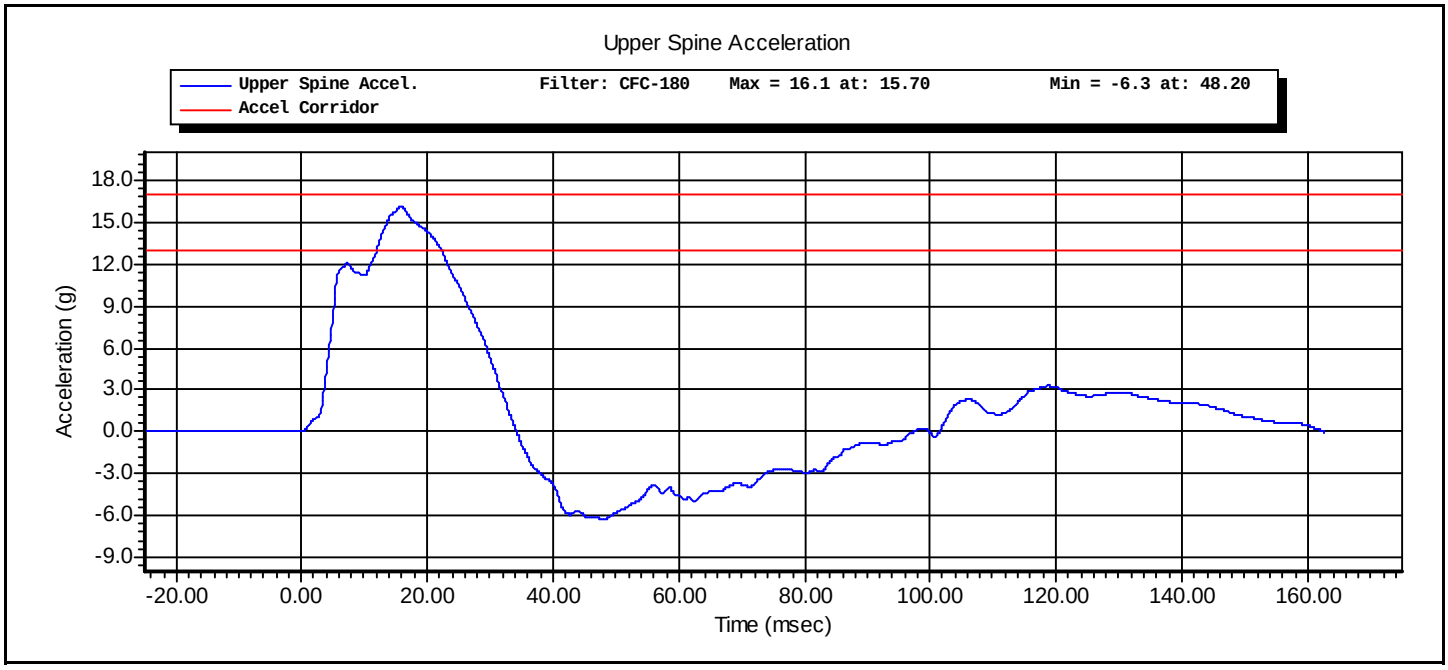


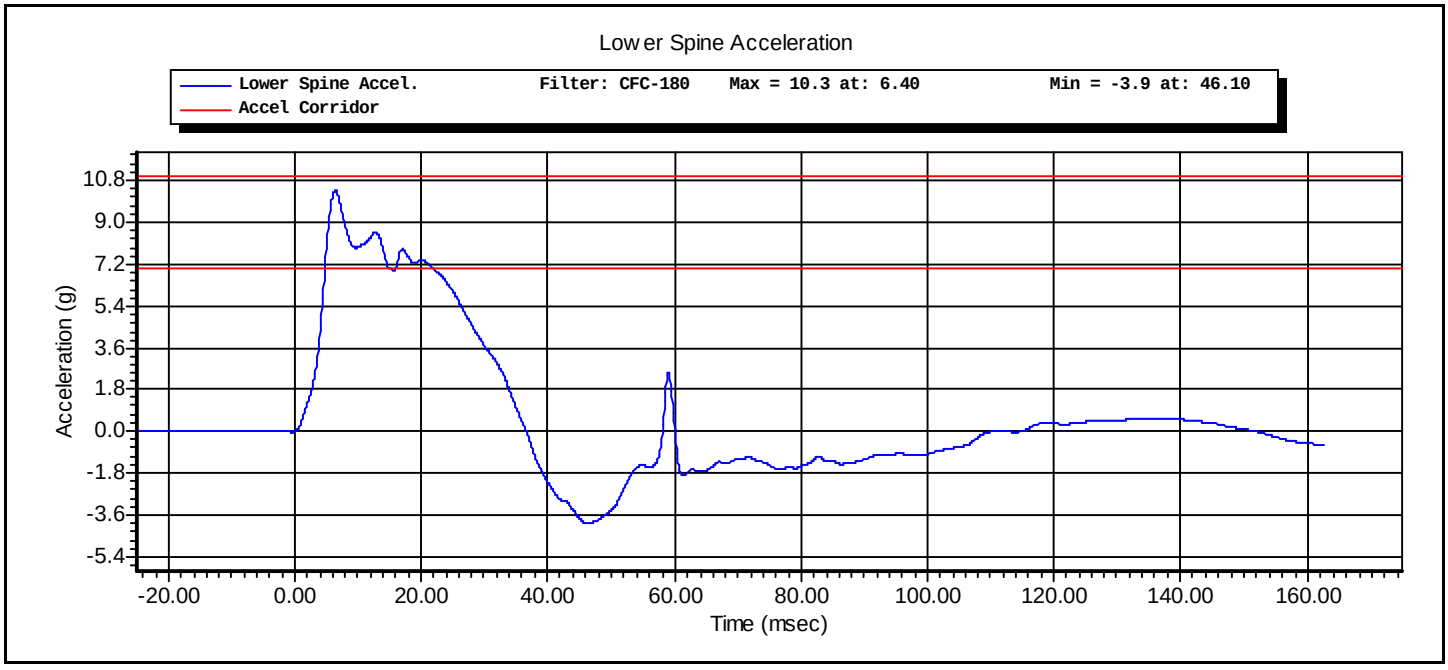






Test ID: **Thorax Without Arm** Test Time: **2:01:13 PM** Test Date: **10/4/2010**





Test ID: **Thorax Without Arm** Test Time: **2:01:13 PM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Abdomen**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:37:39 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**42**	%RH	P
Velocity	4.20	--	4.40	**4.35**	m/s	P
Probe Acceleration	12.0	--	16.0	**15.5**	g	P
Upper Abdominal Rib Deflection	36.0	--	47.0	**39.6**	mm	P
Lower Abdominal Rib Deflection	33.0	--	44.0	**34.4**	mm	P
Lower Spine Acceleration - T12	9.0	--	14.0	**12.7**	g	P

All test parameters are within specifications

Technician: **A Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Servo	**180-3885**	**DS-1162**	**4/7/2010**
Servo	**180-3885**	**DS-1232**	**4/7/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**

Test ID: **Abdomen** Test Time: **2:37:39 PM** Test Date: **10/4/2010**

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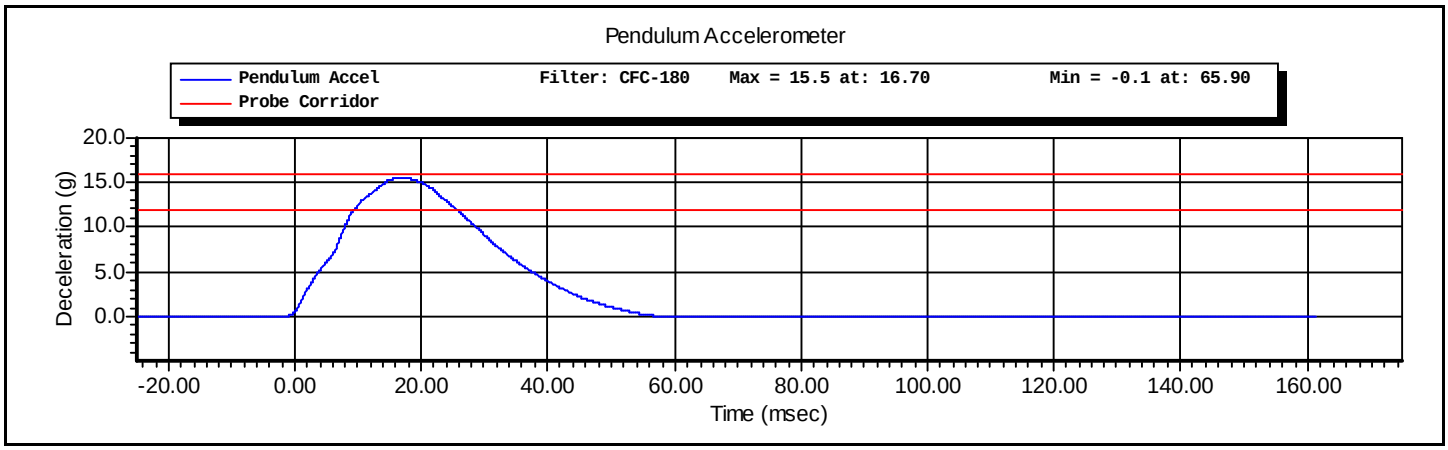
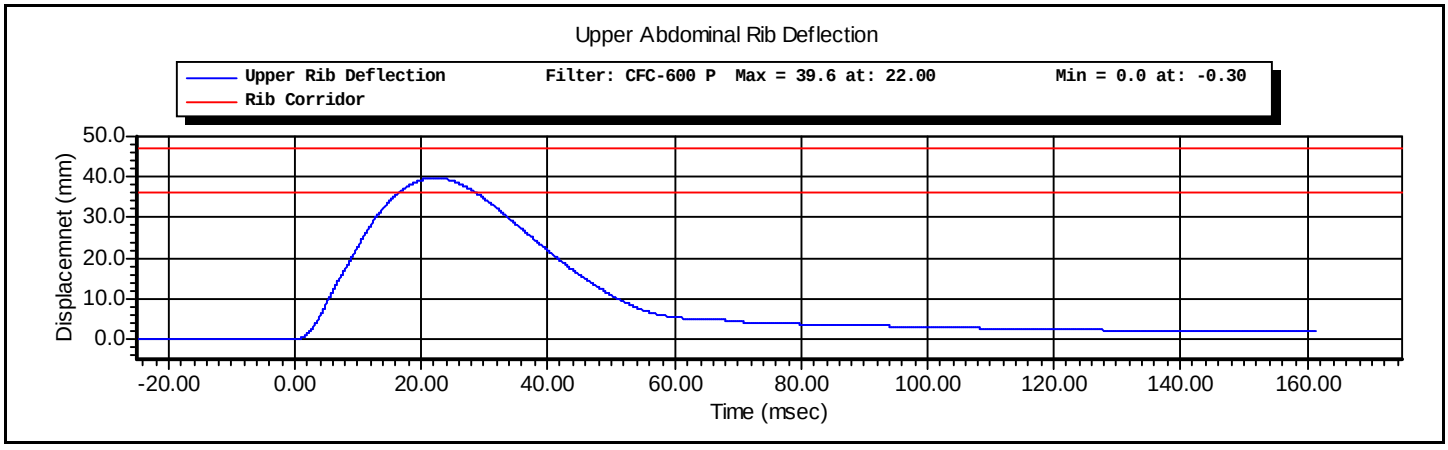
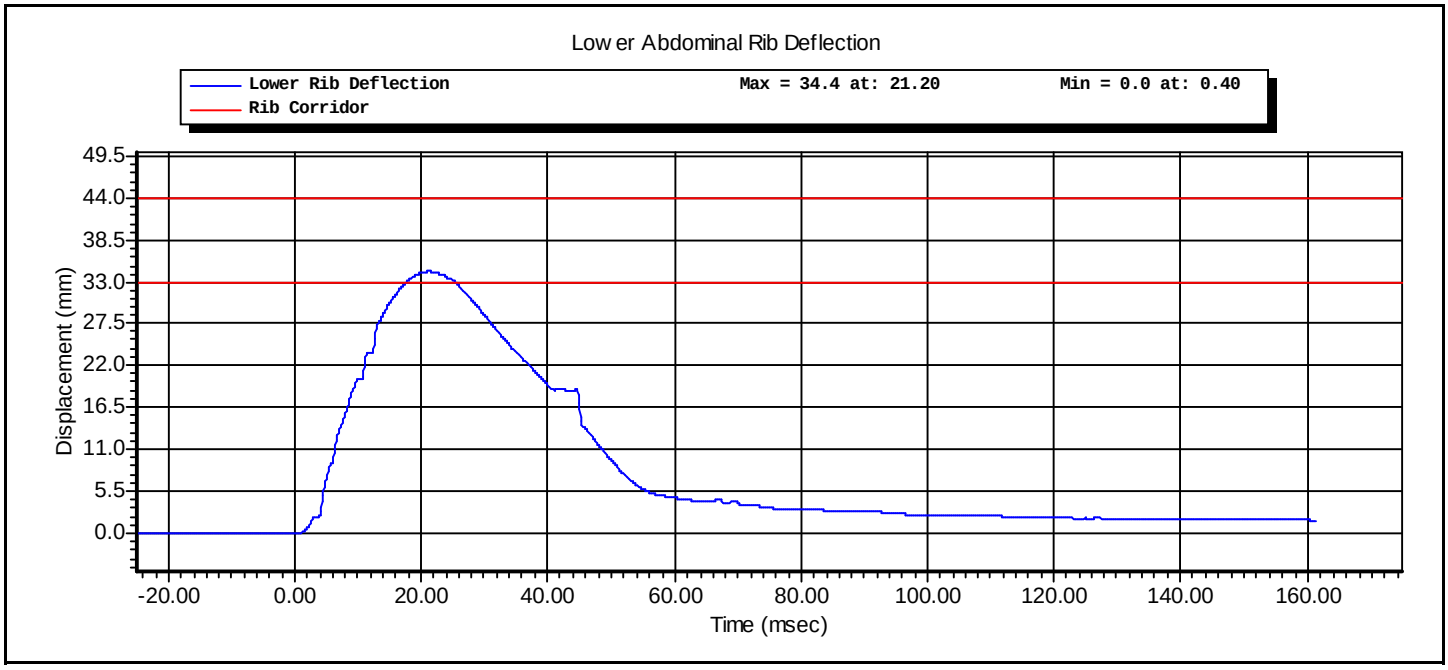
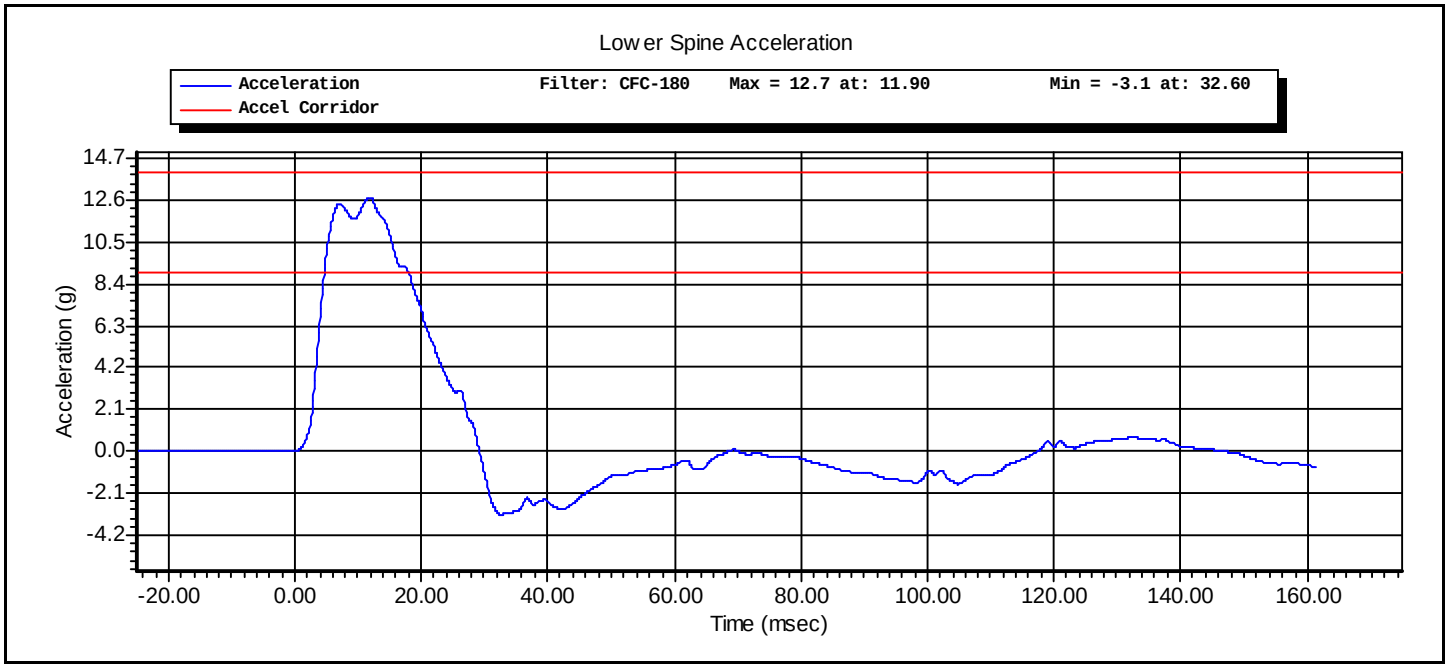
Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Abdomen**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**2:37:39 PM**



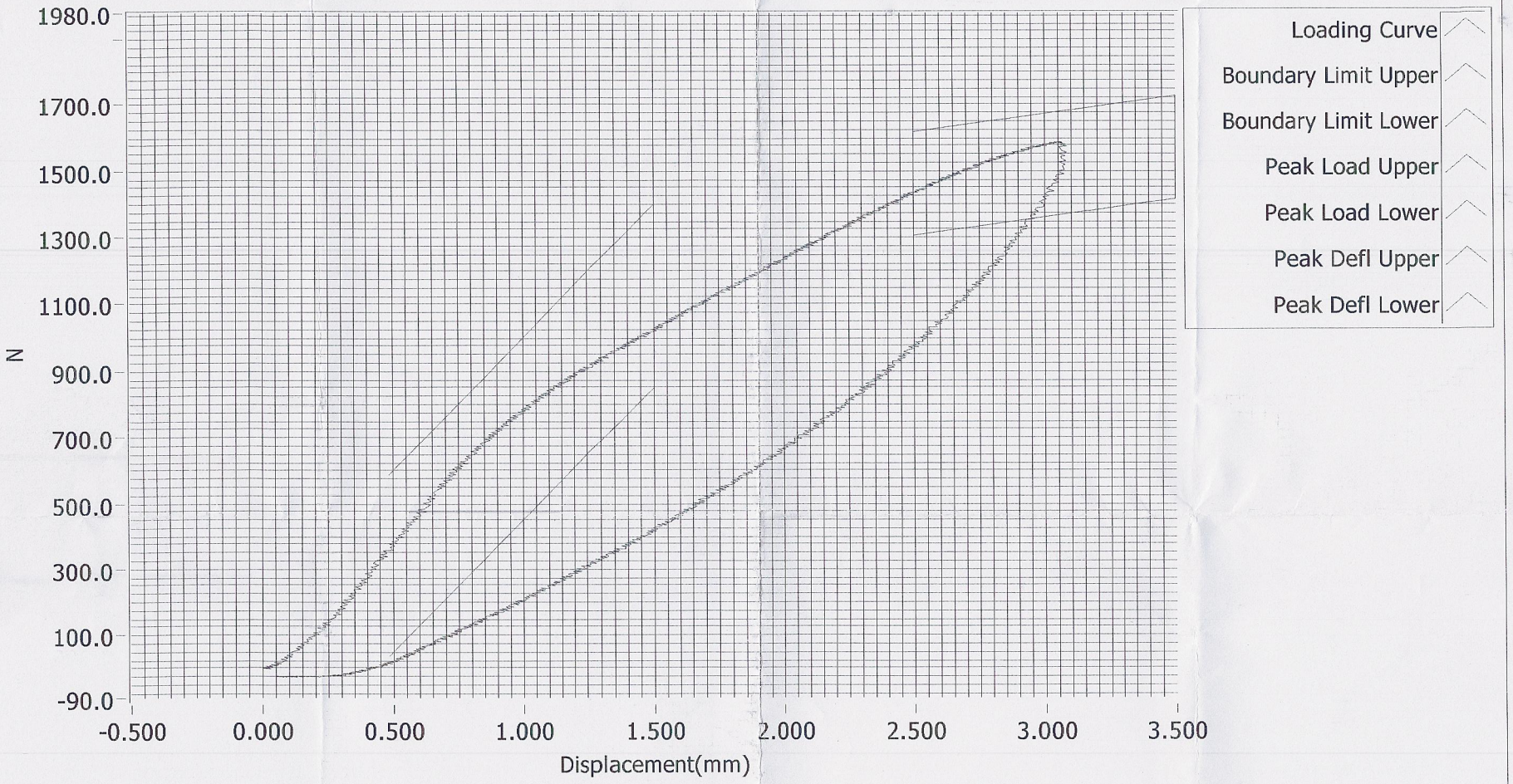






Test ID: **Abdomen** Test Time: **2:37:39 PM** Test Date: **10/4/2010**

Resultant Data - SIDIIs Plug Compression

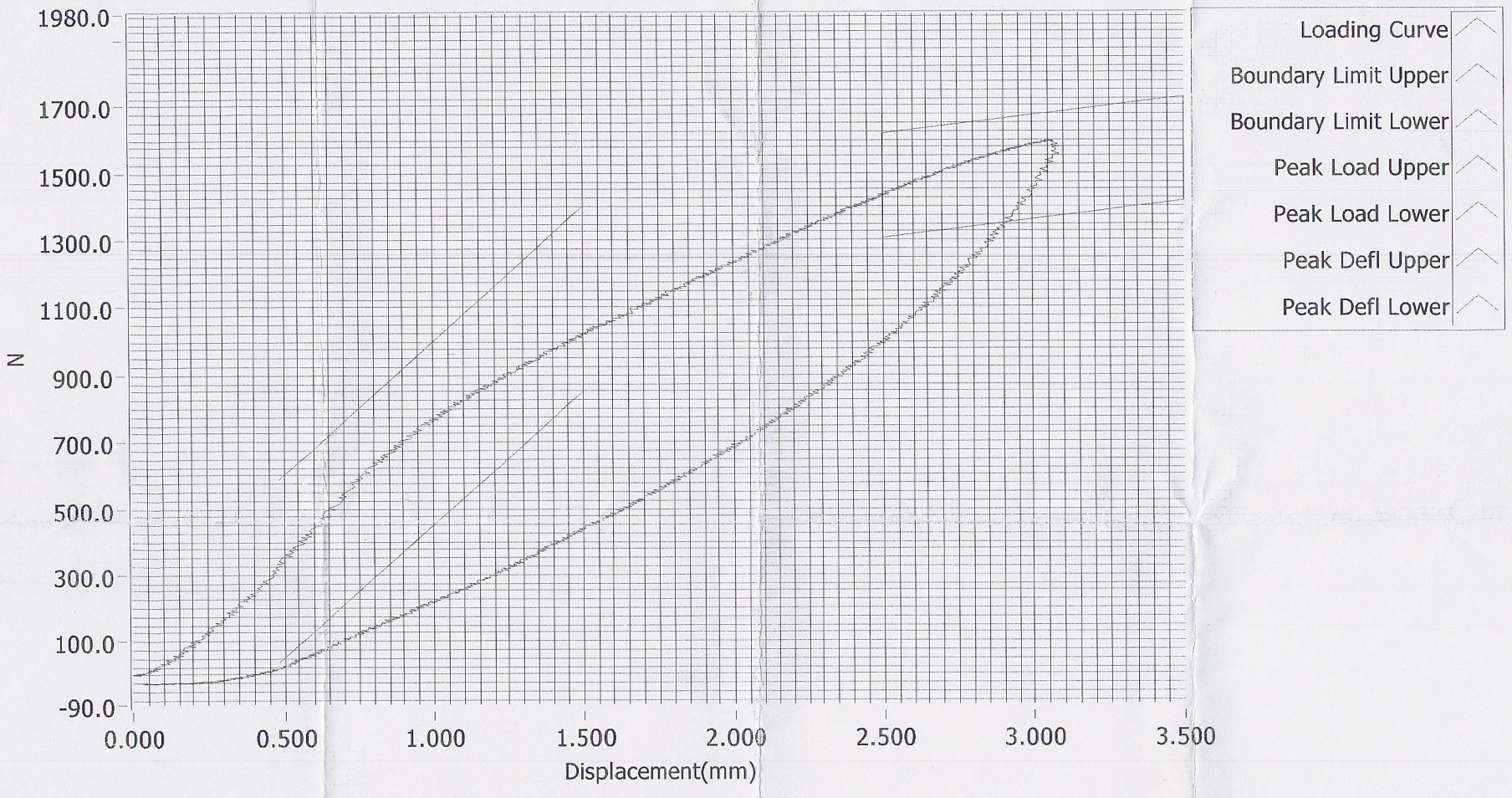


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		6/26/2007	4:14 PM
Cert ID	ATD Serial Number	ATD Type	
	11997	SIDIIs	

Current Date : 6/26/2007 Current Time : 16:15:40

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		6/22/2007	1:51 PM

Cert ID	ATD Serial Number	ATD Type
	11858	SIDIIs

Current Date : 6/22/2007 Current Time : 13:51:58

FS

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VERIFICATION REPORT

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Acetabulum**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**11:44:25 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**39**	%RH	P
Velocity	6.60	--	6.80	**6.62**	m/s	P
Peak Probe Acceleration	38.0	--	47.0	**45.7**	g	P
Peak Pelvis Acceleration	34.0	--	42.0	**41.4**	g	P
Peak Acetabulum Force	3.60	--	4.30	**4.22**	kN	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Endevco	**7264-2000**	**P51671**	**4/12/2010**
DentonATD	**3249J**	**LC-275a**	**4/12/2010**

Test ID: **Acetabulum** Test Time: **11:44:25 AM** Test Date: **10/4/2010**

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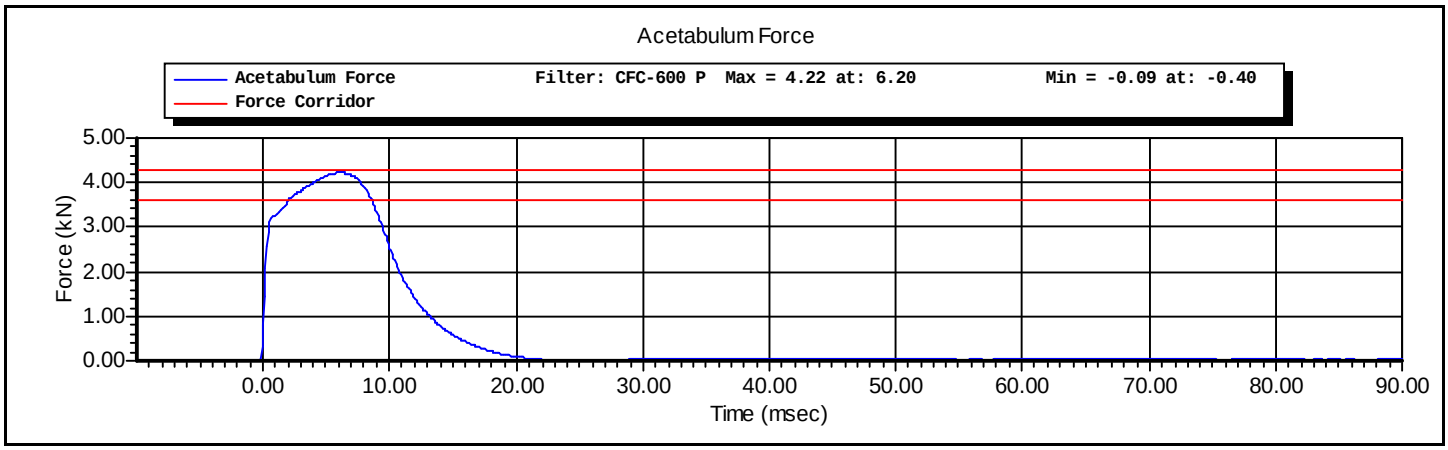
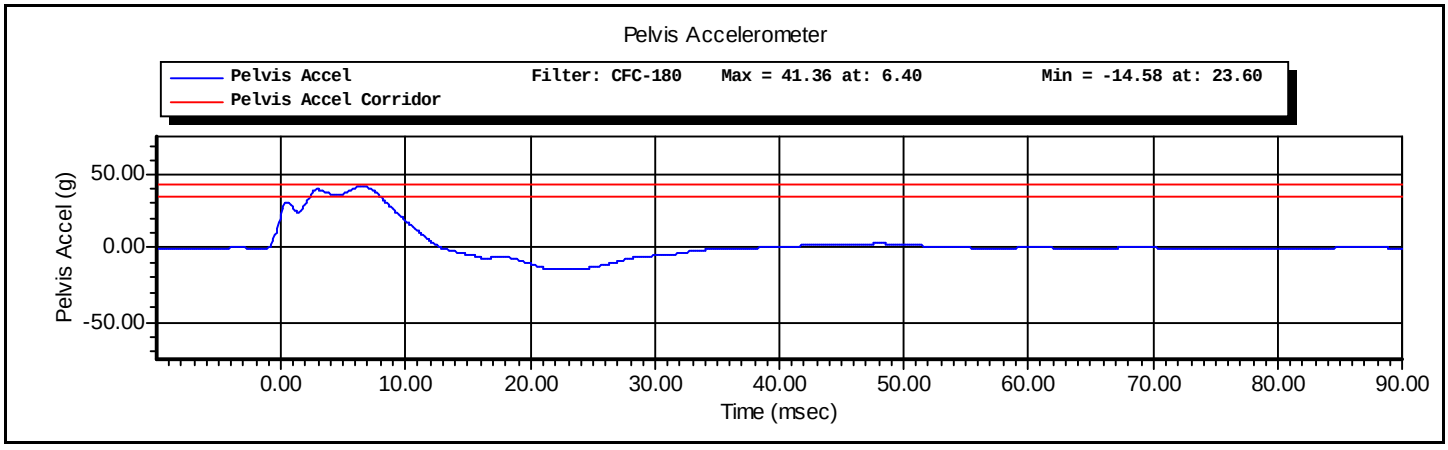
Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Acetabulum**	Test Date:	**10/4/2010**
Test Number:	**1**	Test Time:	**11:44:25 AM**





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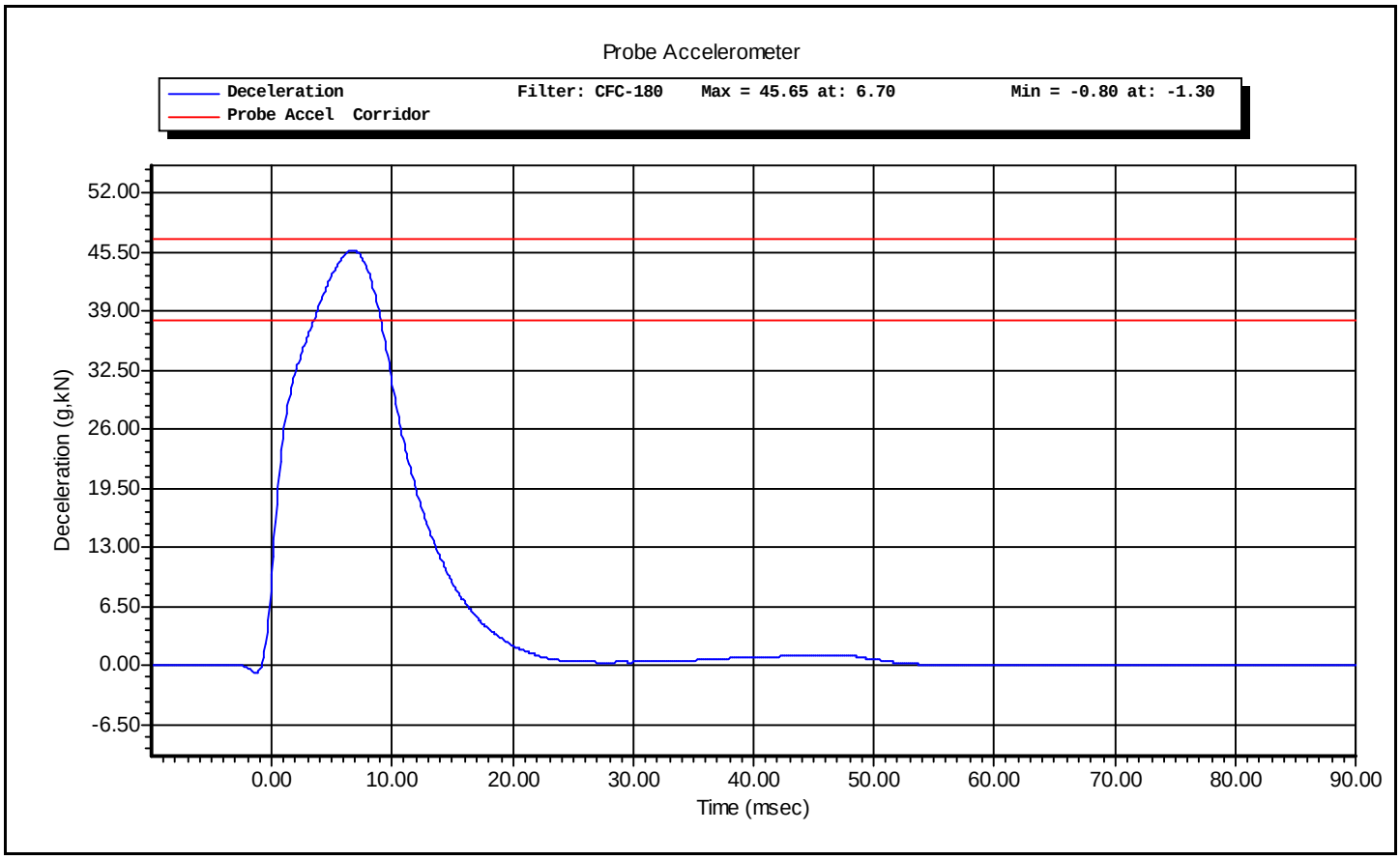

Test ID: **Acetabulum** Test Time: **11:44:25 AM** Test Date: **10/4/2010**

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VERIFICATION REPORT

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID-300**		
Test ID:	**Pelvis Illiac**	Test Date:	**10/4/2010**
Test Number:	**2**	Test Time:	**11:12:17 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**39**	%RH	P
Velocity	4.20	--	4.40	**4.27**	m/s	P
Peak Probe Acceleration	36.0	--	45.0	**42.1**	g	P
Peak Pelvis Acceleration	28.0	--	39.0	**38.2**	g	P
Peak Iliac Force	4.10	--	5.10	**4.81**	kN	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66927**	**4/20/2010**
Endevco	**7264-2000**	**P51671**	**4/12/2010**
DentonATD	**3228J**	**LC-279 Fy**	**4/12/2010**

Test ID: **Pelvis Illiac** Test Time: **11:12:17 AM** Test Date: **10/4/2010**

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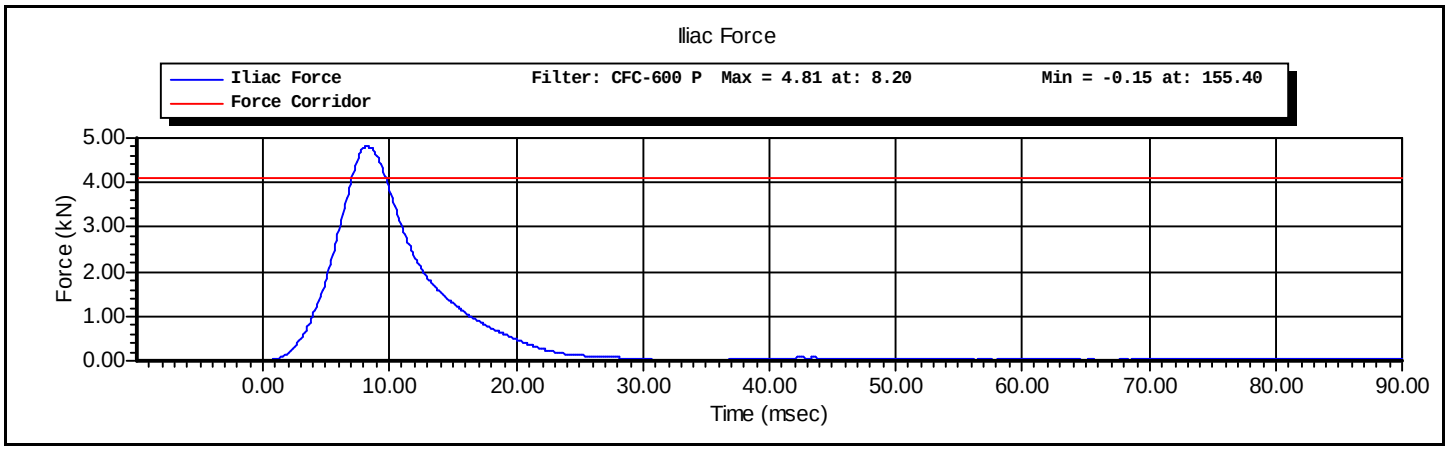
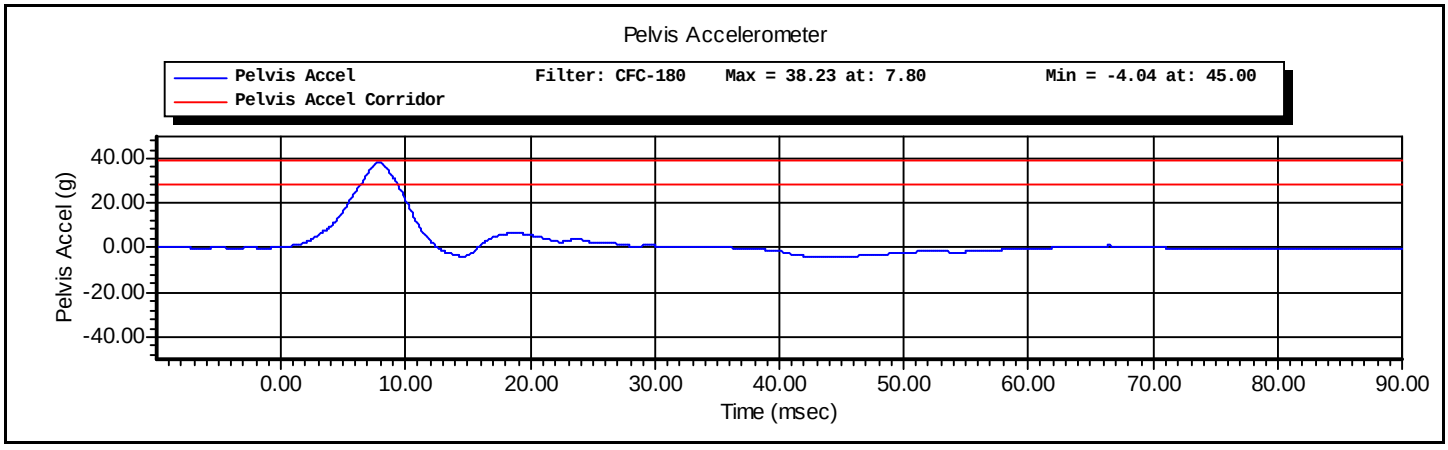
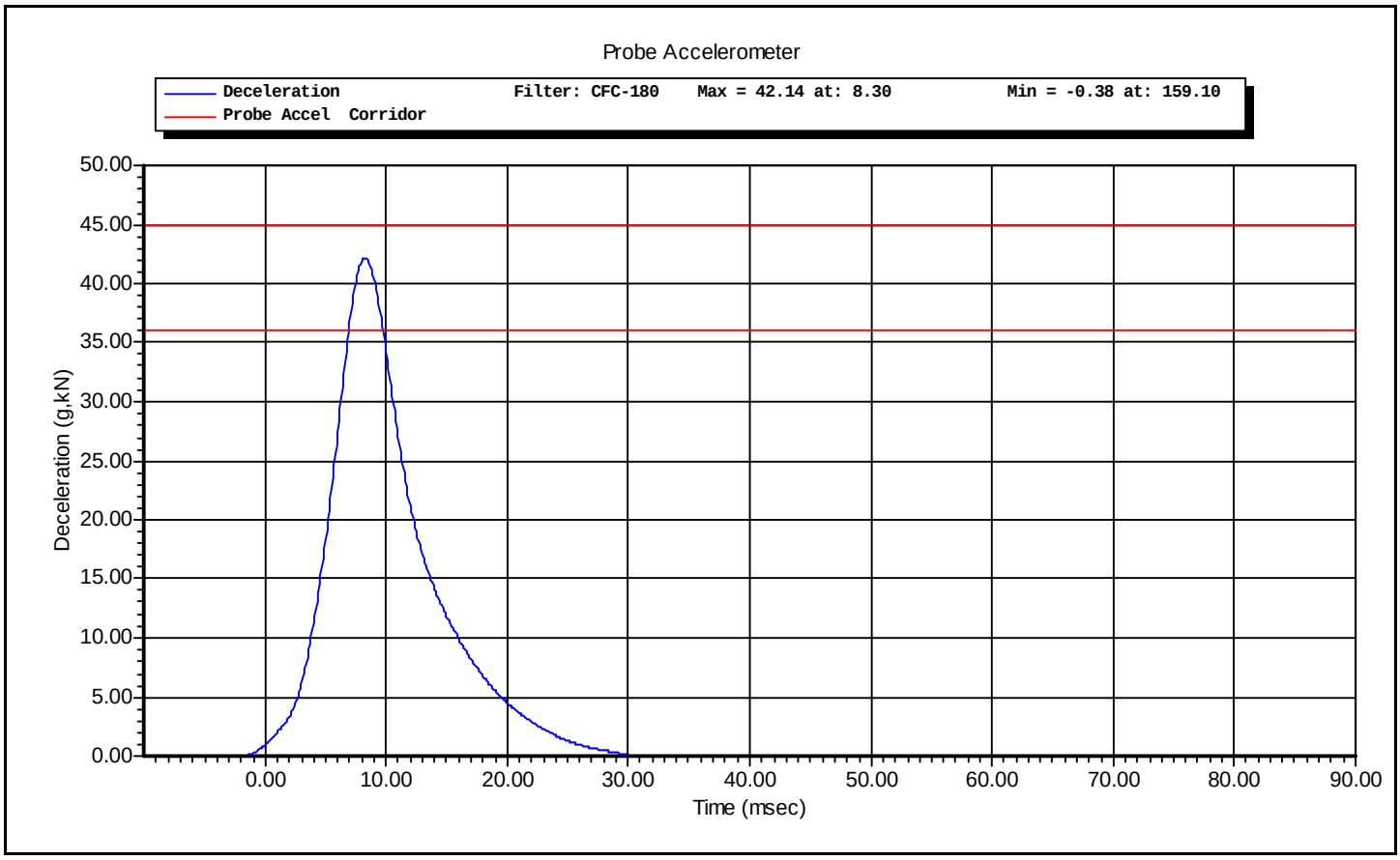
Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID-300**		
Test ID:	**Pelvis Illiac**	Test Date:	**10/4/2010**
Test Number:	**2**	Test Time:	**11:12:17 AM**







Test ID: **Pelvis Illiac** Test Time: **11:12:17 AM** Test Date: **10/4/2010**

CALIBRATION TEST RESULTS

POST-TEST

ES2-re No: 033

CONFIGURED FOR LEFT SIDE IMPACT

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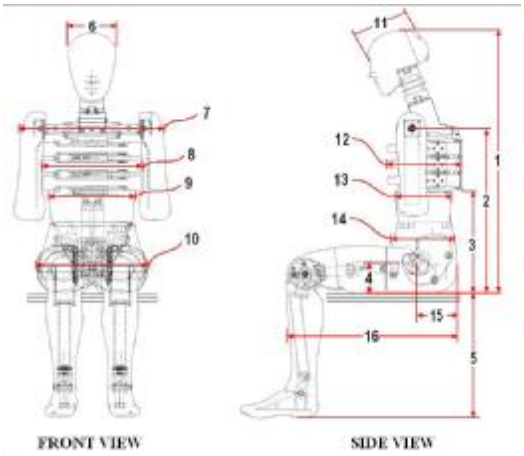
ES-2re External Measurements

NHTSA SN F033



Dim. No.	Description	Specification (mm)	Result (mm)	Pass/Fail
1	Sitting Height	900-918	909	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	100	Pass
5	Sole to Seat, Sitting	433-451	444	Pass
6	Head Width	152-158	158	Pass
7	Shoulder/Arm Width	461-479	470	Pass
8	Thorax Width	322-332	323	Pass
9	Abdomen Width	273-287	282	Pass
10	Pelvis Lap Width	359-373	369	Pass
11	Head Depth	196-206	201	Pass
12	Thorax Depth	262-272	267	Pass
13	Abdomen Depth	194-204	199	Pass
14	Pelvis Depth	235-245	239	Pass
15	Back of Buttocks to Hip Joint (center of bolt)	150-160	157	Pass
16	Back of Buttocks to Front Knee	597-615	603	Pass

Technician: SZ

Date: 10/19/2010

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Head Drop**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**10:33:27 AM**

Component Part Number	Component Serial Number
455-1007	**8473**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.0**	deg C	P
Humidity	10	--	70	**33**	%RH	P
Resultant Acceleration	125	--	155	**149**	g	P
Oscillation	0.0	--	15.0	**6.6**	%	P
Fore-Aft Acceleration	-15.00	--	15.00	**-4.51**	g	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51681**	**9/20/2010**
Endevco	**7264-2000**	**P51949**	**5/26/2010**
Endevco	**7264-2000**	**P51695**	**9/20/2010**

Test ID: **Head Drop** Test Time: **10:33:27 AM** Test Date: **10/18/2010**

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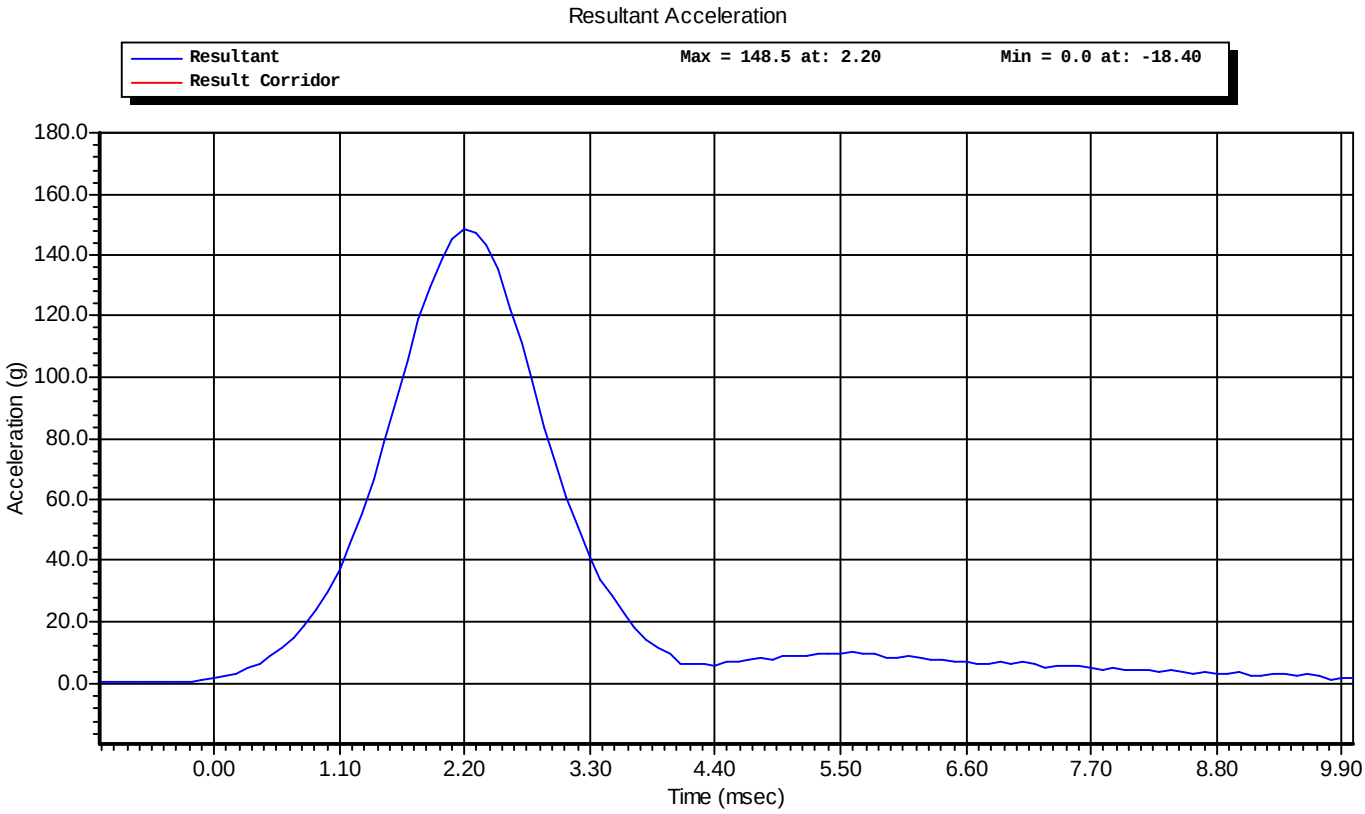
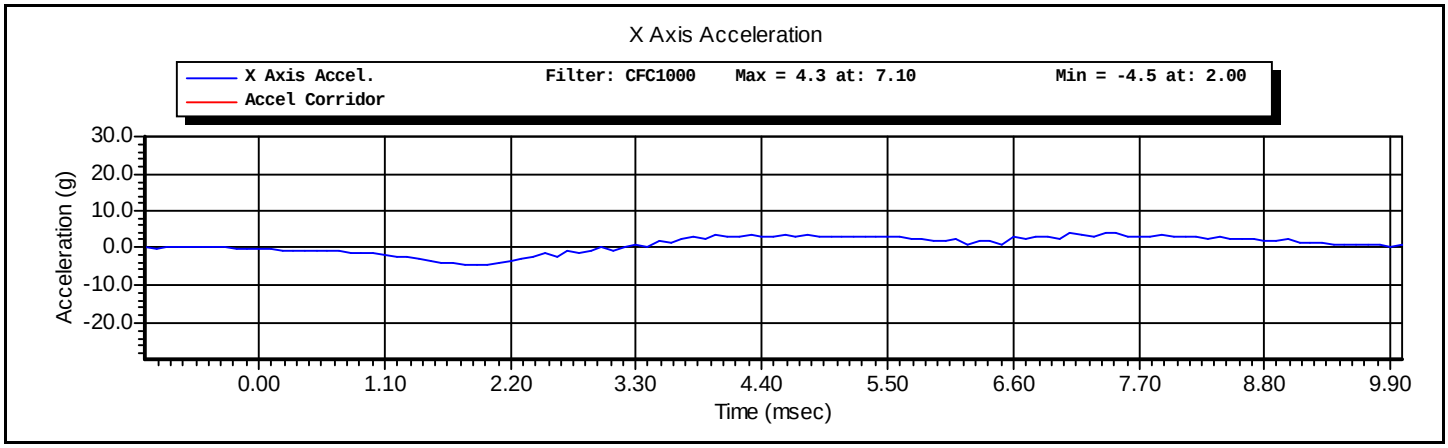
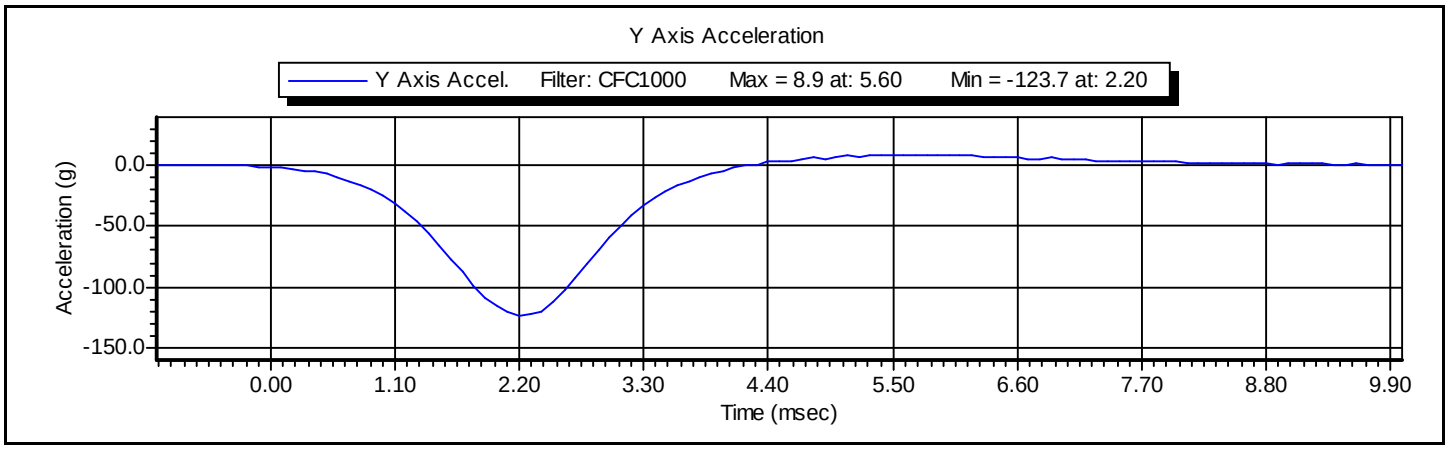
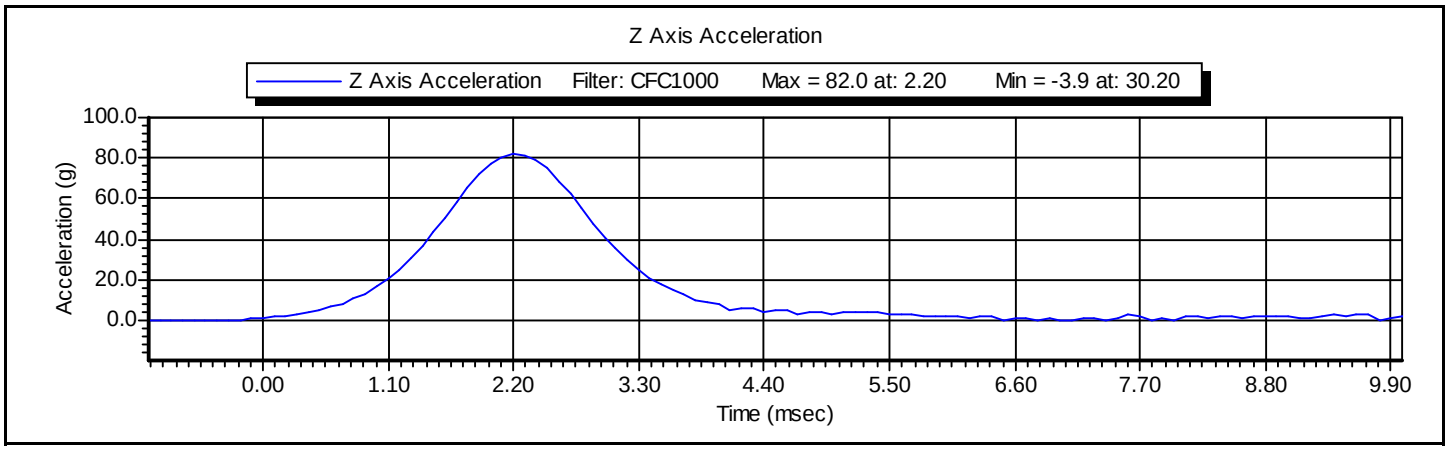
Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Head Drop**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**10:33:27 AM**









Test ID: **Head Drop** Test Time: **10:33:27 AM** Test Date: **10/18/2010**

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VERIFICATION REPORT

Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Neck Flexion**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**11:38:39 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.0**	deg C	P
Humidity	10	--	70	**33**	%RH	P
Velocity	3.30	--	3.50	**3.45**	m/s	P
Maximum Neck Flexion Angle	49.0	--	59.0	**52.5**	degrees	P
Time At Maximum Neck Flexion	54.0	--	66.0	**58.7**	ms	P
Decay to Zero Degrees	53.0	--	88.0	**59.2**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

Test ID: **Neck Flexion** Test Time: **11:38:39 AM** Test Date: **10/18/2010**

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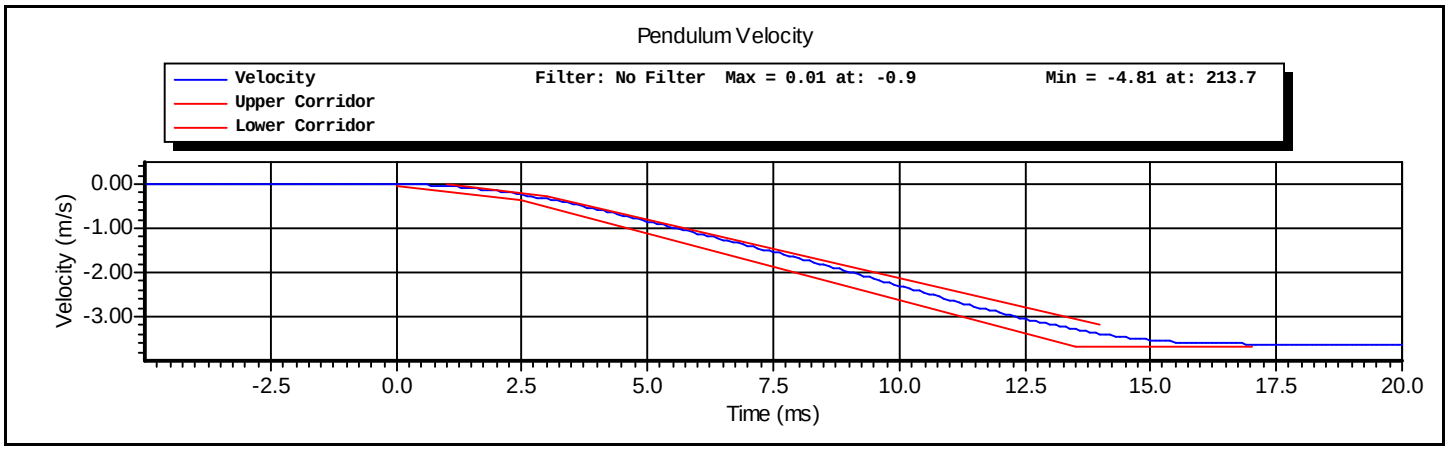
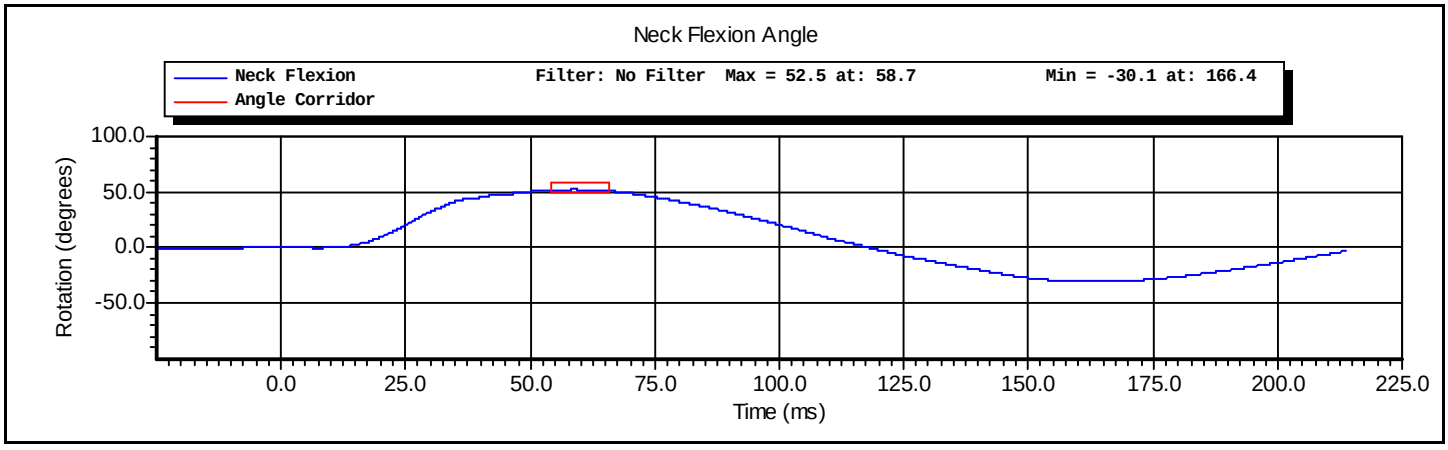
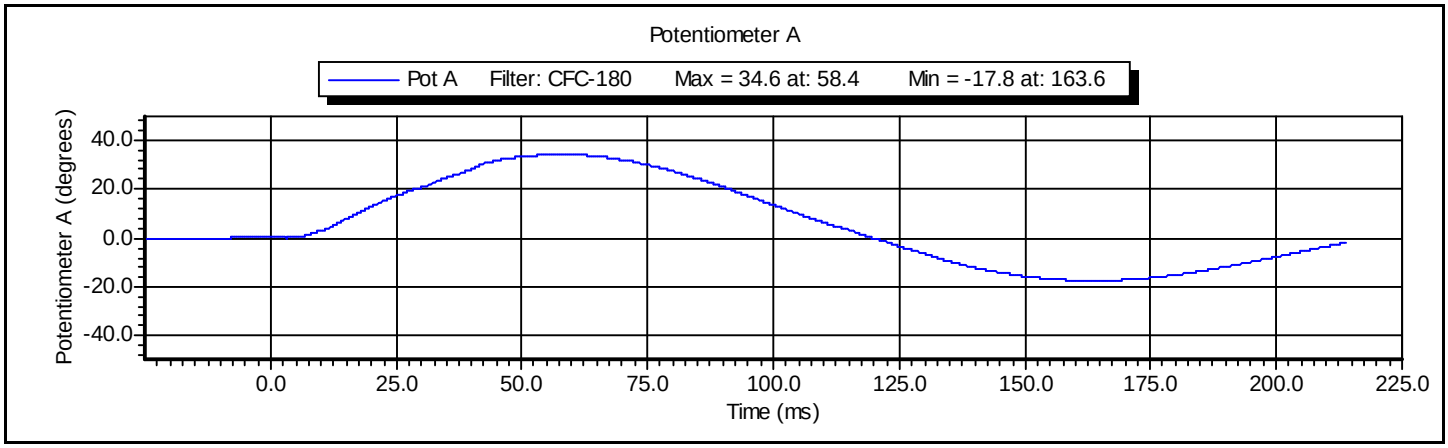
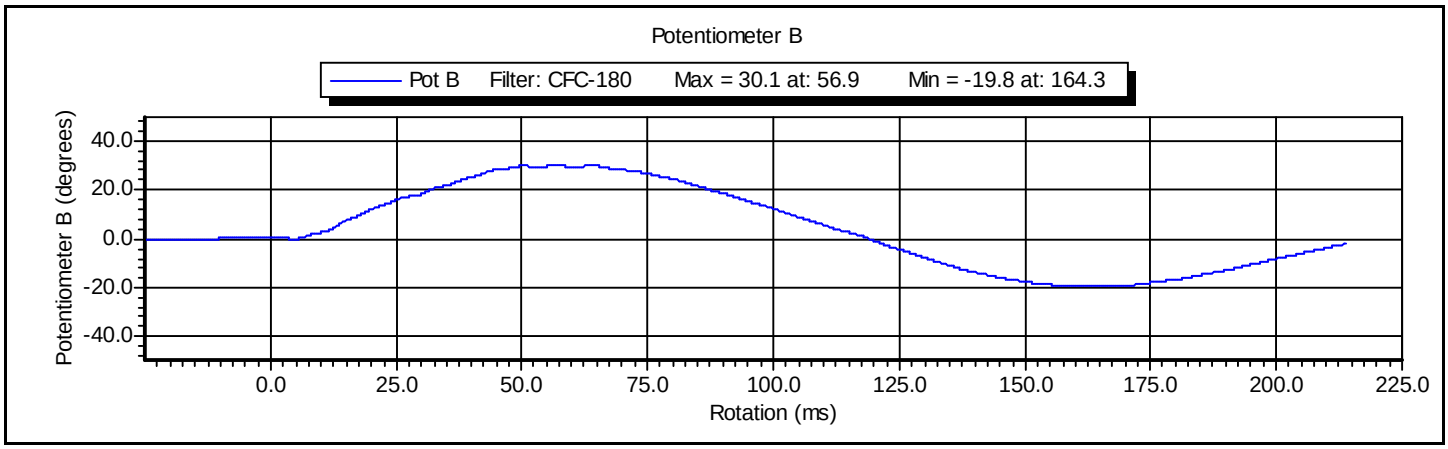
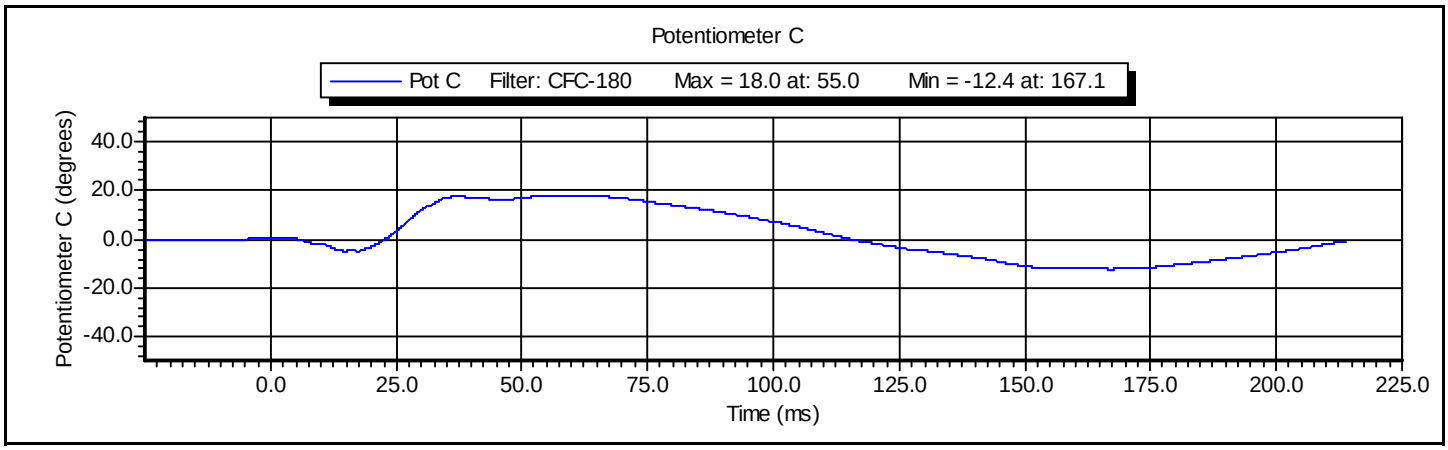
Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Neck Flexion**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**11:38:39 AM**











Test ID: **Neck Flexion** Test Time: **11:38:39 AM** Test Date: **10/18/2010**

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VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Shoulder Impact**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**9:39:10 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.3**	deg C	P
Humidity	10.0	--	70.0	**38.0**	%RH	P
Velocity	4.20	--	4.40	**4.32**	m/s	P
Pendulum Acceleration	-10.50	--	-7.50	**-9.81**	g	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**

Test ID: **Shoulder Impact** Test Time: **9:39:10 AM** Test Date: **10/19/2010**

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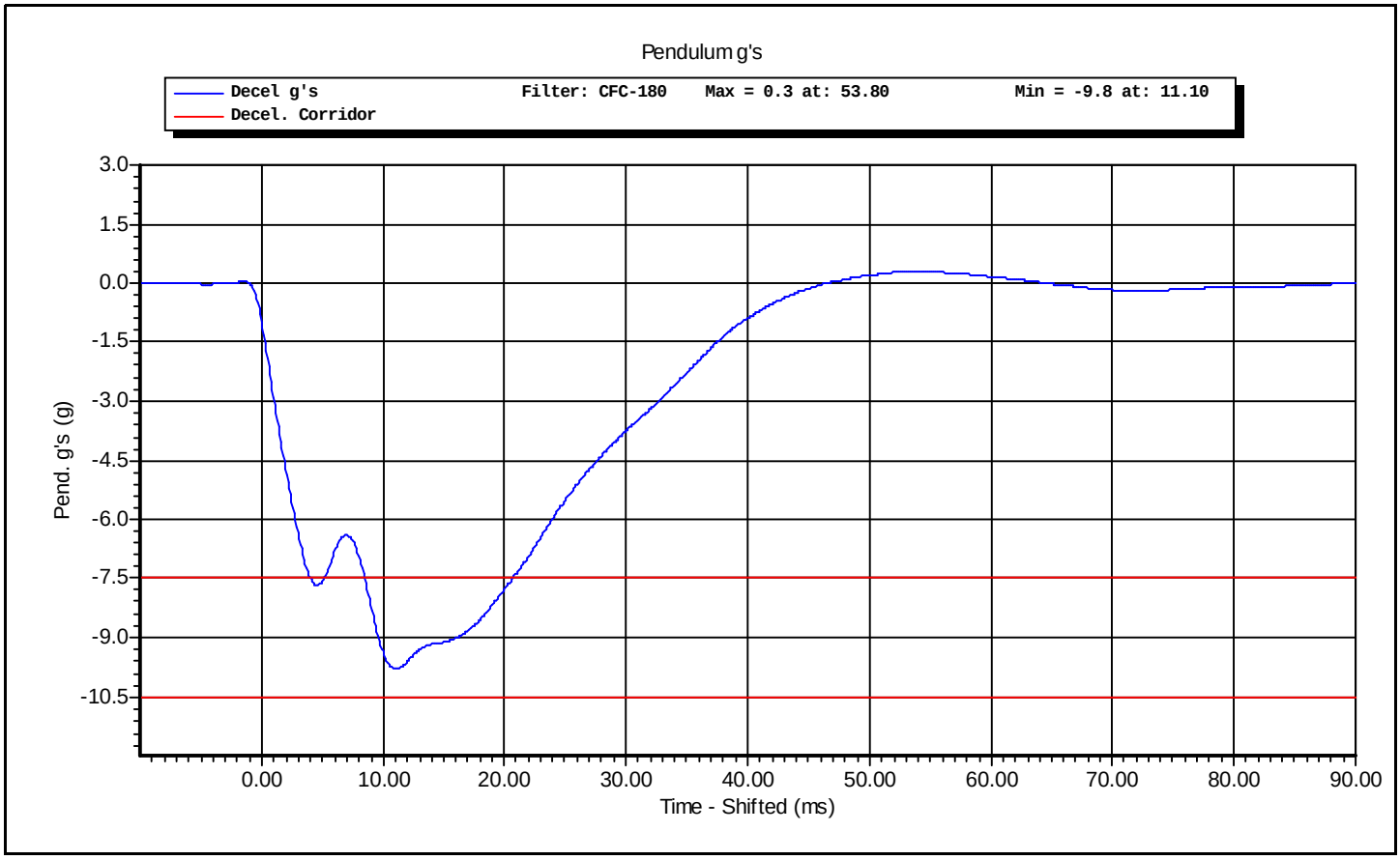
Test Name:	**Shoulder Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Shoulder Impact**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**9:39:10 AM**



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VERIFICATION REPORT

Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**8:38:47 AM**

Component Part Number	Component Serial Number

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.7**	deg C	P
Humidity	10.0	--	70.0	**38.0**	%RH	P
Velocity	5.40	--	5.60	**5.49**	m/s	P
Upper Rib Displacement	34.0	--	41.0	**37.0**	mm	P
Middle Rib Displacement	37.0	--	45.0	**41.5**	mm	P
Lower Rib Displacement	37.0	--	44.0	**41.6**	mm	P
Impactor Force	5100	--	6200	**5433**	N	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**

Test ID: **Thorax** Test Time: **8:38:47 AM** Test Date: **10/19/2010**

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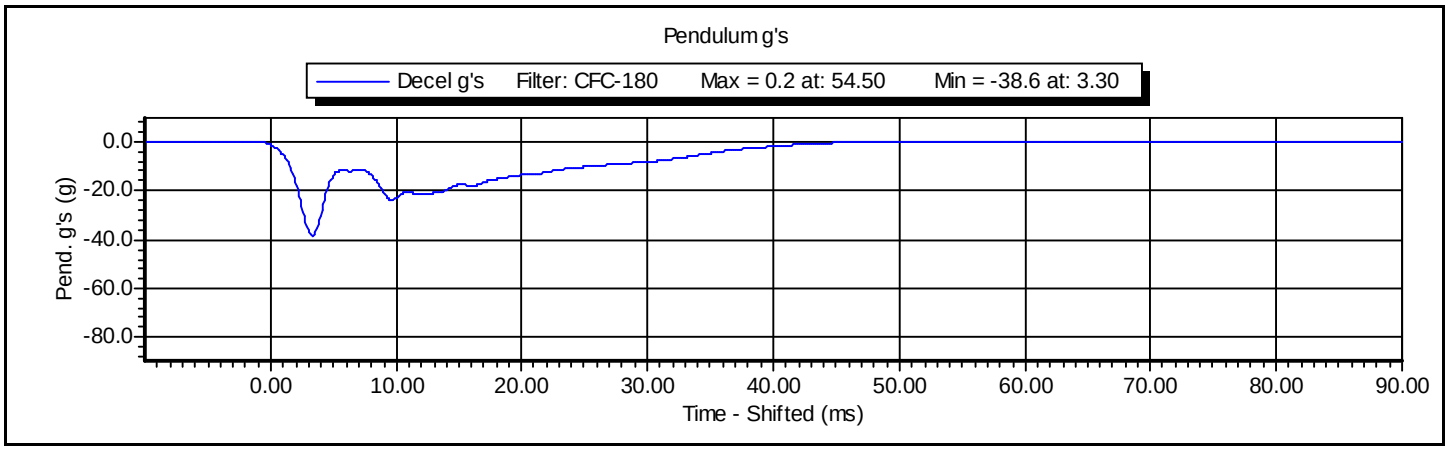
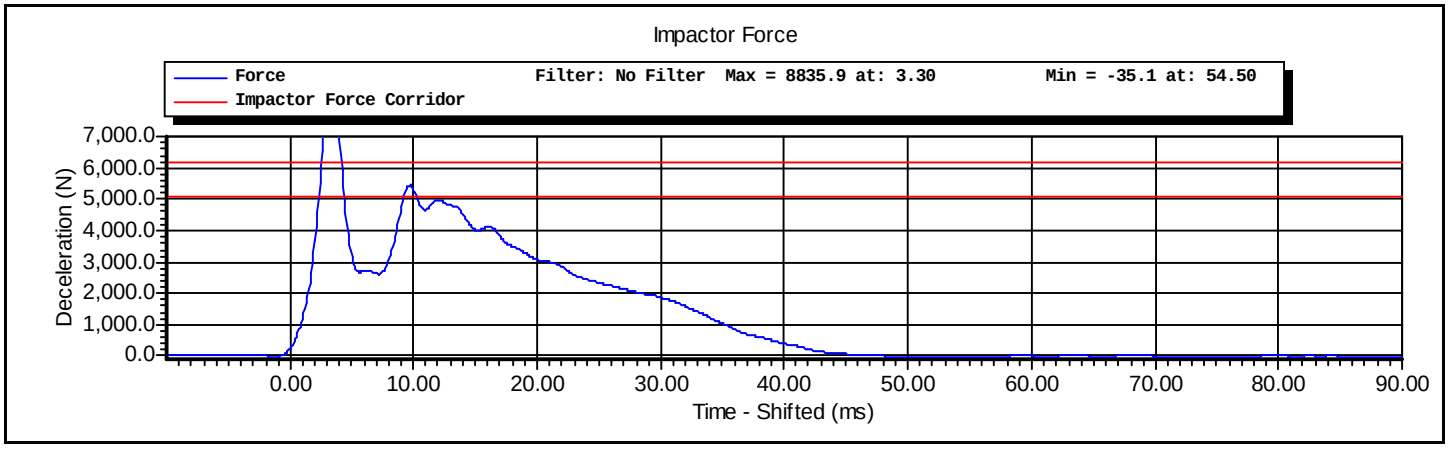
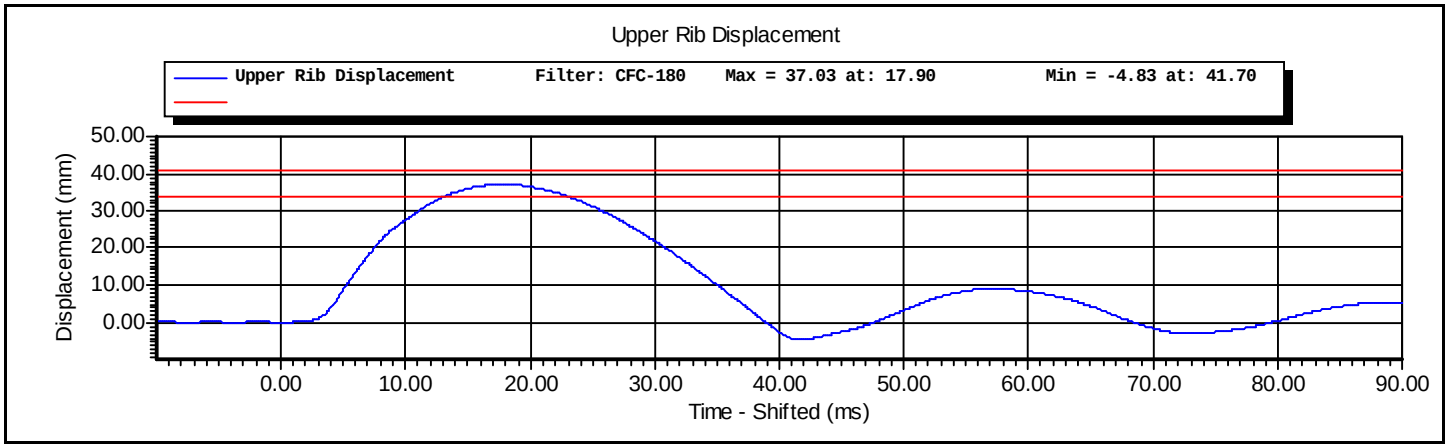
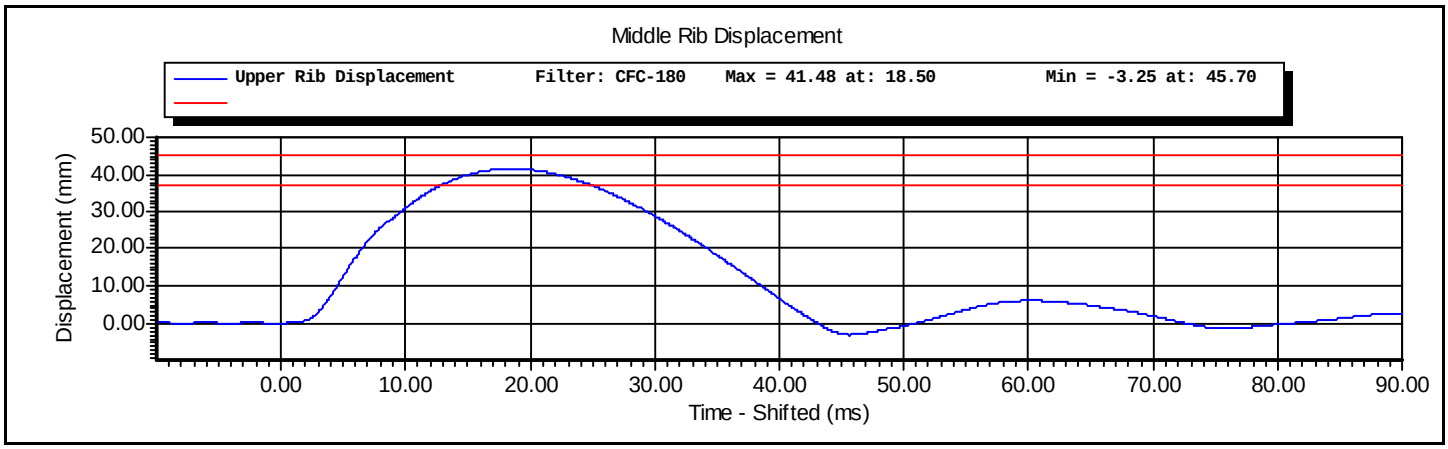
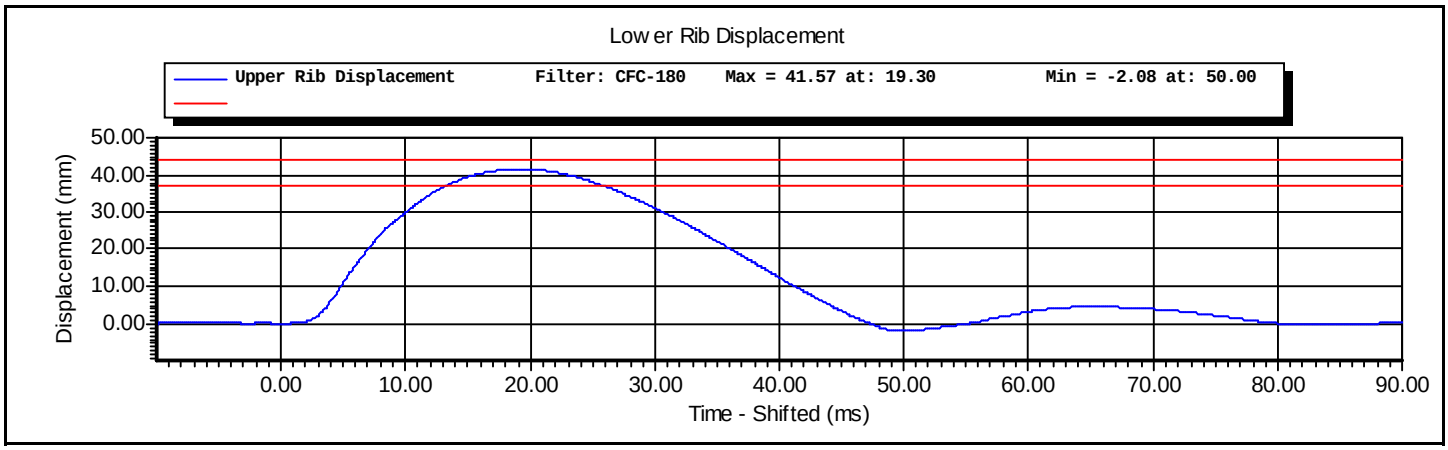
Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**8:38:47 AM**











Test ID: **Thorax** Test Time: **8:38:47 AM** Test Date: **10/19/2010**

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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**2:57:23 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**30.0**	%RH	P
Velocity	3.90	--	4.10	**3.99**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.80**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Upper Rib 4 m/s** Test Time: **2:57:23 PM** Test Date: **10/18/2010**

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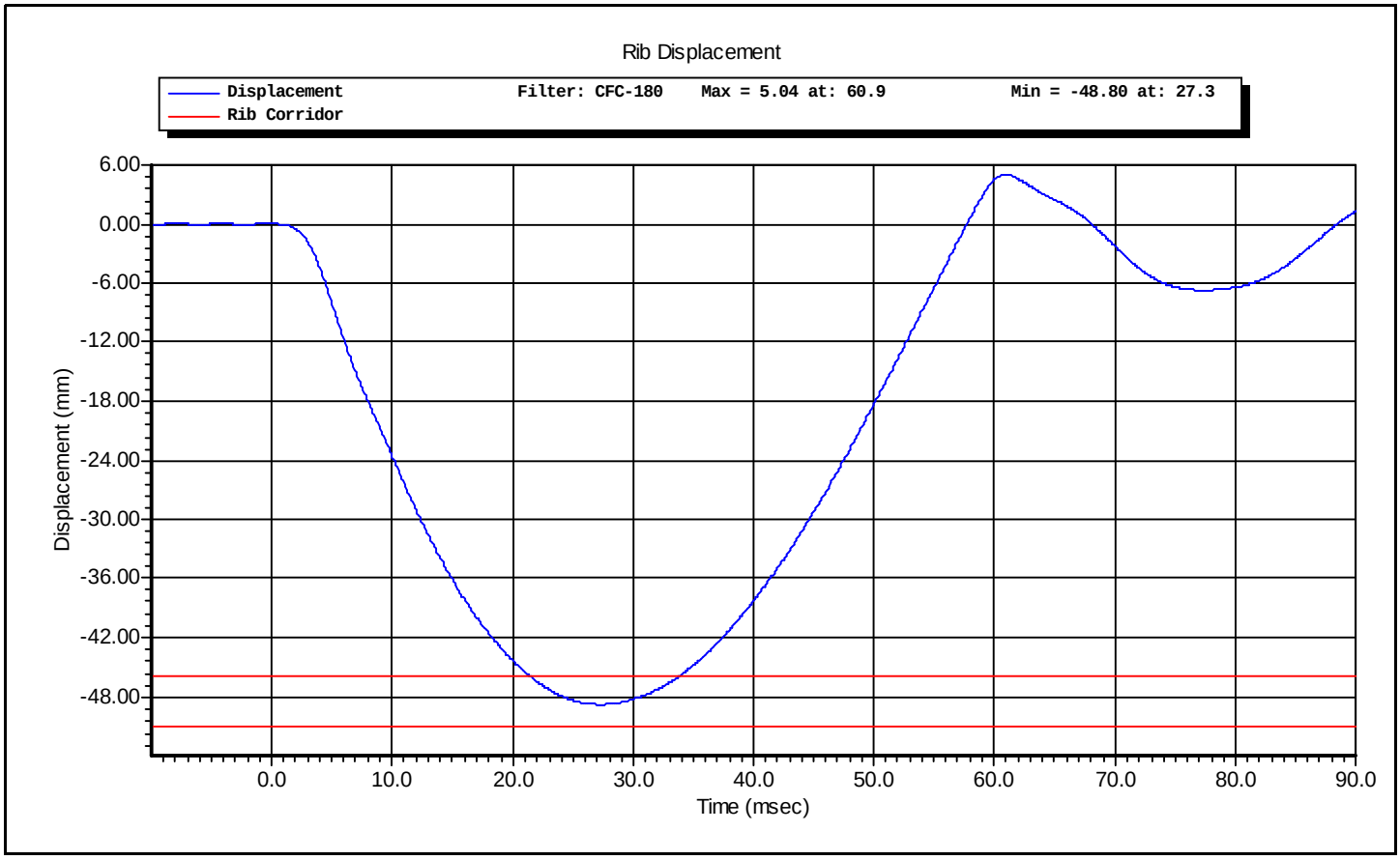
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**2:57:23 PM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:03:35 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**30.0**	%RH	P
Velocity	2.90	--	3.10	**2.97**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.94**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Upper Rib 3 m/s** Test Time: **3:03:35 PM** Test Date: **10/18/2010**

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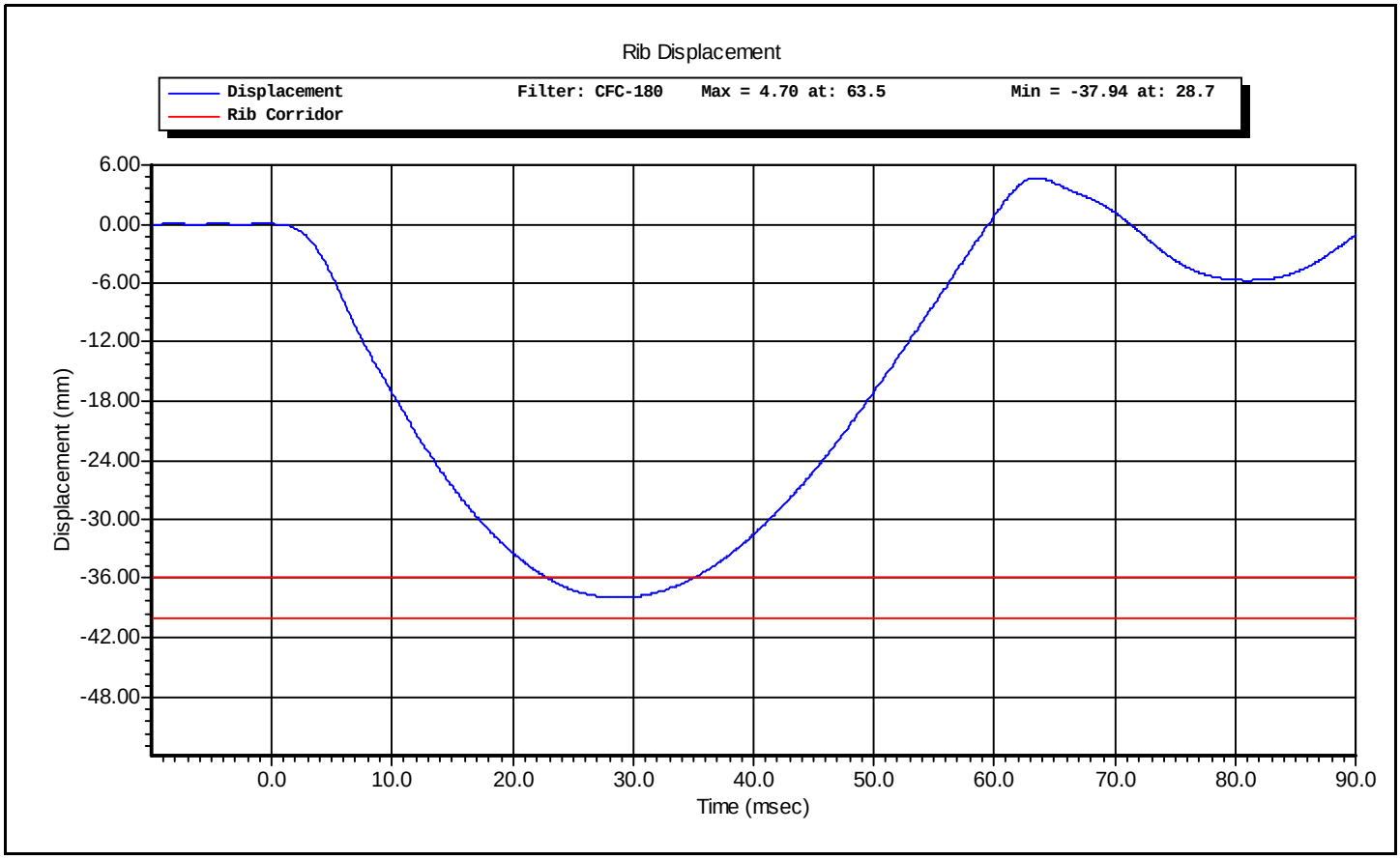
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:03:35 PM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:10:11 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**28.0**	%RH	P
Velocity	3.90	--	4.10	**3.97**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-47.90**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Middle Rib 4 m/s** Test Time: **3:10:11 PM** Test Date: **10/18/2010**

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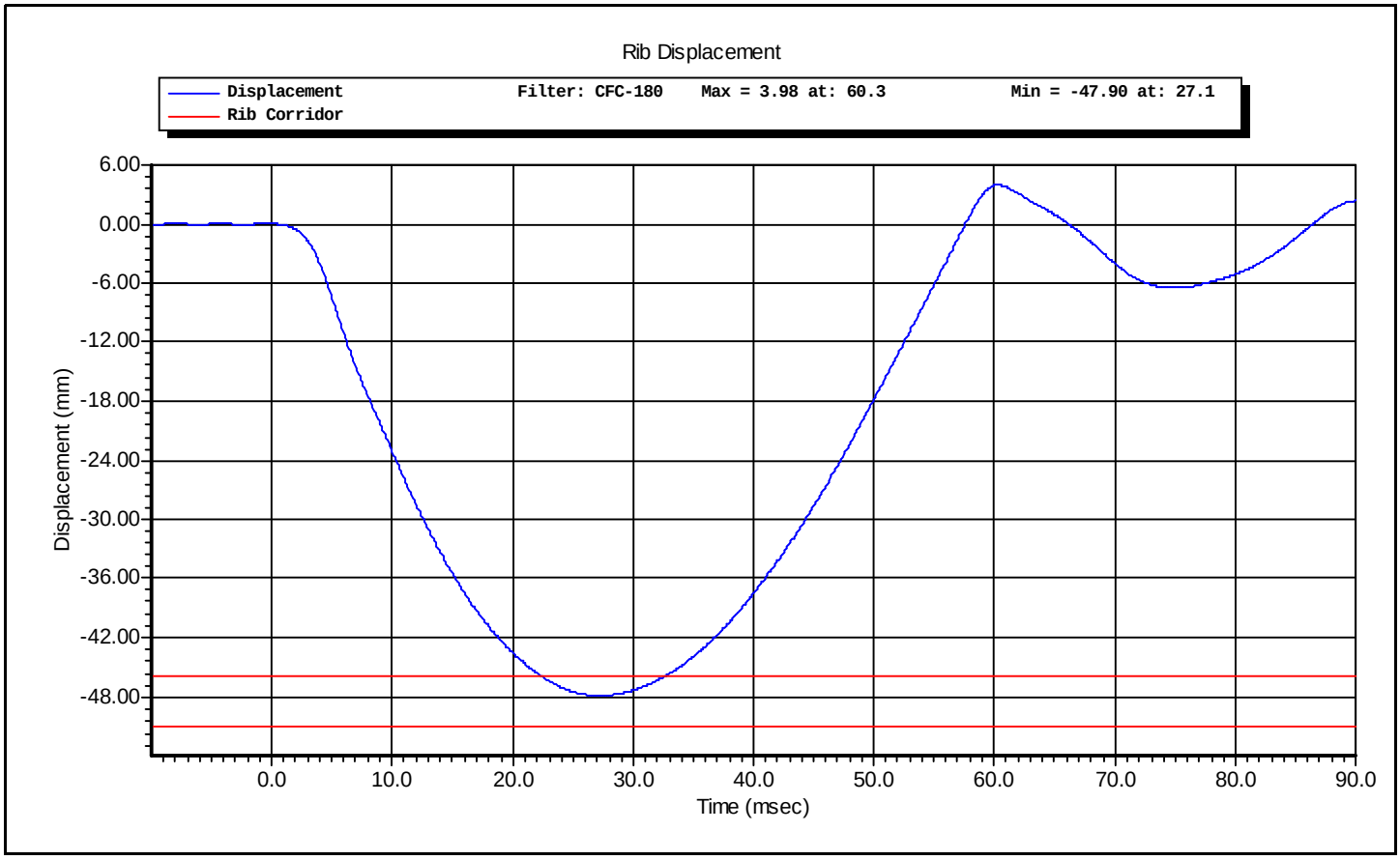
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:10:11 PM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:16:33 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**28.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.57**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Middle Rib 3 m/s** Test Time: **3:16:33 PM** Test Date: **10/18/2010**

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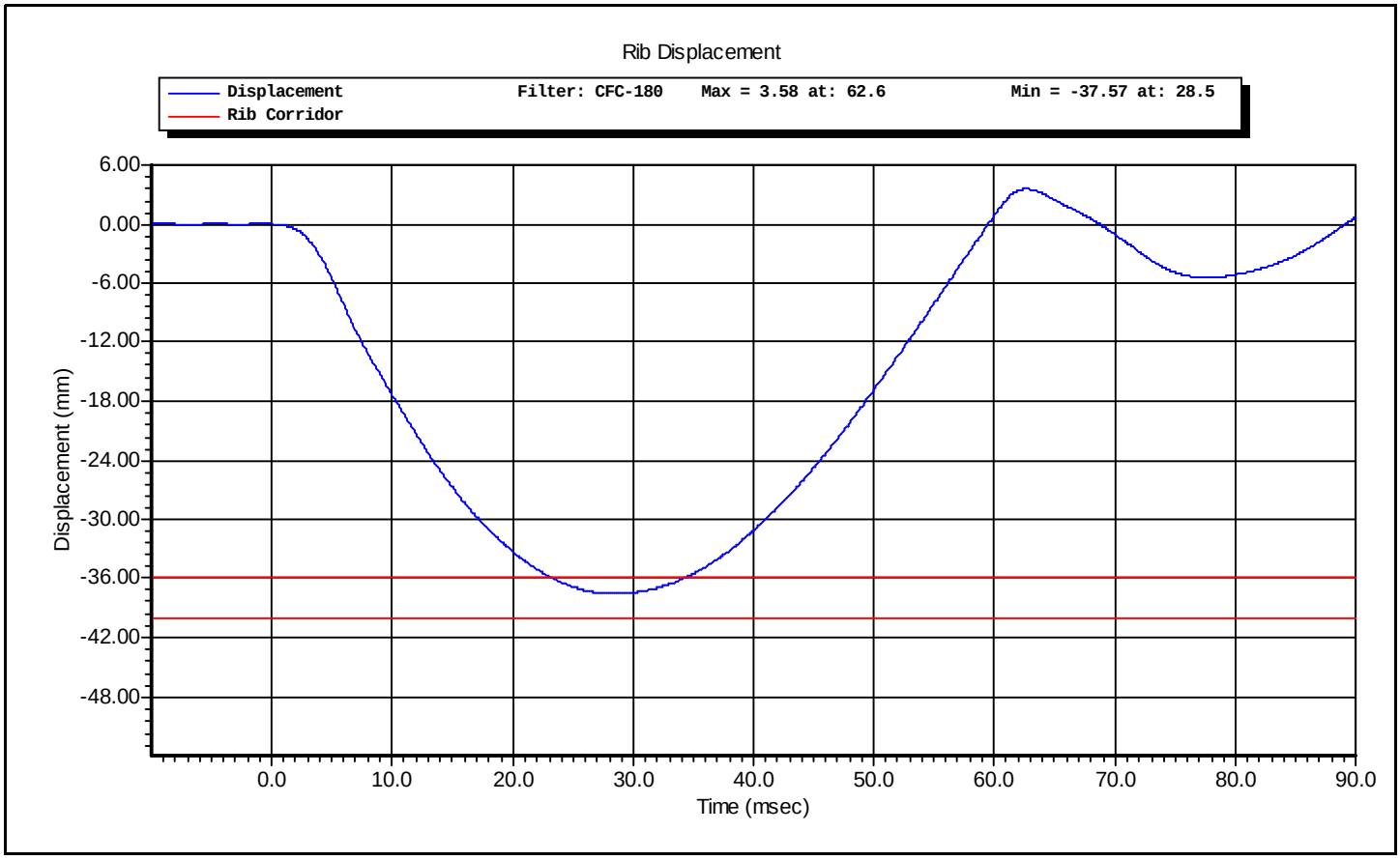
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Middle Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:16:33 PM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:20:37 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**28.0**	%RH	P
Velocity	3.90	--	4.10	**3.97**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.37**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Lower Rib 4 m/s** Test Time: **3:20:37 PM** Test Date: **10/18/2010**

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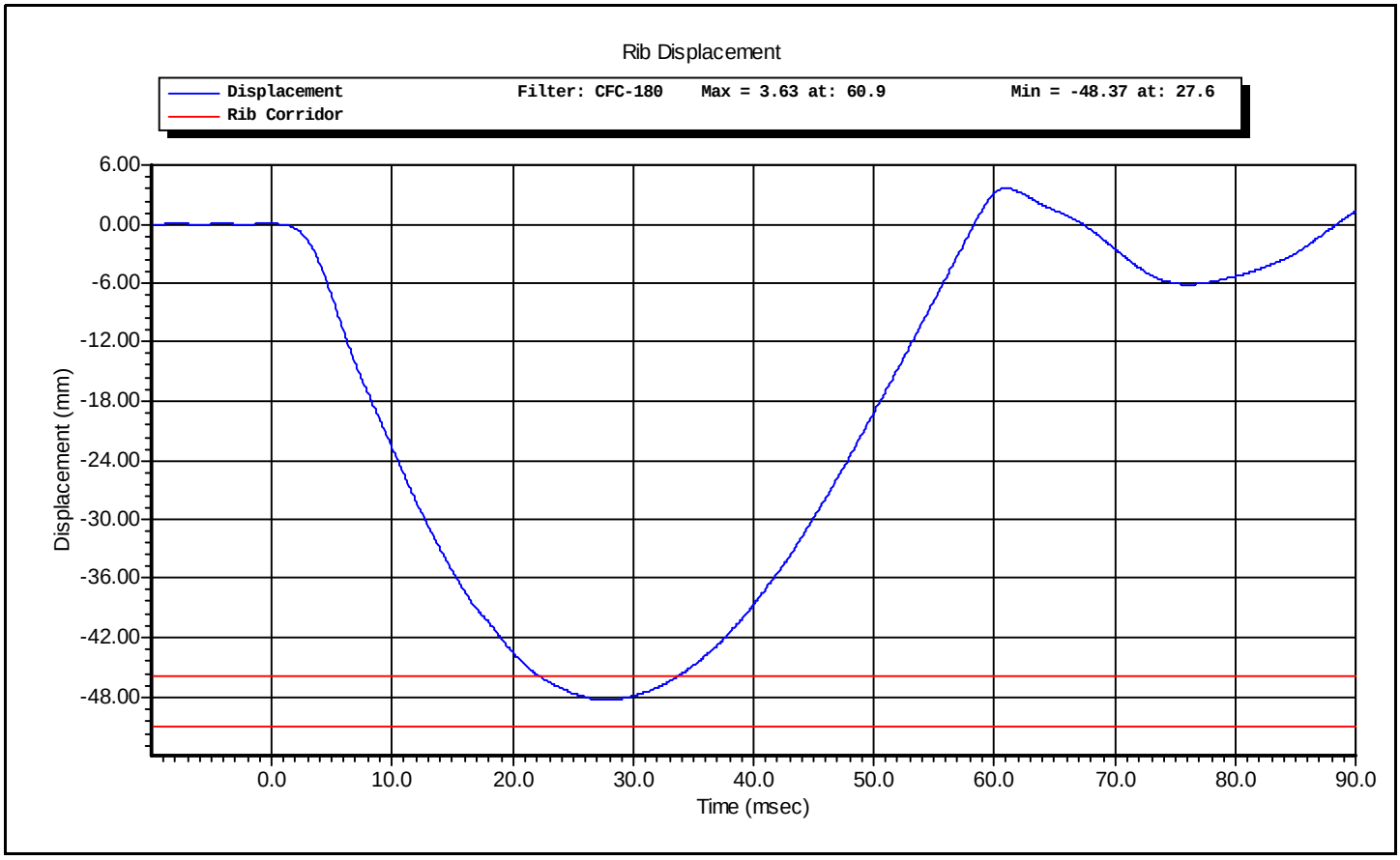
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 4 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:20:37 PM**



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VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:29:23 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**28.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.99**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P38216**	**6/22/2010**

Test ID: **Lower Rib 3 m/s** Test Time: **3:29:23 PM** Test Date: **10/18/2010**

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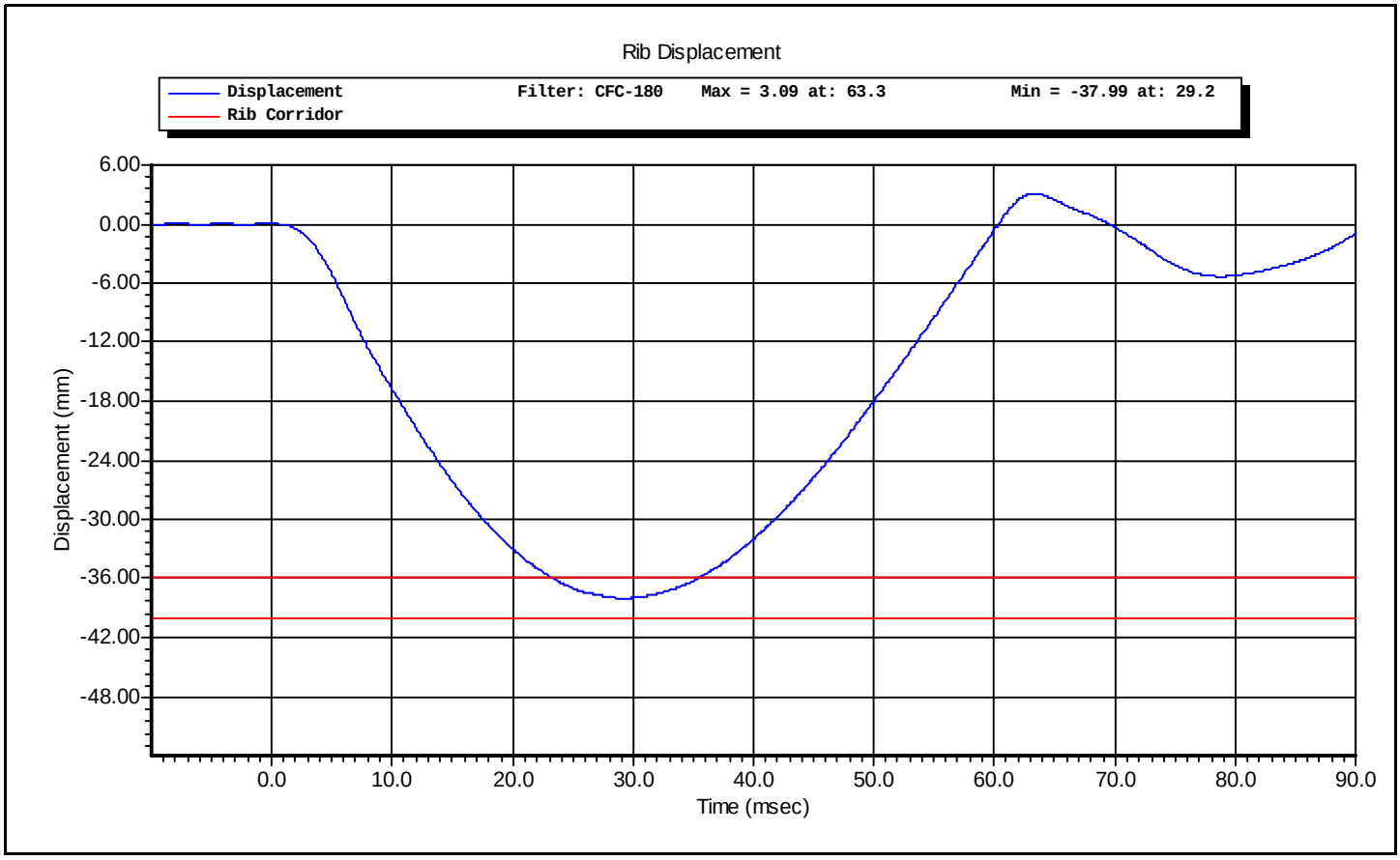
Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**3.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lower Rib 3 m/s**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**3:29:23 PM**



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VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdmen**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**4:11:28 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**28**	%RH	P
Velocity	3.90	--	4.10	**4.03**	m/s	P
Peak Abdominal Force	-2.70	--	-2.20	**-2.37**	kN	P
Time At Peak Abdominal Force	10.0	--	12.3	**10.8**	ms	P
Maximum Pendulum Force	-4.80	--	-4.00	**-4.42**	kN	P
Time at Peak Pendumlum Force	10.6	--	13.0	**11.3**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**2631**	**LC-1524**	**4/22/2010**
Denton	**2631**	**LC-1523**	**4/22/2010**
Denton	**2631**	**LC-1530**	**4/22/2010**

Test ID: **Abdmen** Test Time: **4:11:28 PM** Test Date: **10/18/2010**

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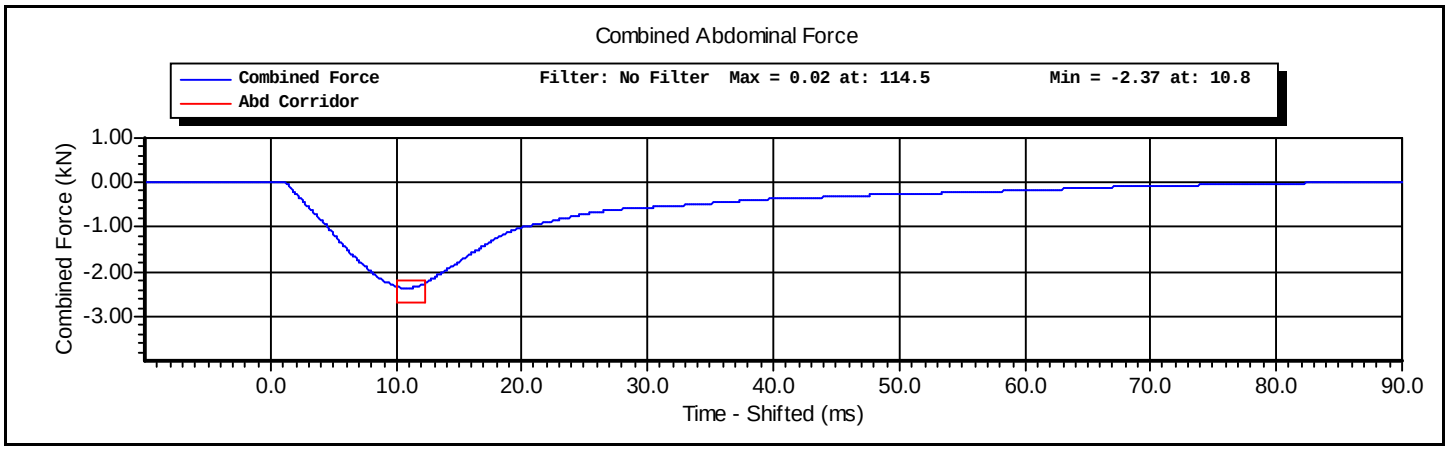
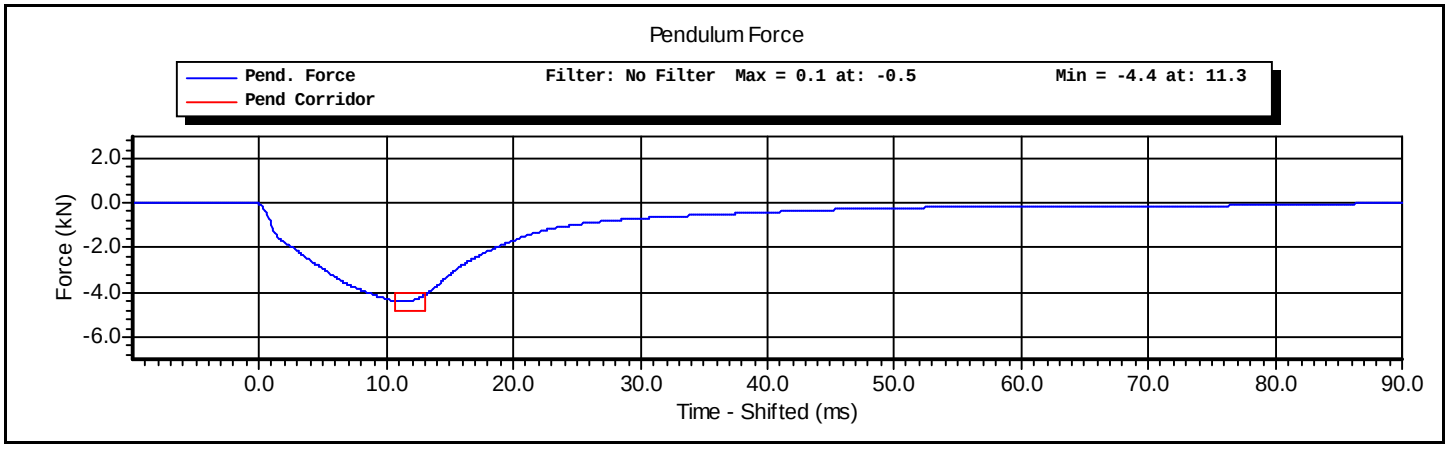
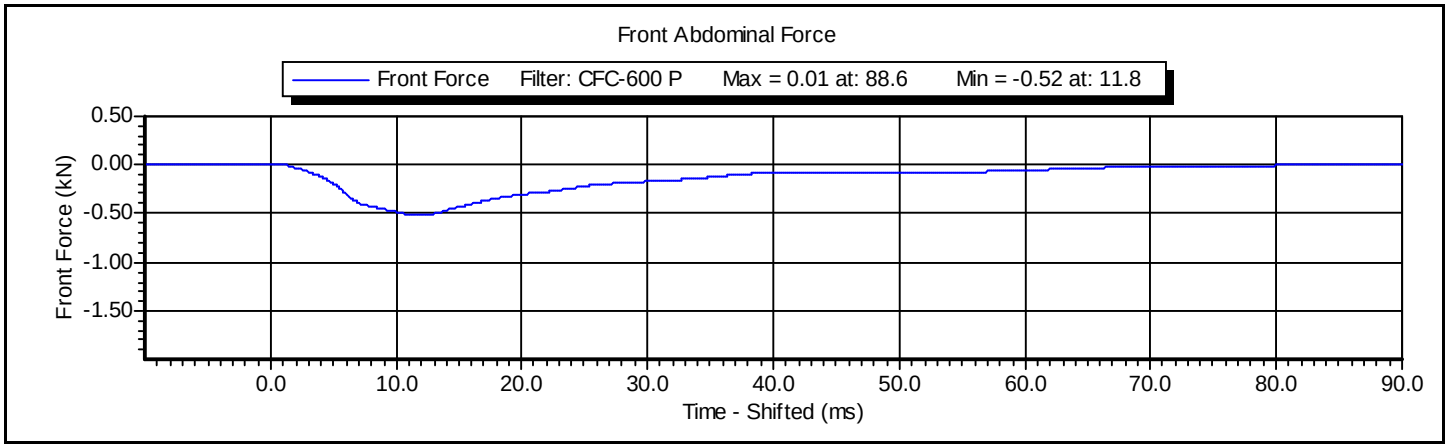
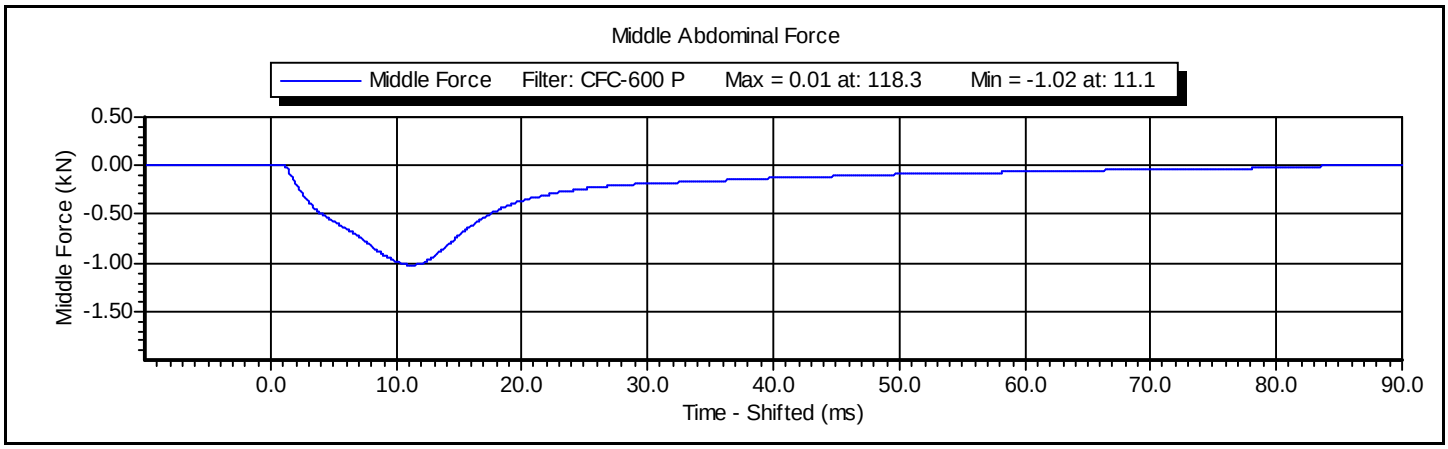
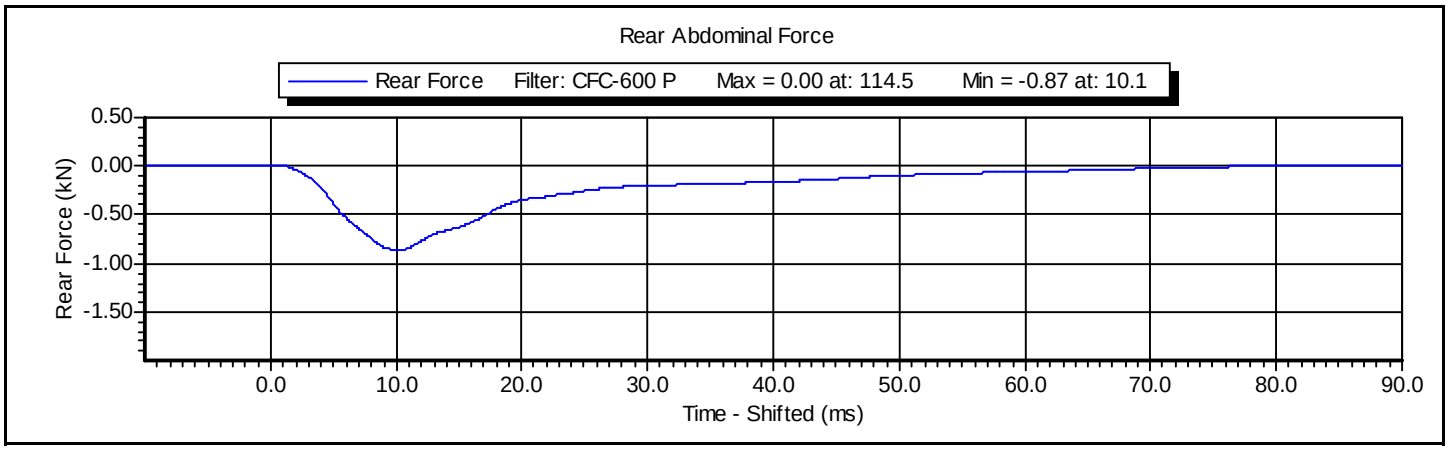
Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdmen**	Test Date:	**10/18/2010**
Test Number:	**1**	Test Time:	**4:11:28 PM**











Test ID: **Abdmen** Test Time: **4:11:28 PM** Test Date: **10/18/2010**

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VERIFICATION REPORT

Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Spine Flexion**	Test Date:	**10/18/2010**
Test Number:	**3**	Test Time:	**2:37:33 PM**

Component Part Number	Component Serial Number
175-5501	**15-0545**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**29**	%RH	P
Velocity	5.95	--	6.15	**6.12**	m/s	P
Maximum Headform Flexion Angle	45.0	--	55.0	**47.6**	degrees	P
Time at Maximum Headform Flexion Angle	39.0	--	53.0	**42.5**	ms	P
Decay to Zero Degrees	37.0	--	57.0	**39.1**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

Test ID: **Spine Flexion** Test Time: **2:37:33 PM** Test Date: **10/18/2010**

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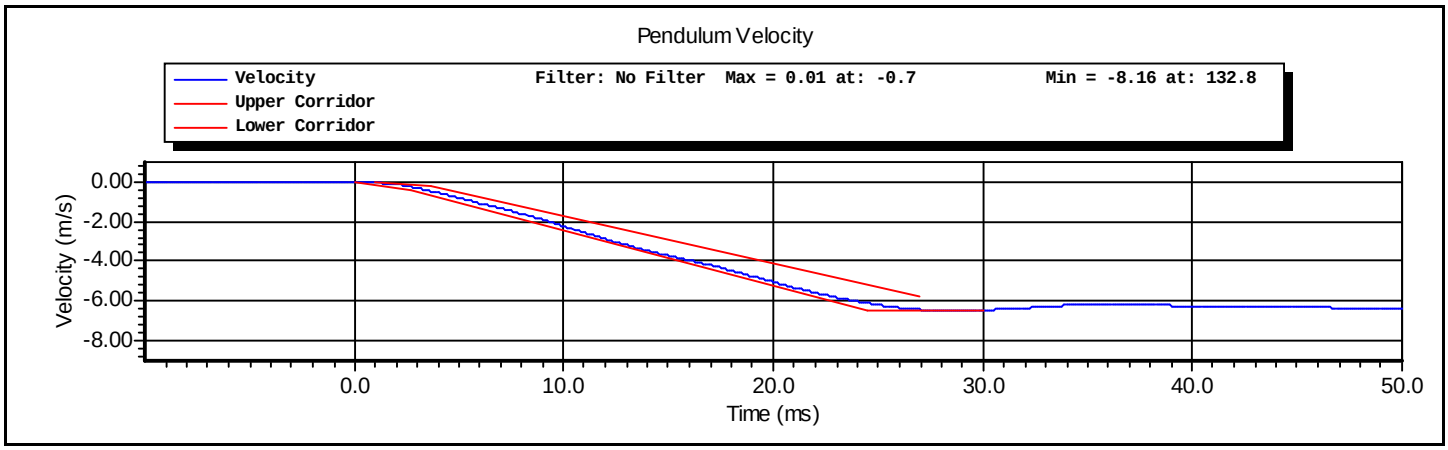
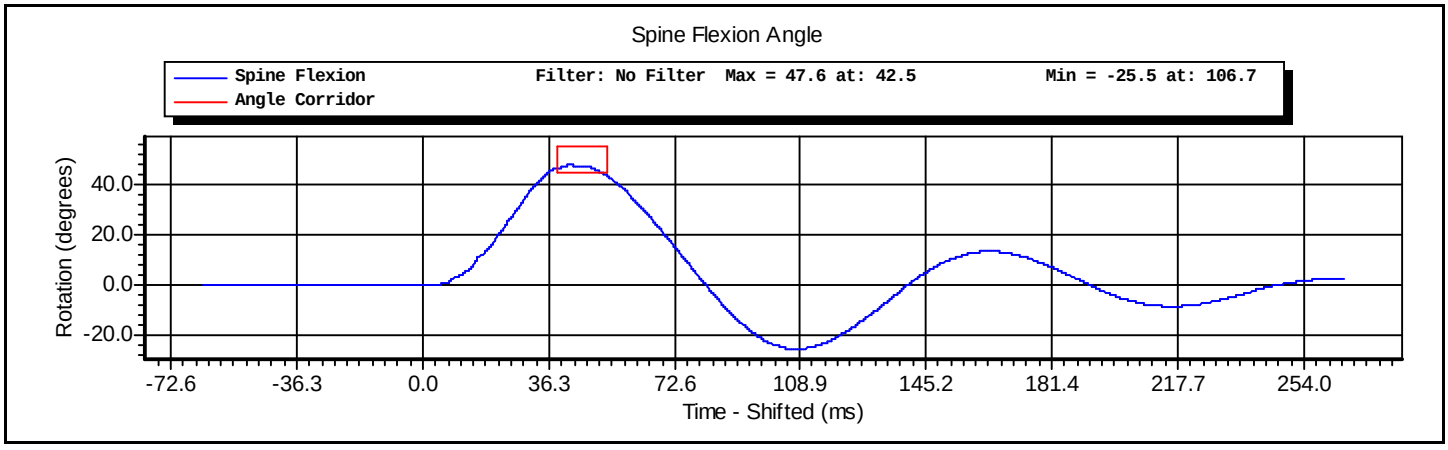
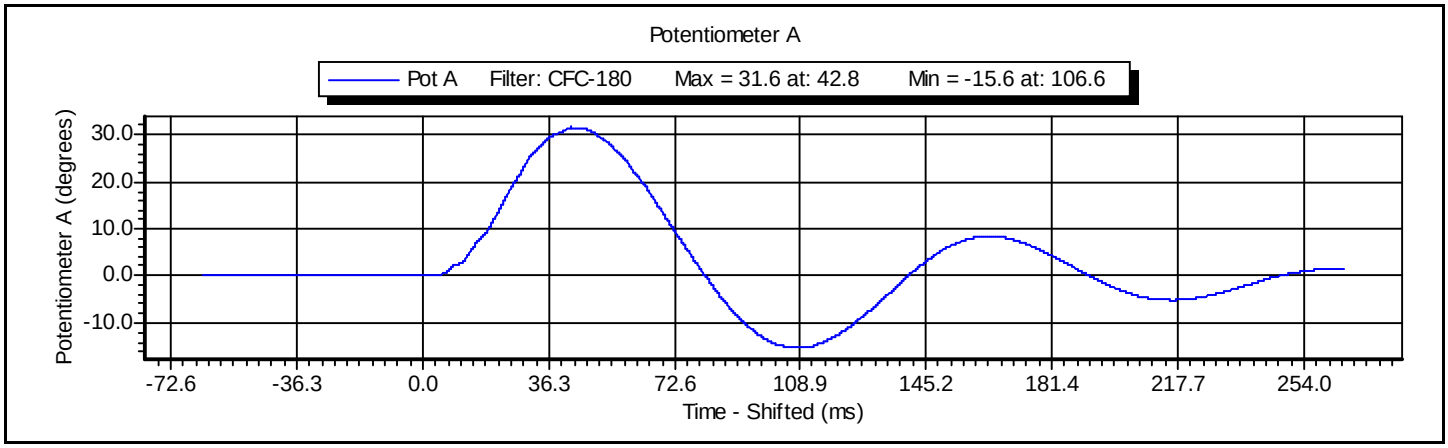
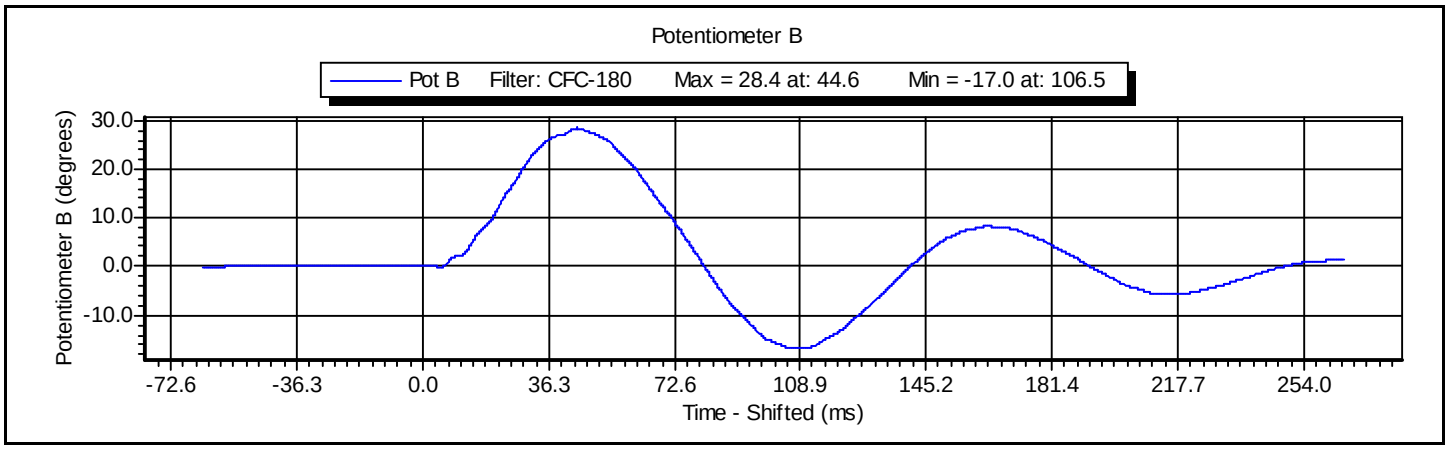
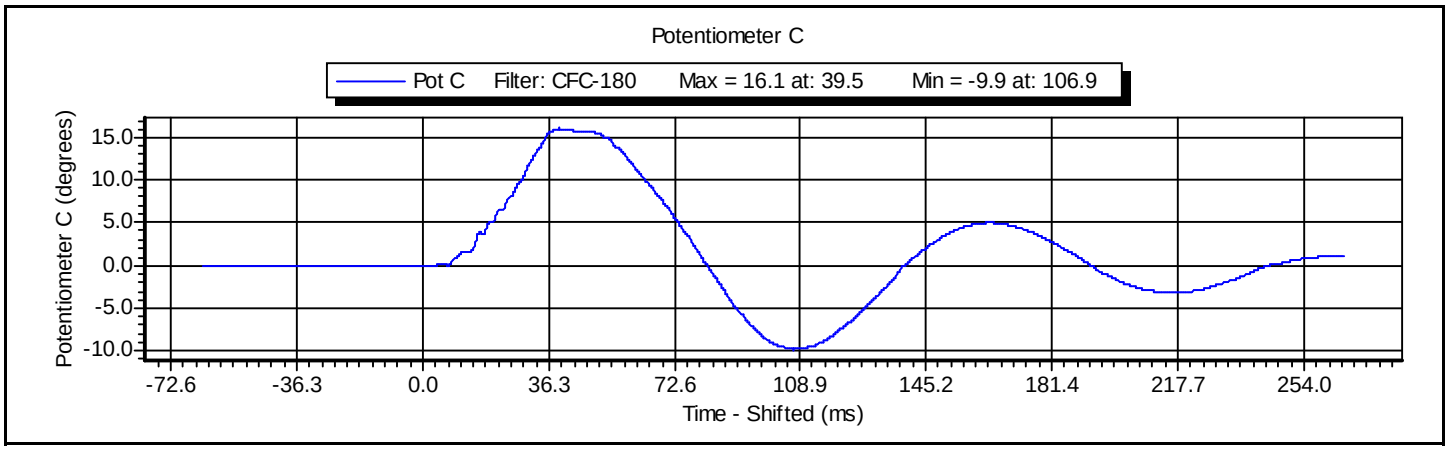
Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Spine Flexion**	Test Date:	**10/18/2010**
Test Number:	**3**	Test Time:	**2:37:33 PM**











Test ID: **Spine Flexion** Test Time: **2:37:33 PM** Test Date: **10/18/2010**

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VERIFICATION REPORT

Test Name:	**Pelvis Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Pelvis**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**8:52:29 AM**

Component Part Number	Component Serial Number

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.7**	deg C	P
Humidity	10	--	70	**38**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Peak Pendulum Force	-5.40	--	-4.70	**-4.94**	kN	P
Time at Peak Pendulum Force	11.80	--	16.10	**13.71**	ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	**-1.31**	kN	P
Time at Peak Pubic Symphysis Force	12.20	--	17.00	**14.51**	ms	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**3096**	**LC-456Fy**	**4/22/2010**

Test ID: **Pelvis** Test Time: **8:52:29 AM** Test Date: **10/19/2010**

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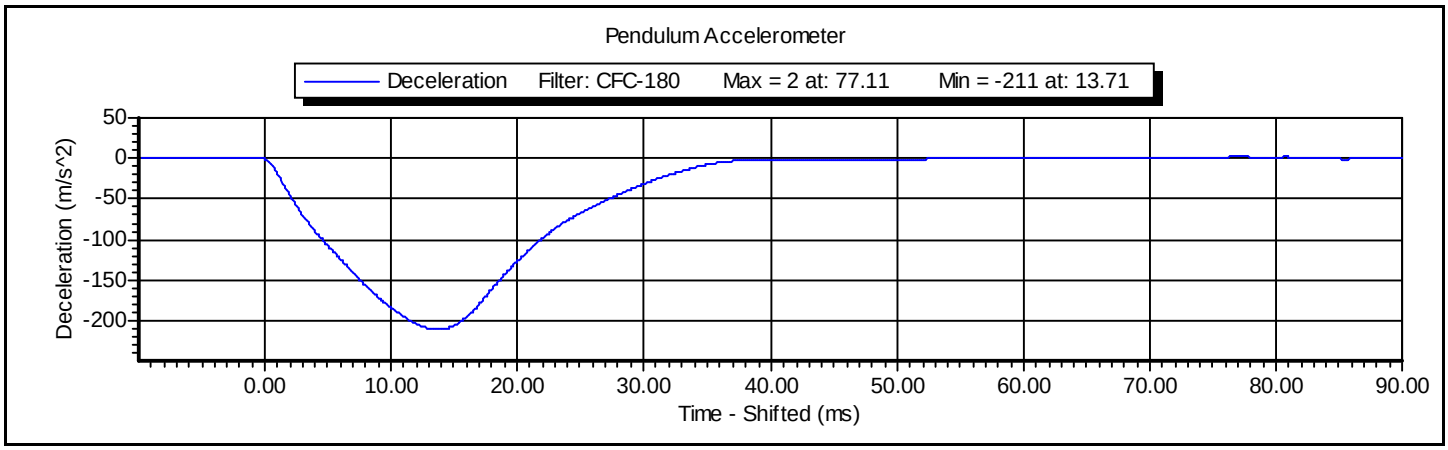
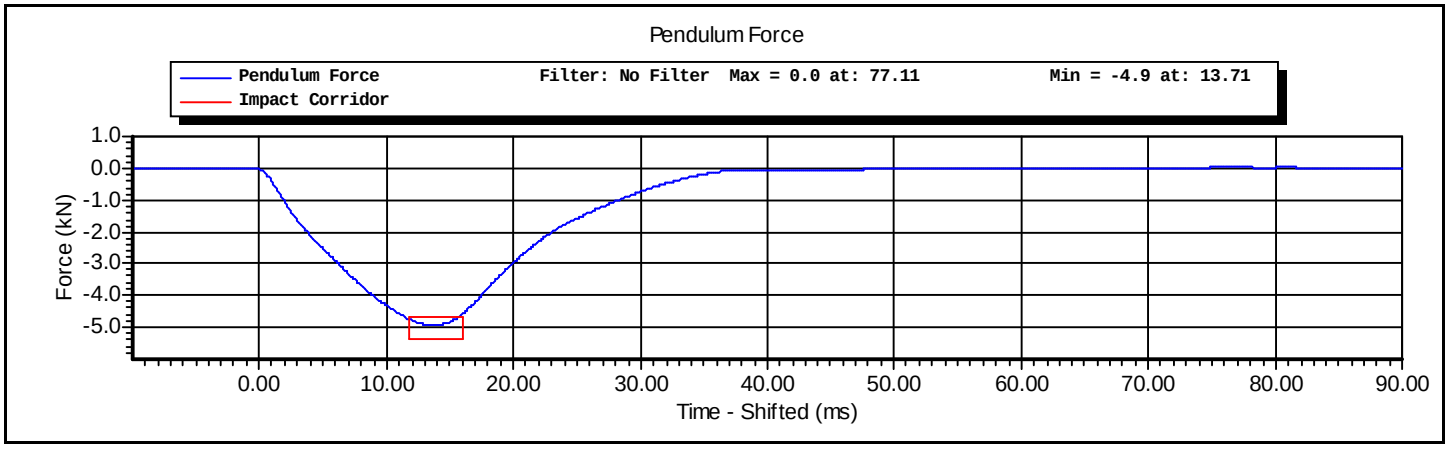
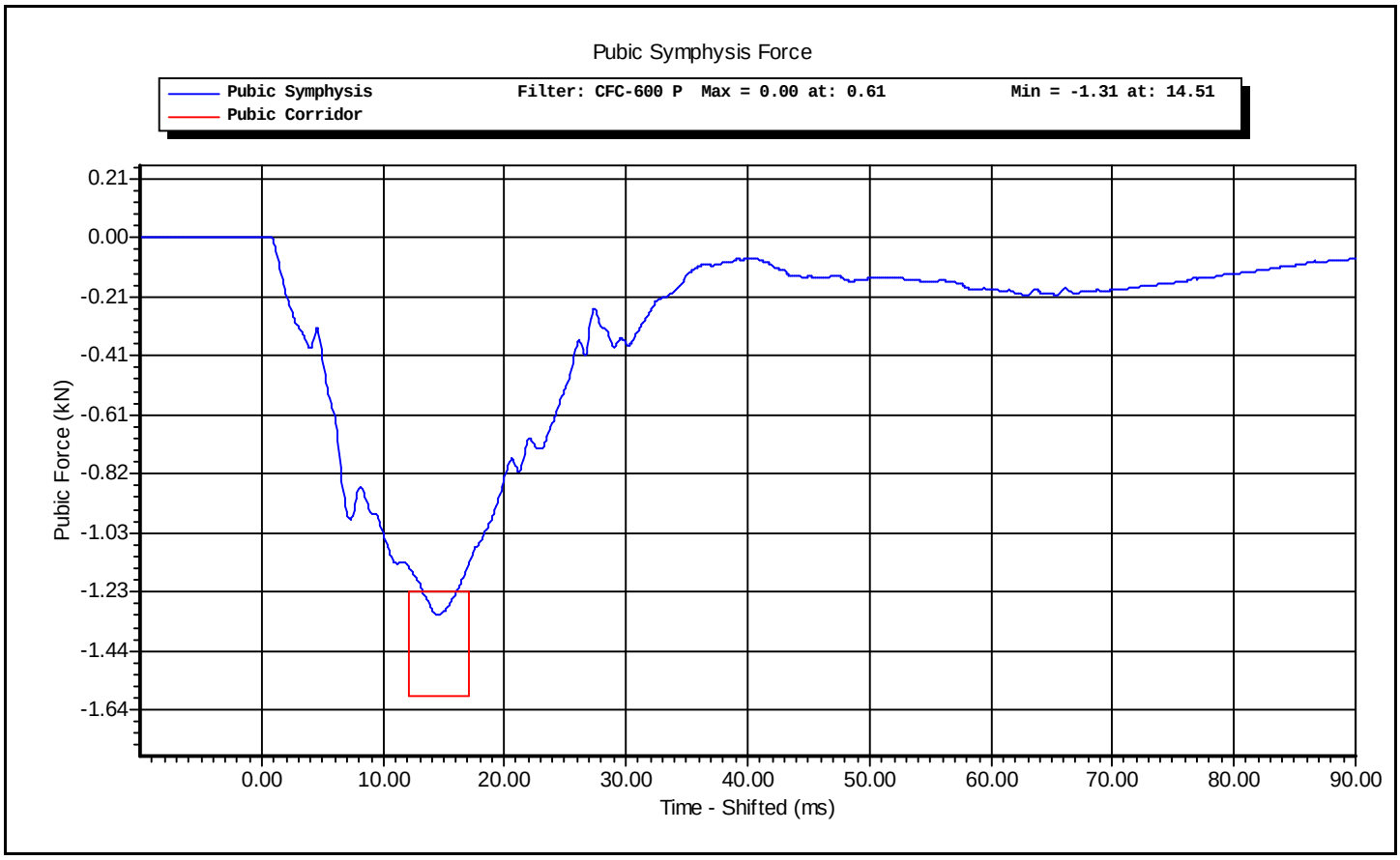
Test Name:	**Pelvis Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Pelvis**	Test Date:	**10/19/2010**
Test Number:	**1**	Test Time:	**8:52:29 AM**







Test ID: **Pelvis** Test Time: **8:52:29 AM** Test Date: **10/19/2010**

CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 300

CONFIGURED FOR LEFT SIDE IMPACT

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SID-IIsD External Measurements

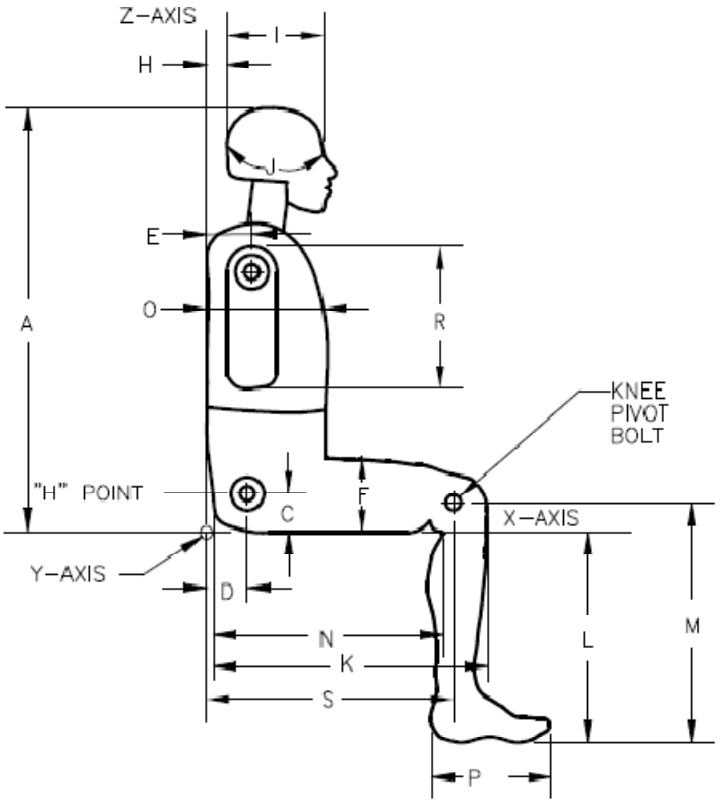
NHTSA ATD S/N 300

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	785	Yes
B	Shoulder Pivot Height	437.0 - 453.0	450	Yes
C	H-Point Height	79.0 - 89.0	87	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	98	Yes
F	Thigh Clearance	119.0 - 135.0	125	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	42	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	523	Yes
L	Popliteal Height	343.0 - 369.0	365	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	395	Yes
N	Buttock Popliteal Length	416.0 - 442.0	430	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	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	475	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	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	870	Yes
Z	Waist Circumference	761.0 - 791.0	773	Yes

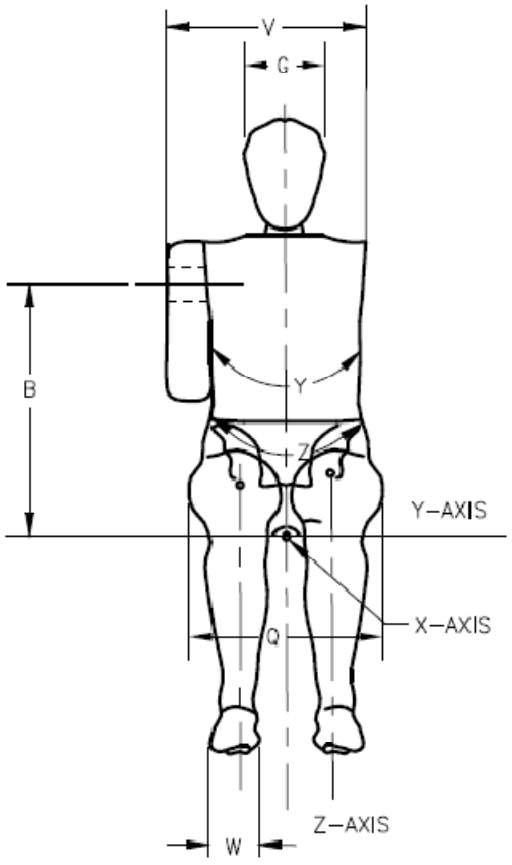
Technician: S. Zito

Date: 10/20/2010

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Head Drop**	Test Date:	**10/21/2010**
Test Number:	**1**	Test Time:	**9:01:45 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**20.6**	deg C	P
Humidity	10	--	70	**39**	%RH	P
Resultant Acceleration	115.0	--	137.0	**131.8**	g	P
Oscillation	0.0	--	15.0	**2.8**	%	P
Fore-Aft Acceleration	-15.0	--	15.0	**8.5**	g	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51685**	**10/8/2010**
Endevco	**7264-2000**	**P51682**	**10/8/2010**
Endevco	**7264-2000**	**P51699**	**10/8/2010**

Test ID: **Head Drop** Test Time: **9:01:45 AM** Test Date: **10/21/2010**

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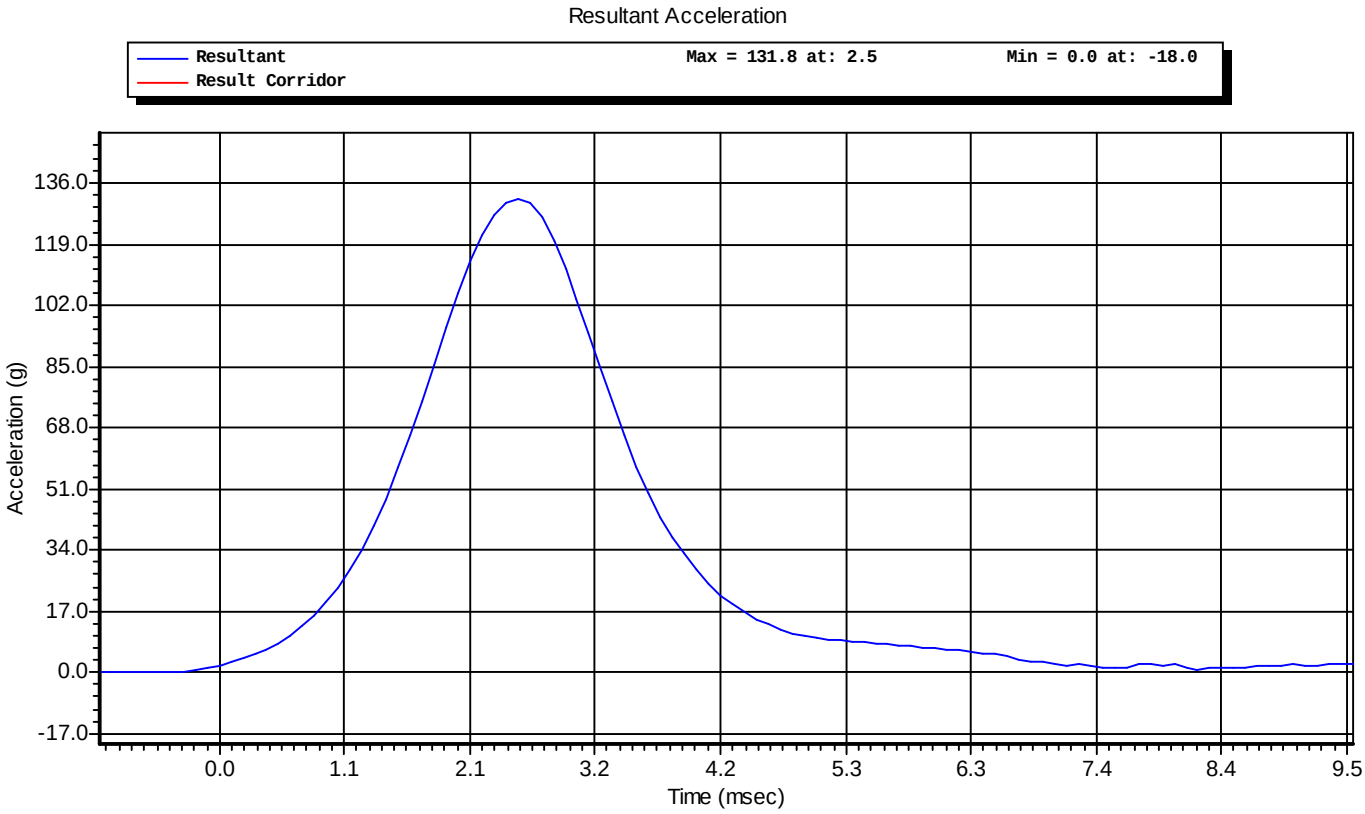
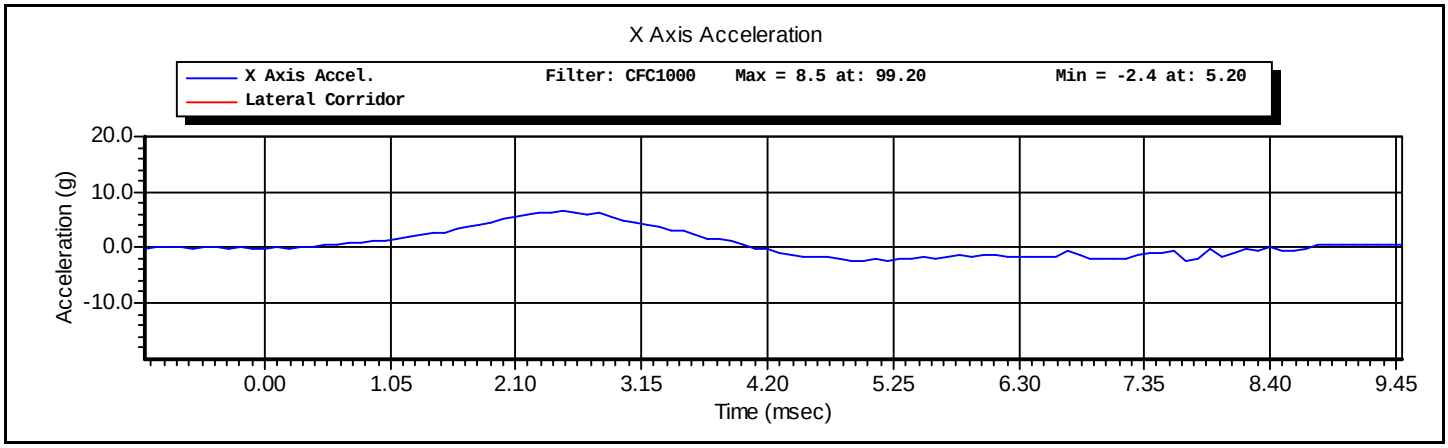
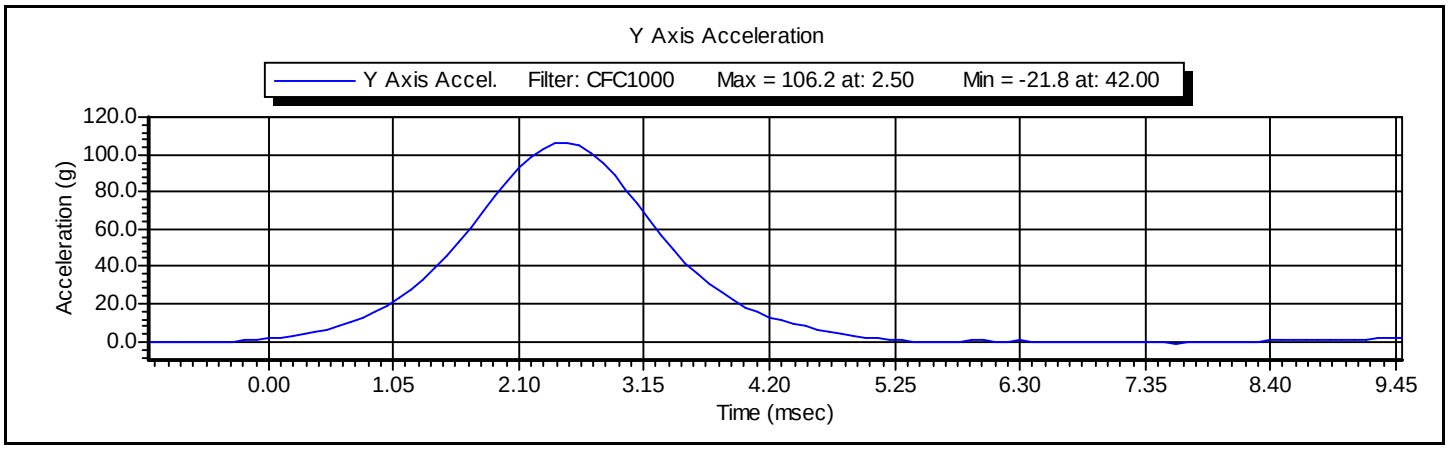
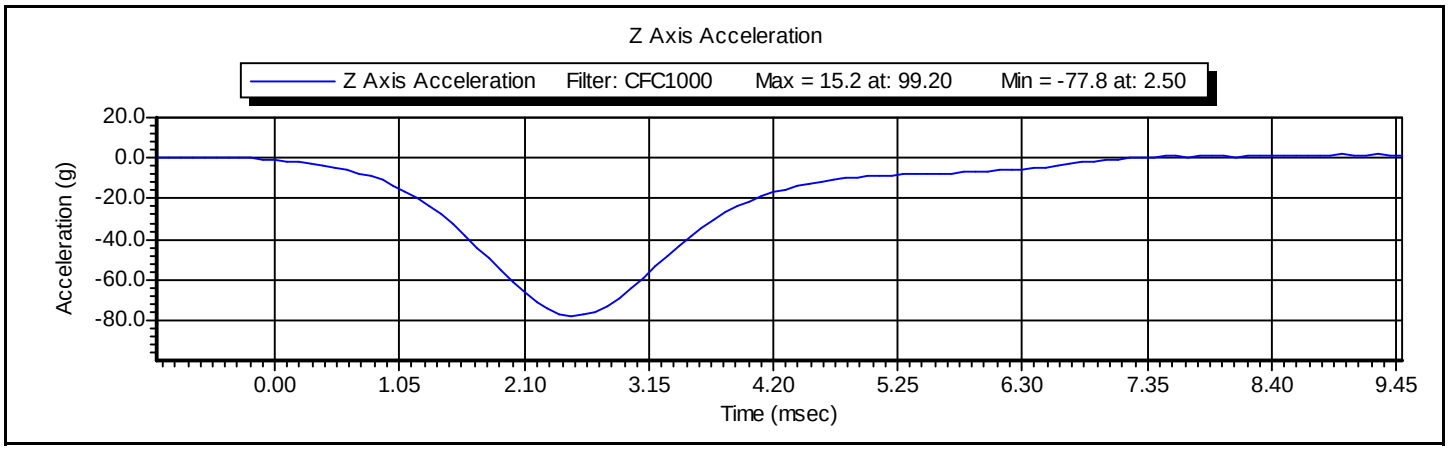
Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Head Drop**	Test Date:	**10/21/2010**
Test Number:	**1**	Test Time:	**9:01:45 AM**









Test ID: **Head Drop** Test Time: **9:01:45 AM** Test Date: **10/21/2010**

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VERIFICATION REPORT

Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Neck Flexion**	Test Date:	**10/21/2010**
Test Number:	**1**	Test Time:	**11:29:14 AM**

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

Test Parameters	Test Specifications	Test Results	
Temperature	20.6 -- 22.2	**21.7** deg C	P
Humidity	10 -- 70	**35** %RH	P
Velocity	5.51 -- 5.63	**5.56** m/s	P
Pendulum Impulse at 10 ms	2.20 -- 2.80	**2.49** m/s	P
Pendulum Impulse at 15 ms	3.30 -- 4.10	**3.59** m/s	P
Pendulum Impulse at 20 ms	4.40 -- 5.40	**4.90** m/s	P
Pendulum Impulse at 25 ms	5.40 -- 6.10	**5.79** m/s	P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	**5.89** m/s	P
Max D Plane Rotation	71.0 -- 81.0	**73.8** degrees	P
Time at Max Rotation	50.0 -- 70.0	**61.4** ms	P
Moment about OC	-44.0 -- -36.0	**-40.5** Nm	P
Moment Decay to Zero	102.0 -- 126.0	**115.3** ms	P

All test parameters are within specifications

Technician: **A,. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
Denton	**1716A**	**LC-576 Fy**	**2/15/2010**
Denton	**1716A**	**LC-576 Mx**	**2/15/2010**
DentonATD	**78051-342**	**184**	**4/30/2010**
DentonATD	**78051-342**	**174**	**4/30/2010**
DentonATD	**78051-342**	**185**	**4/30/2010**

Test ID: **Neck Flexion** Test Time: **11:29:14 AM** Test Date: **10/21/2010**

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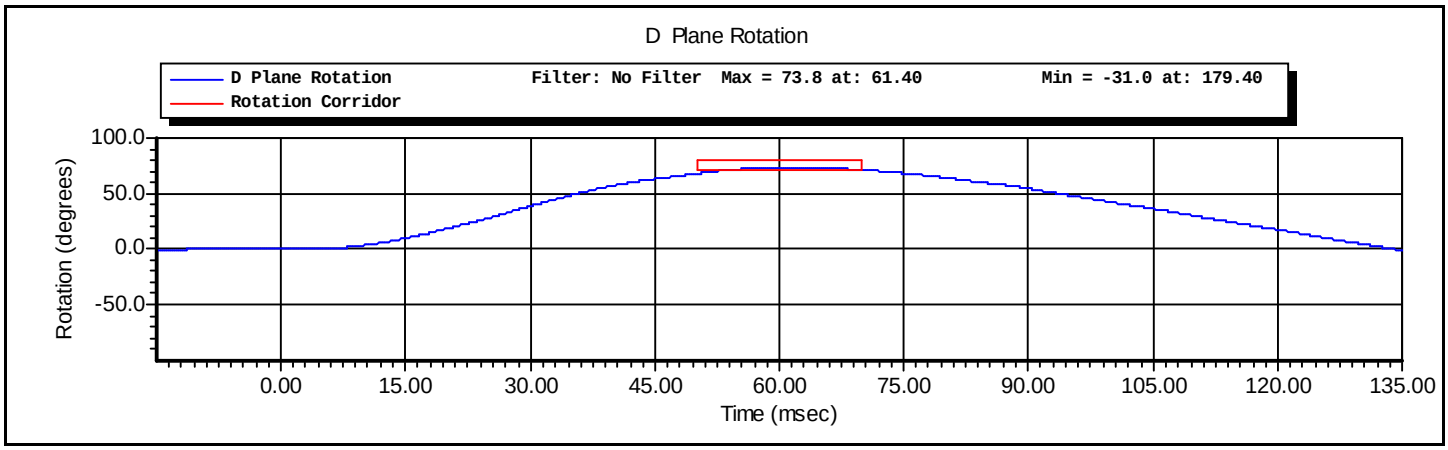
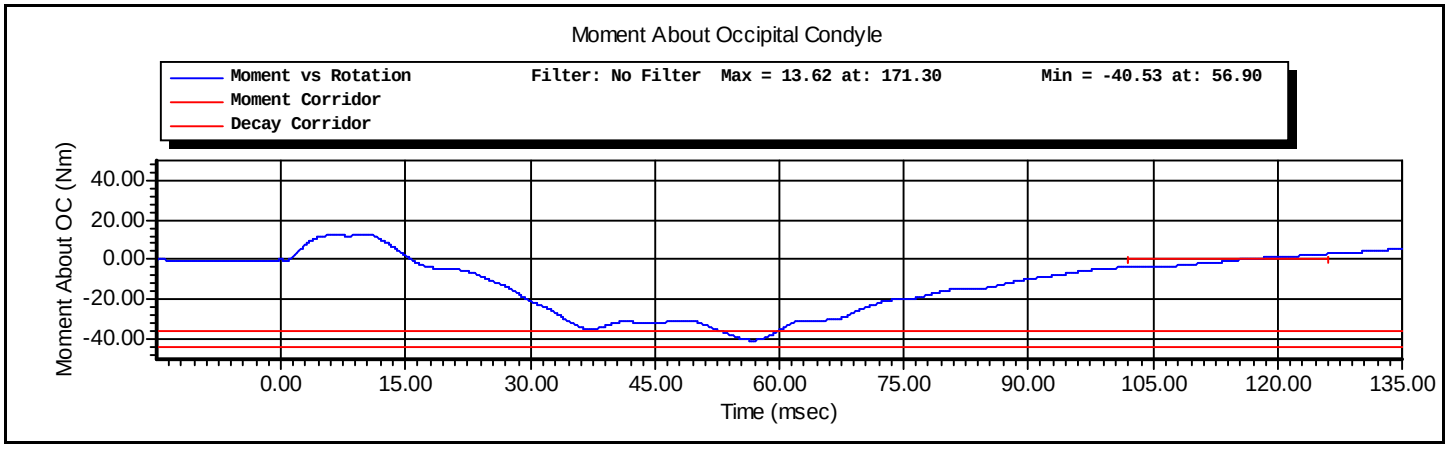
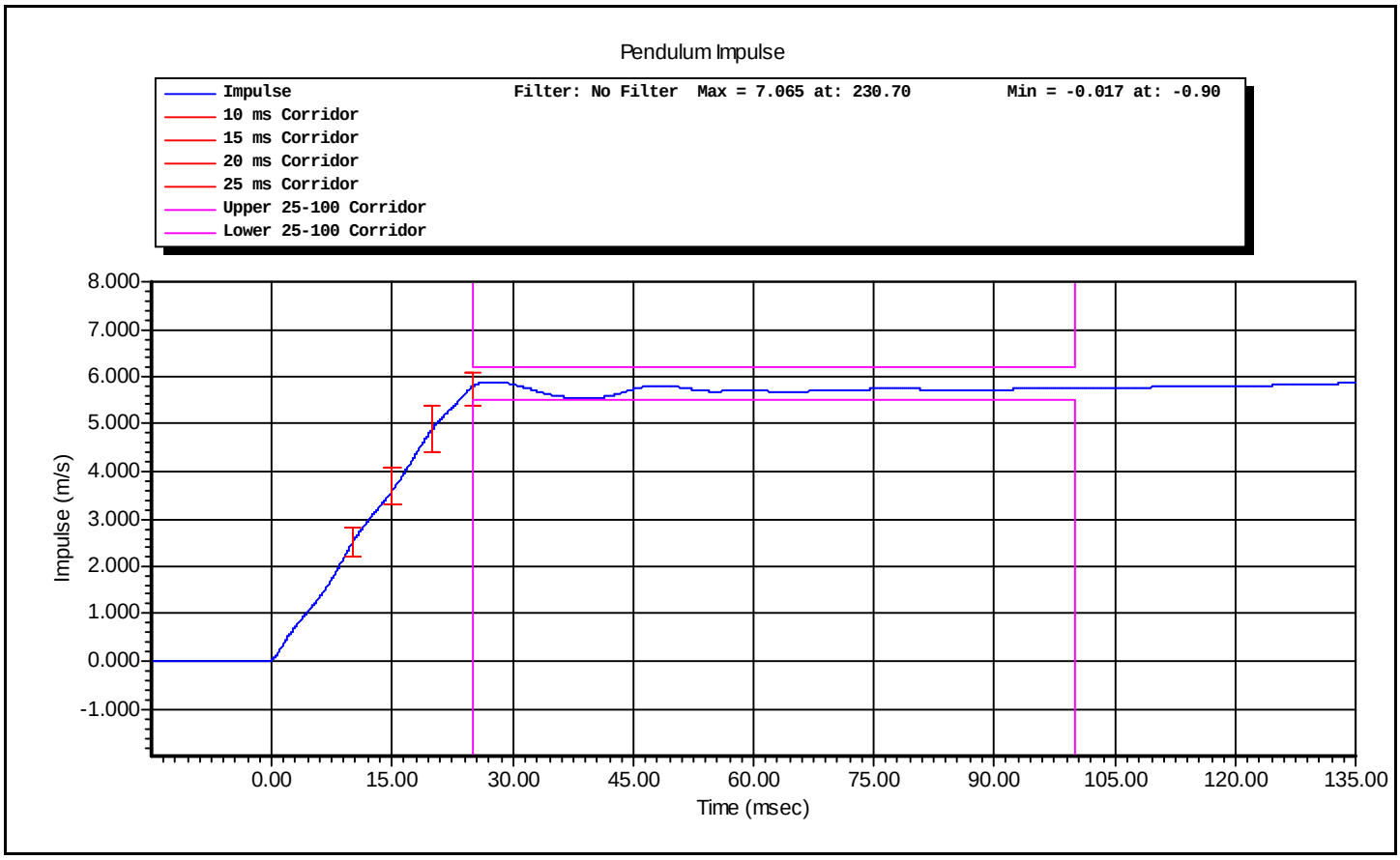
Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Neck Flexion**	Test Date:	**10/21/2010**
Test Number:	**1**	Test Time:	**11:29:14 AM**







Test ID: **Neck Flexion** Test Time: **11:29:14 AM** Test Date: **10/21/2010**

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VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Shoulder**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**1:28:24 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.20**	deg C	P
Humidity	10.0	--	70.0	**32.0**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Probe Acceleration	13.0	--	18.0	**16.6**	g	P
Shoulder Deflection	28.0	--	37.0	**32.3**	mm	P
T1 Acceleration	17.0	--	22.0	**20.0**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1063**	**4/7/2010**
Endevco	**7264-2000**	**P51927**	**10/8/2010**

Test ID: **Shoulder** Test Time: **1:28:24 PM** Test Date: **10/20/2010**

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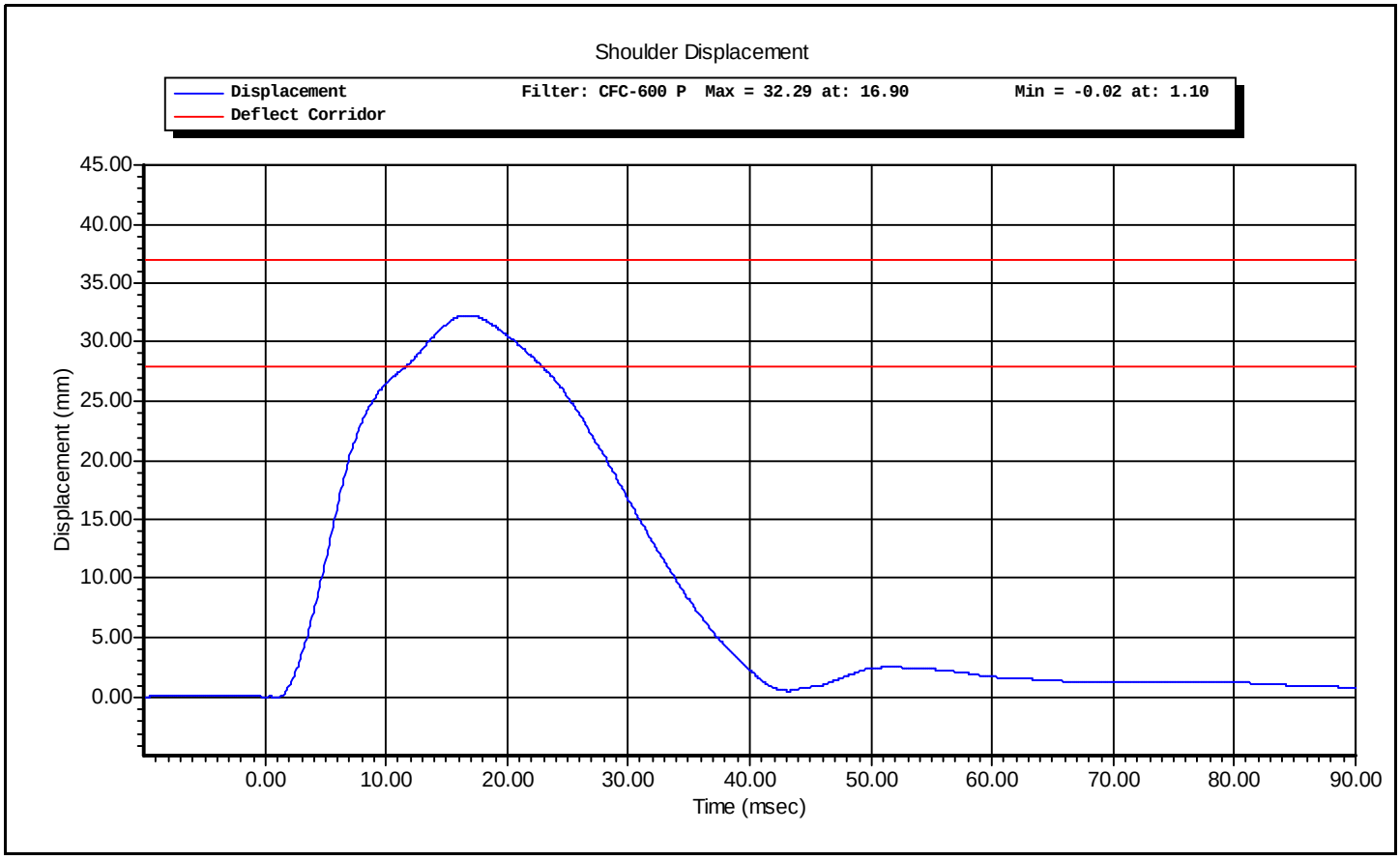
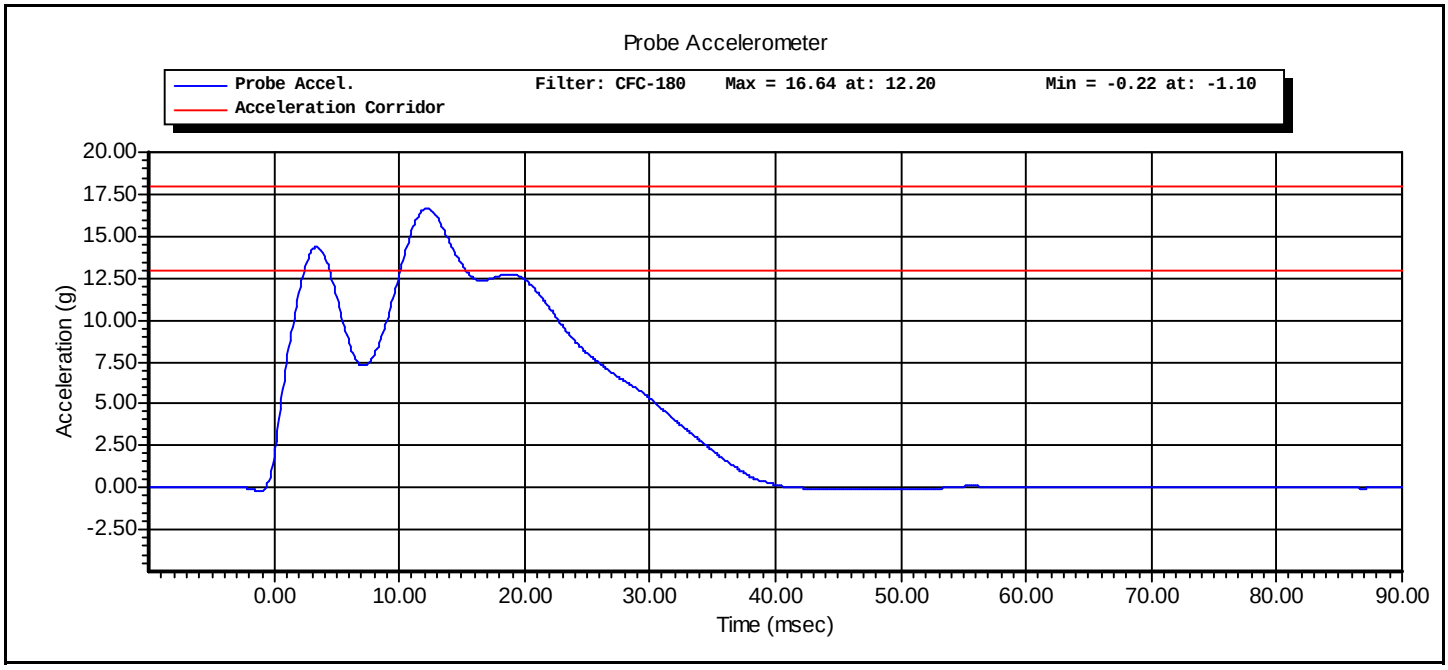
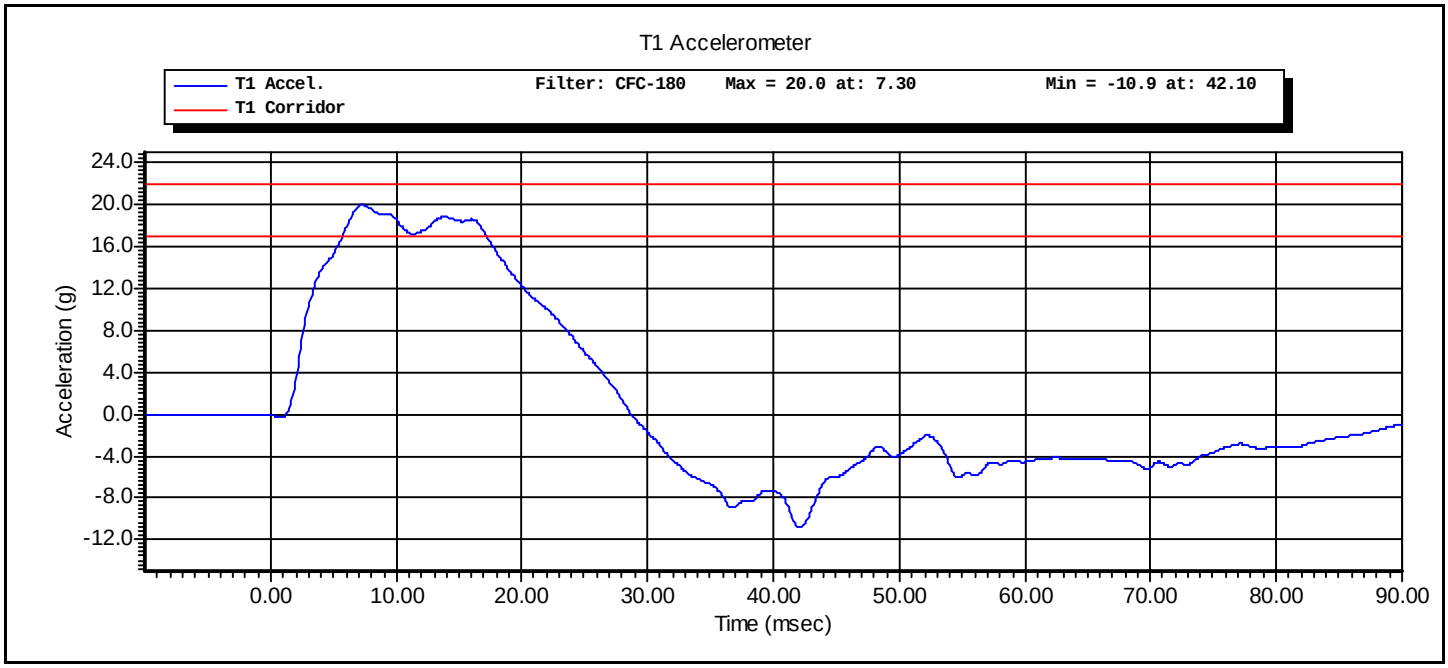
Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Shoulder**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**1:28:24 PM**







Test ID: **Shoulder** Test Time: **1:28:24 PM** Test Date: **10/20/2010**

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VERIFICATION REPORT

Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**2:29:29 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**32**	%RH	P
Velocity	4.20	--	4.40	**4.34**	m/s	P
Probe Acceleration	14.0	--	18.0	**16.3**	g	P
Upper Thorax Rib Deflection	32.0	--	40.0	**35.6**	mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	**41.6**	mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	**41.3**	mm	P
Upper Spine Acceleration T1	13.0	--	17.0	**15.8**	g	P
Lower Spine Acceleration T12	7.0	--	11.0	**10.1**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1121**	**4/7/2010**
Servo	**180-3885**	**DS-1151**	**4/7/2010**
Servo	**180-3885**	**DS-1156**	**4/7/2010**
Endevco	**7264-2000**	**P51927**	**10/8/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**

Test ID: **Thorax Without Arm** Test Time: **2:29:29 PM** Test Date: **10/20/2010**

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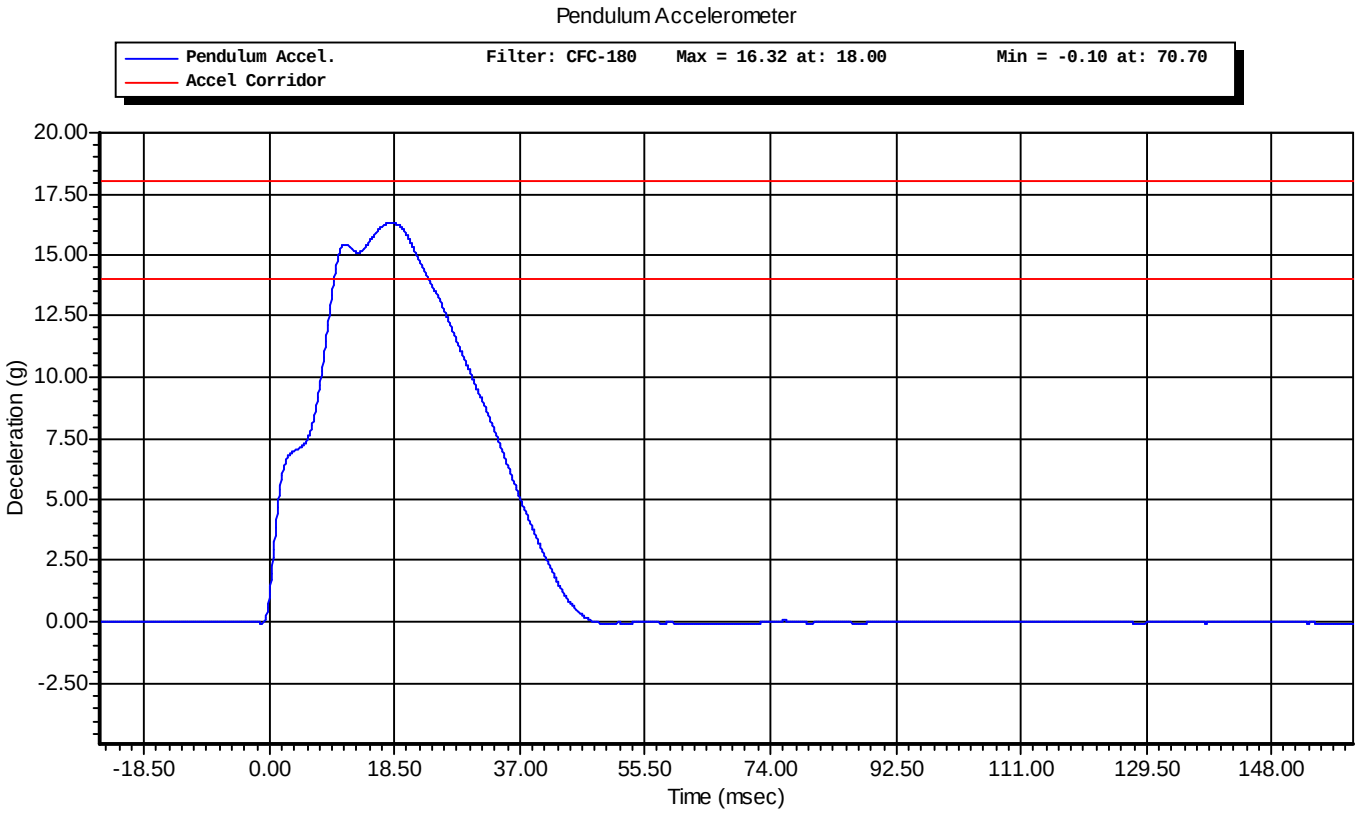
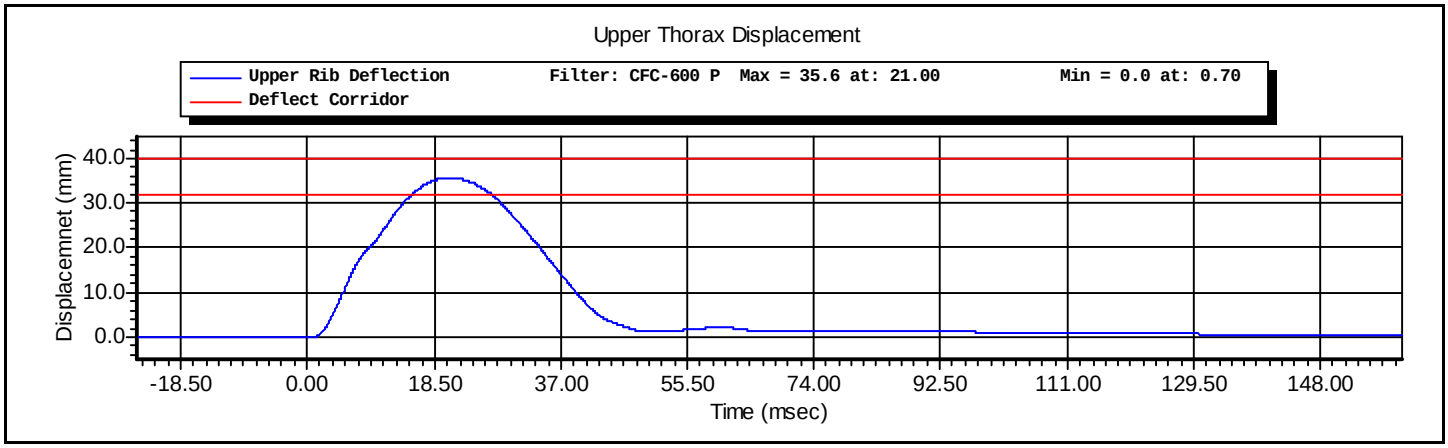
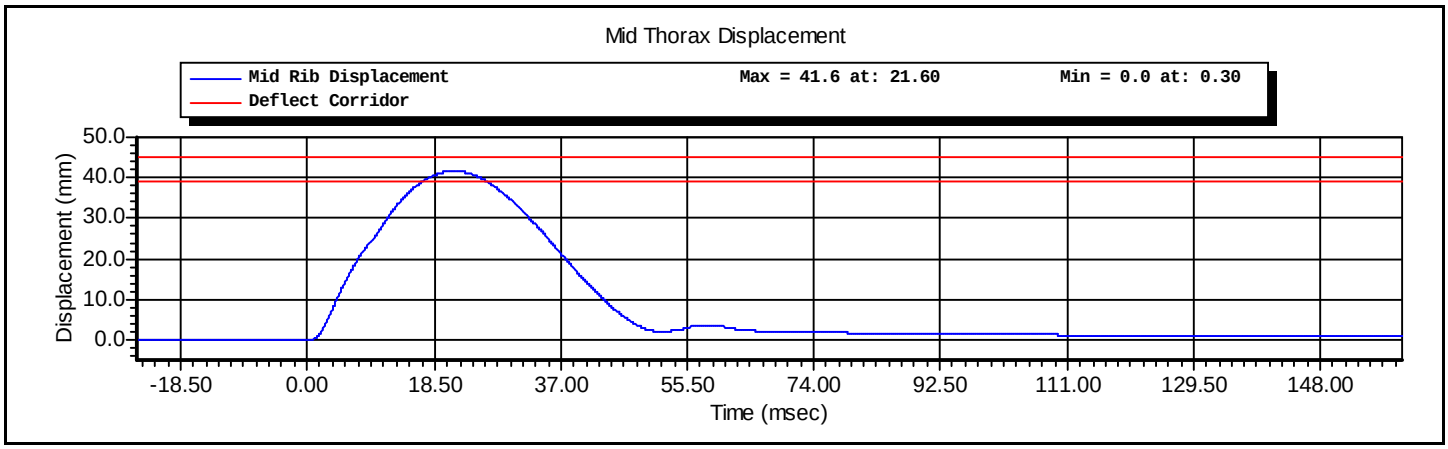
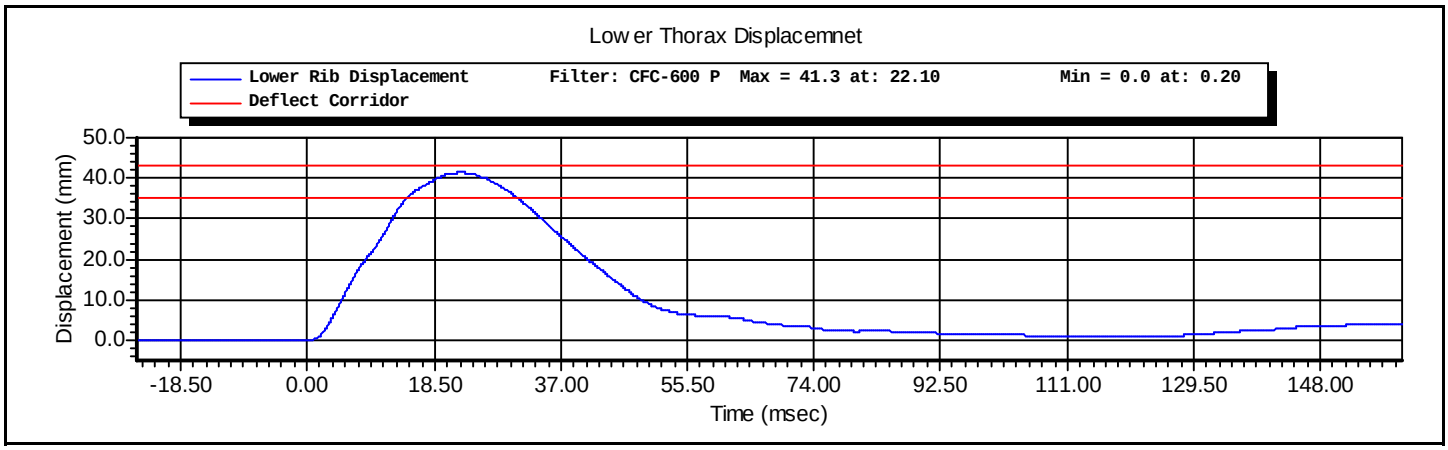
Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**2:29:29 PM**

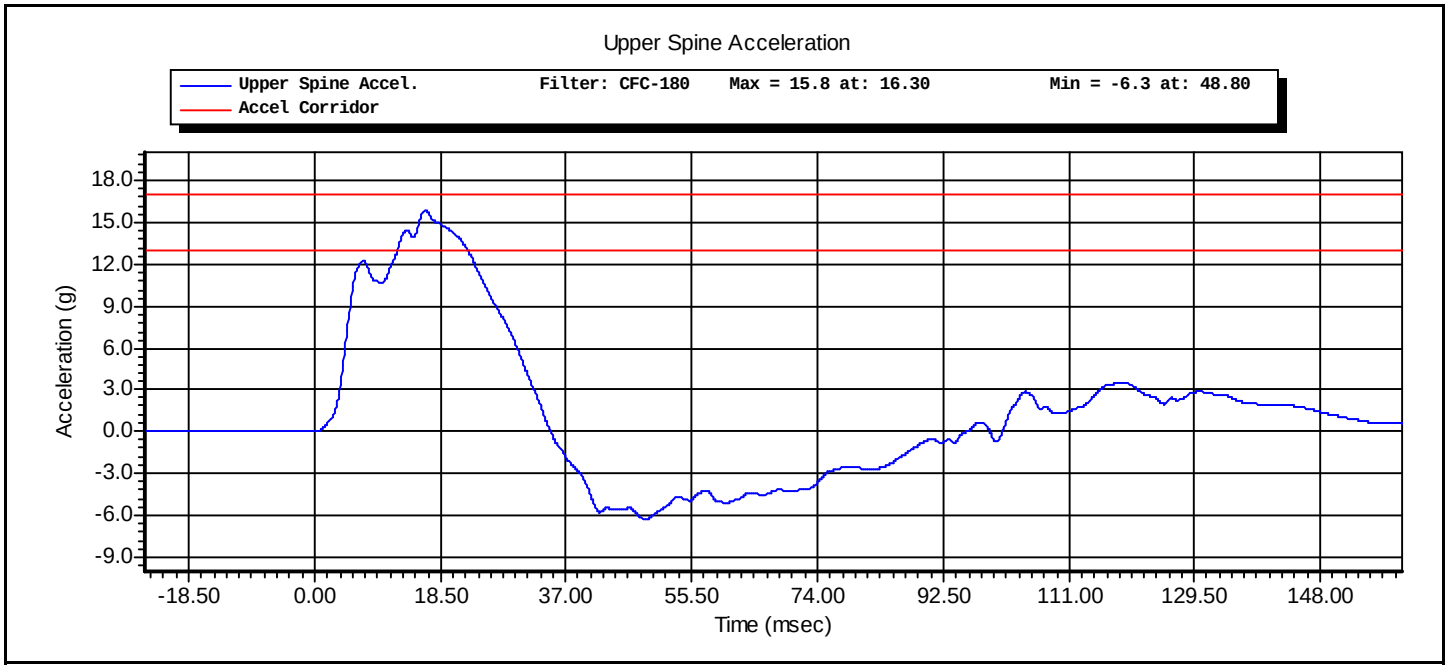


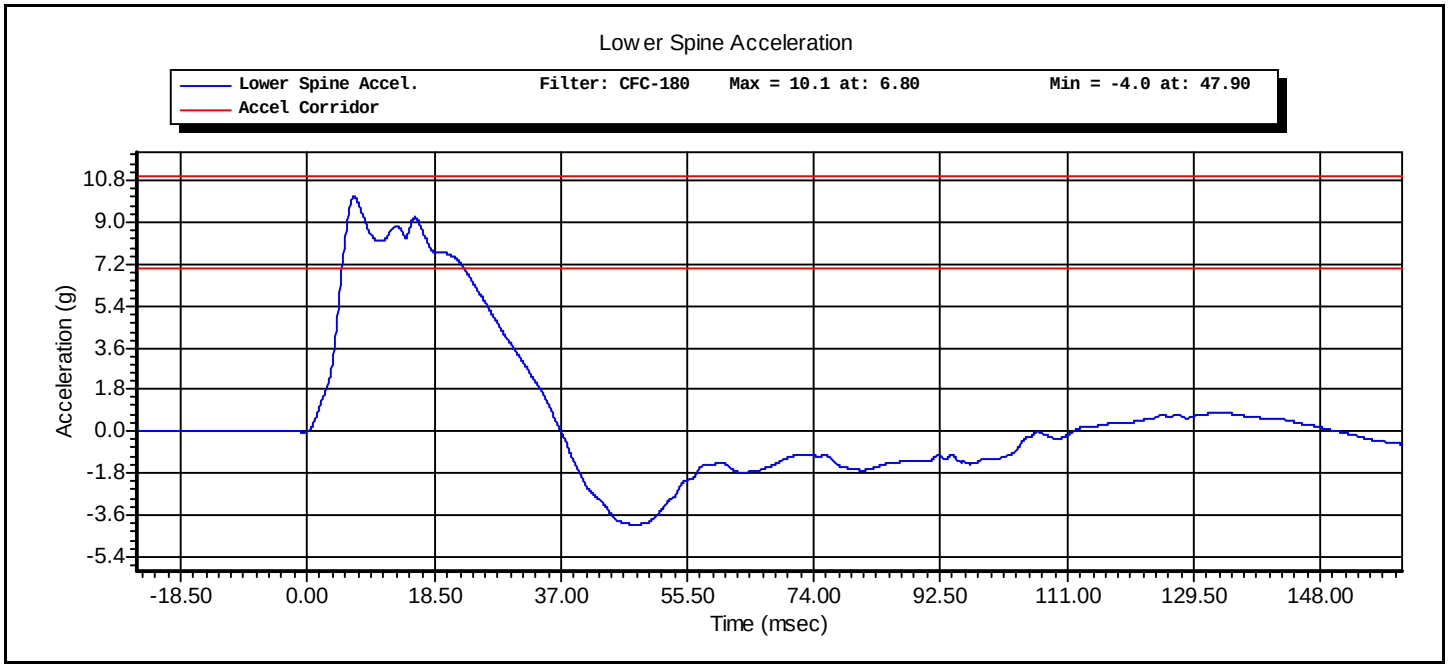






Test ID: **Thorax Without Arm** Test Time: **2:29:29 PM** Test Date: **10/20/2010**





Test ID: **Thorax Without Arm** Test Time: **2:29:29 PM** Test Date: **10/20/2010**

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VERIFICATION REPORT

Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Thorax With Arm**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**3:17:17 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**32**	%RH	P
Velocity	6.60	--	6.80	**6.69**	m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	**34.4**	g	P
Upper Thorax Rib Deflection	25.0	--	32.0	**27.0**	mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	**32.0**	mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	**36.8**	mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	**39.4**	g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	**35.8**	g	P
Shoulder Deflection	31.0	--	40.0	**37.0**	mm	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1121**	**4/7/2010**
Servo	**180-3885**	**DS-1151**	**4/7/2010**
Servo	**180-3885**	**DS-1156**	**4/7/2010**
Endevco	**7264-2000**	**P51927**	**10/8/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**
Servo	**180-3885**	**DS-1063**	**4/7/2010**

Test ID: **Thorax With Arm** Test Time: **3:17:17 PM** Test Date: **10/20/2010**

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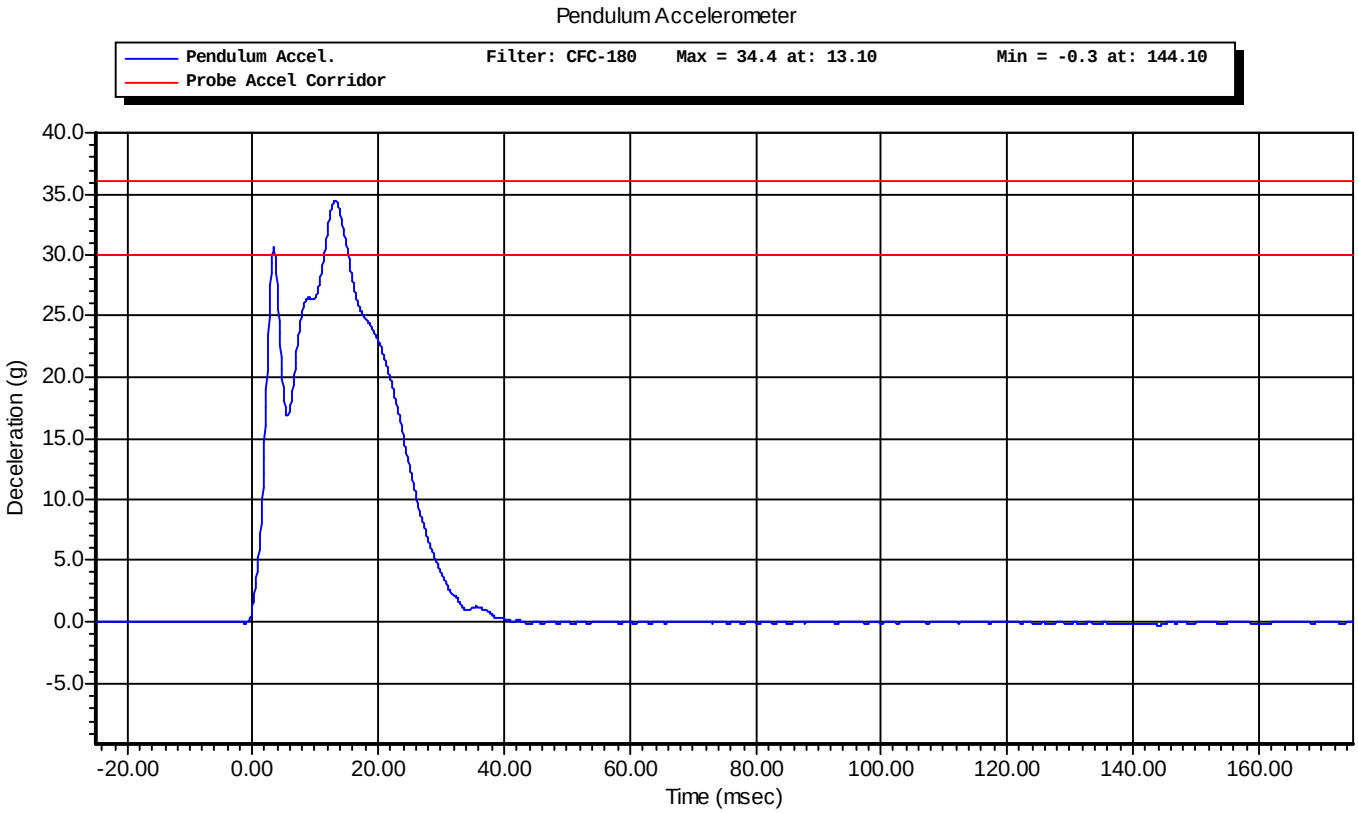
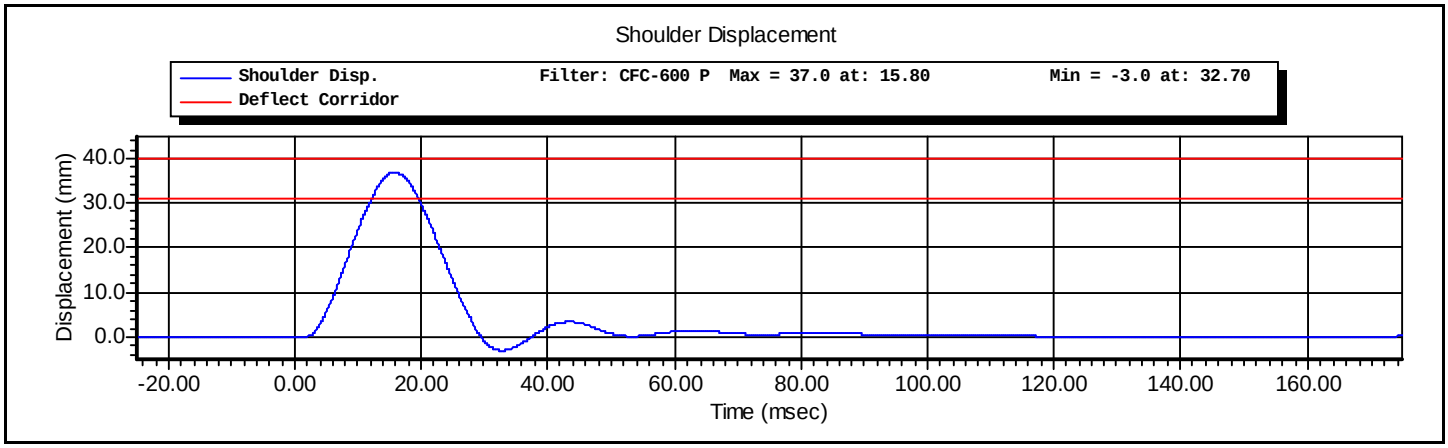
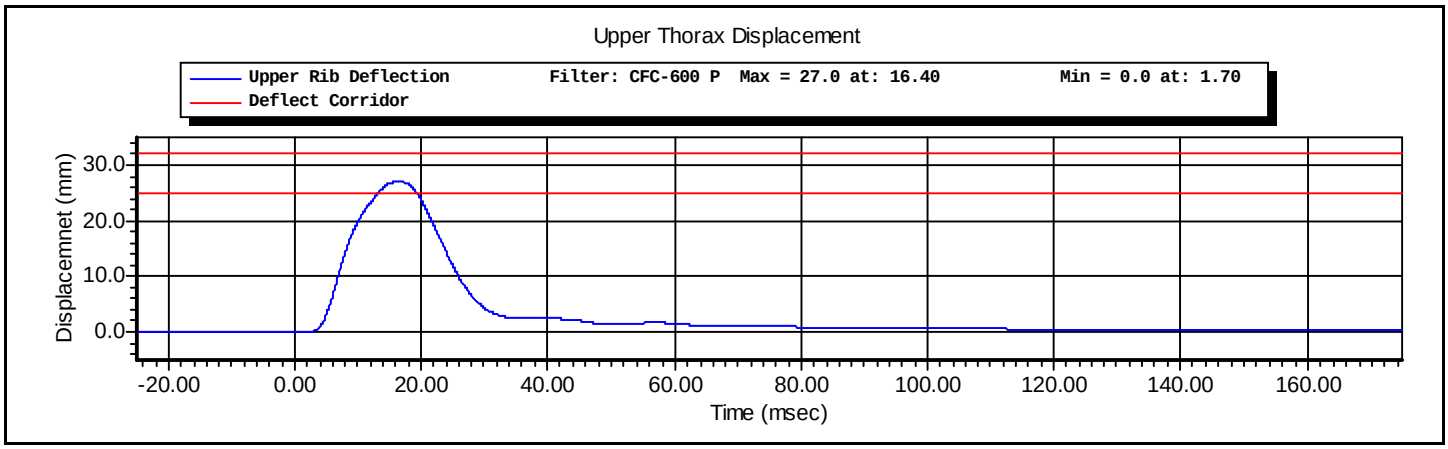
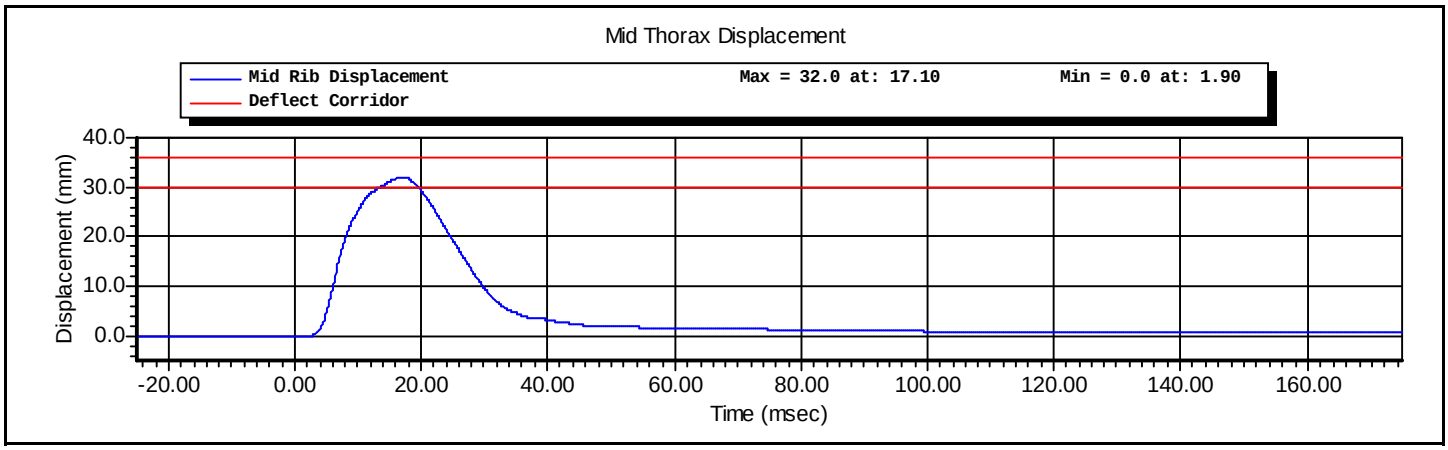
Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Thorax With Arm**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**3:17:17 PM**

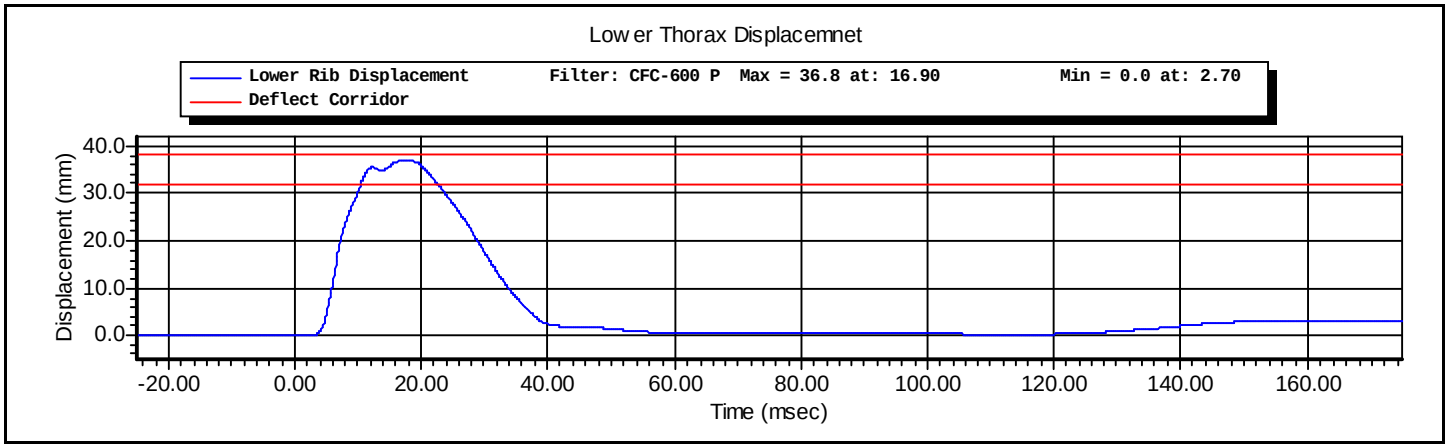


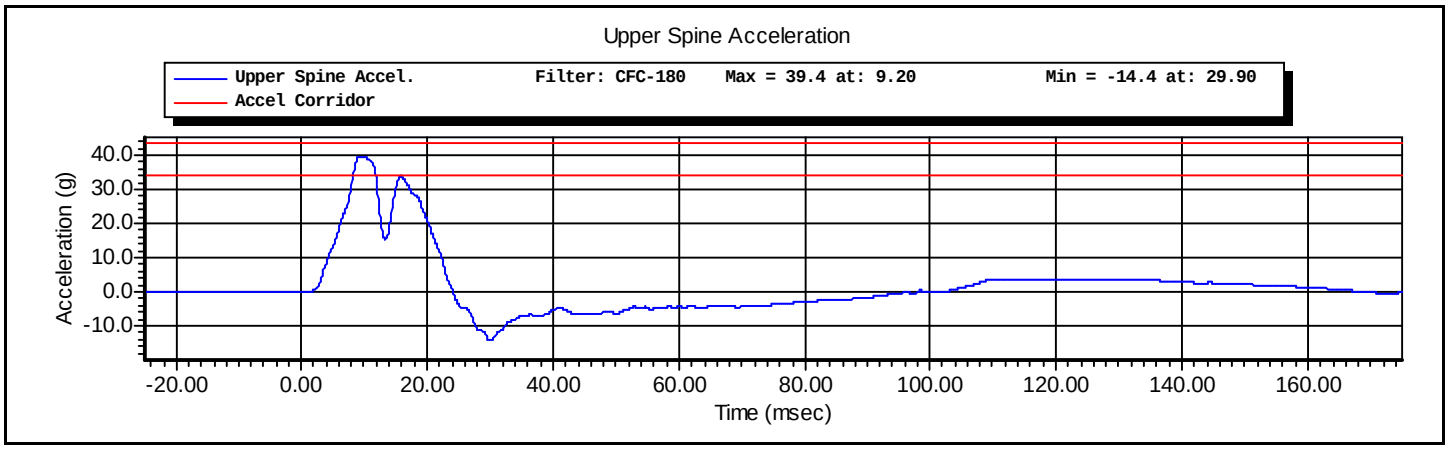


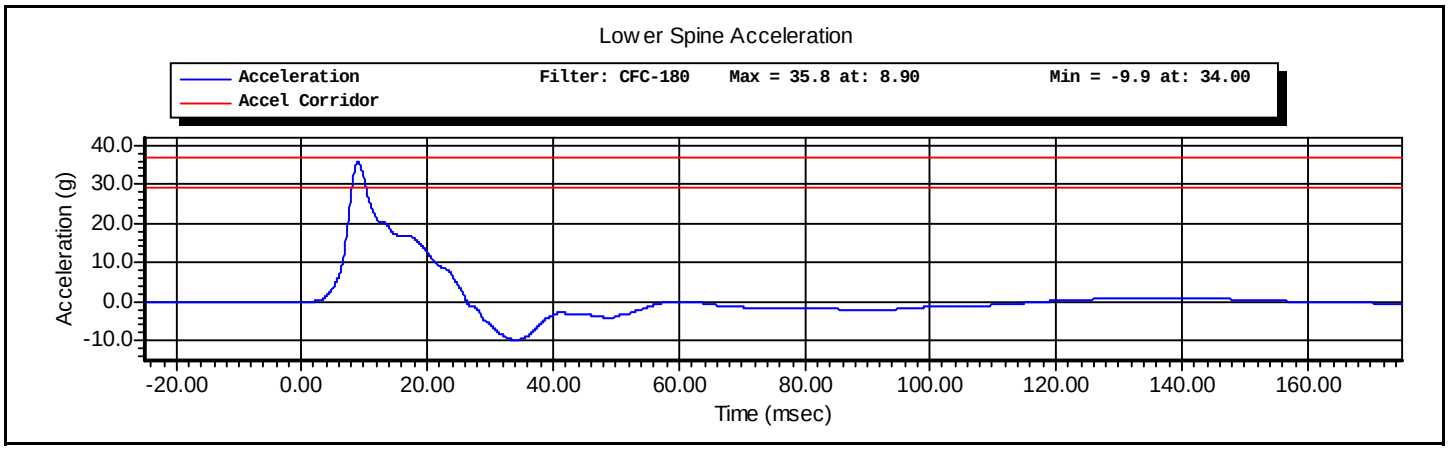




Test ID: **Thorax With Arm** Test Time: **3:17:17 PM** Test Date: **10/20/2010**







Test ID: **Thorax With Arm** Test Time: **3:17:17 PM** Test Date: **10/20/2010**

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VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Abdomen**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**2:02:37 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**32**	%RH	P
Velocity	4.20	--	4.40	**4.35**	m/s	P
Probe Acceleration	12.0	--	16.0	**15.5**	g	P
Upper Abdominal Rib Deflection	36.0	--	47.0	**39.3**	mm	P
Lower Abdominal Rib Deflection	33.0	--	44.0	**36.0**	mm	P
Lower Spine Acceleration - T12	9.0	--	14.0	**12.2**	g	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1162**	**4/7/2010**
Servo	**180-3885**	**DS-1232**	**4/7/2010**
Endevco	**7264-2000**	**P64147**	**9/20/2010**

Test ID: **Abdomen** Test Time: **2:02:37 PM** Test Date: **10/20/2010**

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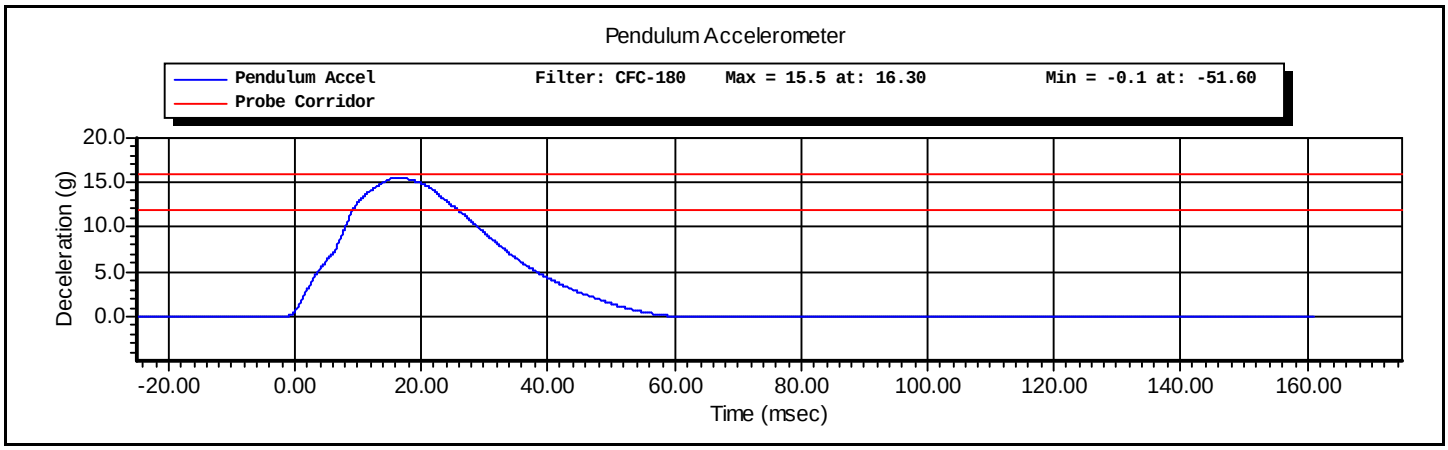
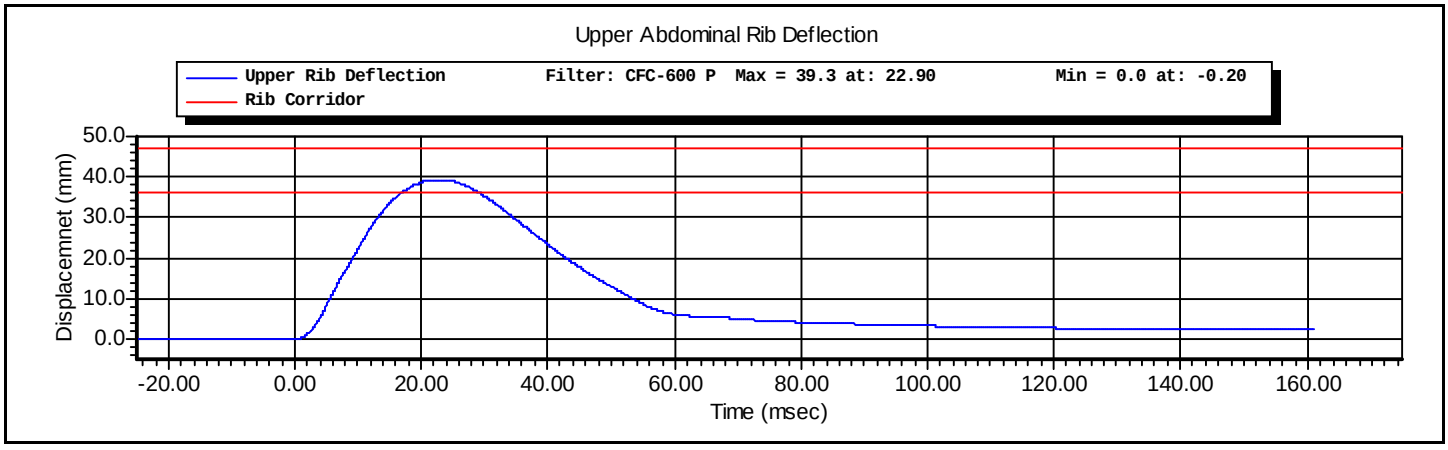
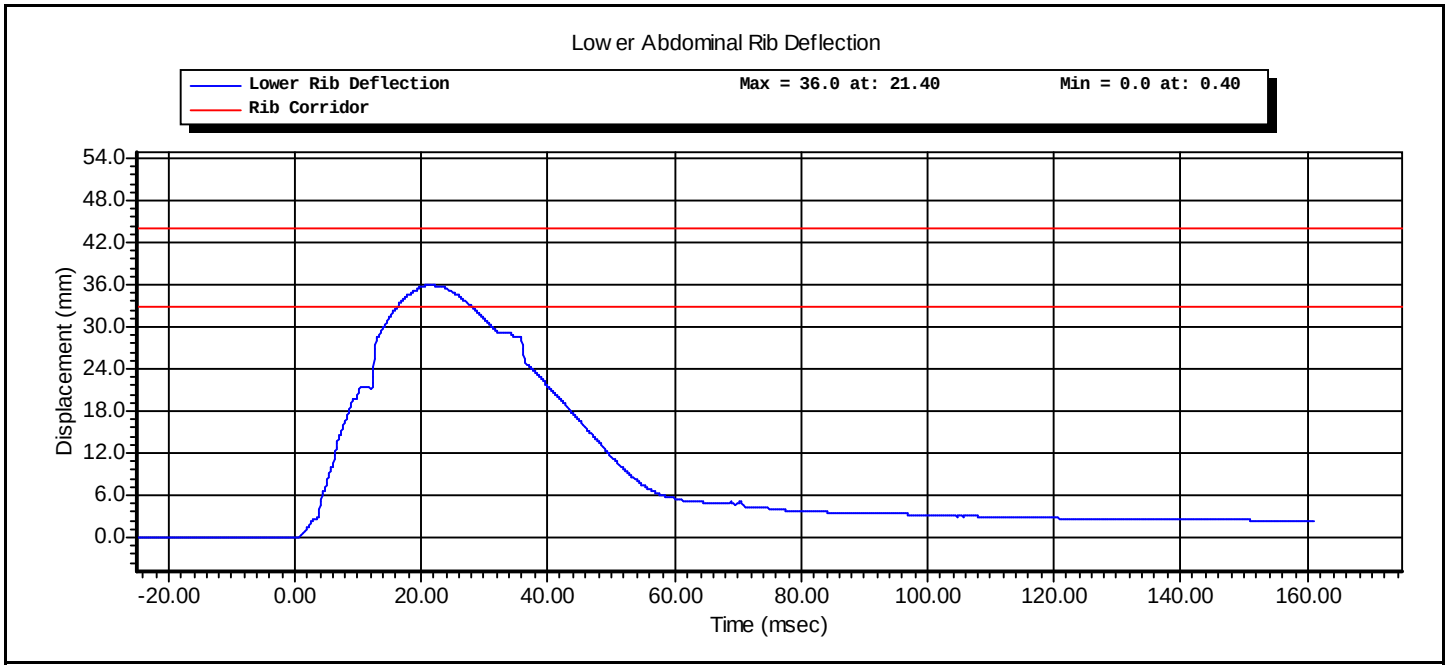
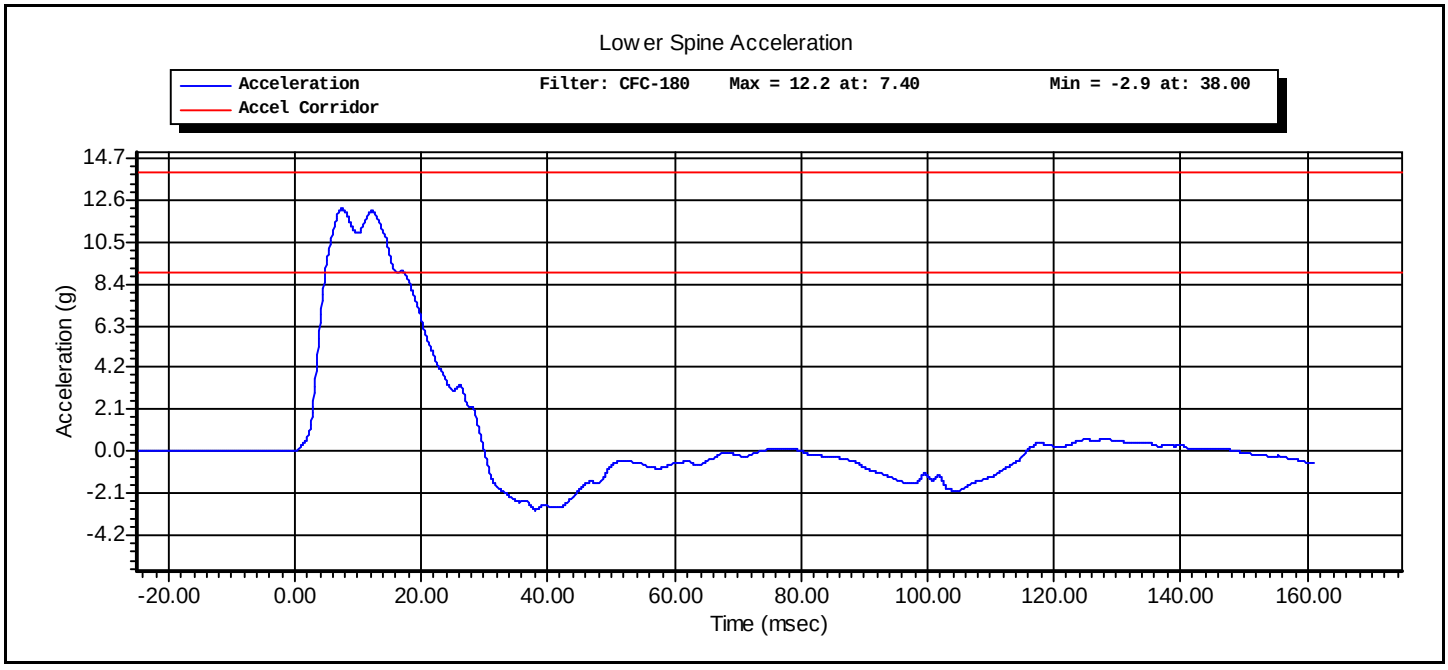
Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Abdomen**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**2:02:37 PM**









Test ID: **Abdomen** Test Time: **2:02:37 PM** Test Date: **10/20/2010**

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VERIFICATION REPORT

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Pelvis Iliac**	Test Date:	**10/20/2010**
Test Number:	**2**	Test Time:	**10:31:18 AM**

Comments:

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.2**	deg C	P
Humidity	10	--	70	**32**	%RH	P
Velocity	4.20	--	4.40	**4.28**	m/s	P
Peak Probe Acceleration	36.0	--	45.0	**43.6**	g	P
Peak Pelvis Acceleration	28.0	--	39.0	**38.1**	g	P
Peak Iliac Force	4.10	--	5.10	**4.93**	kN	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P51671**	**10/12/2010**
DentonATD	**3228J**	**LC-279 Fy**	**4/12/2010**

Test ID: **Pelvis Iliac** Test Time: **10:31:18 AM** Test Date: **10/20/2010**

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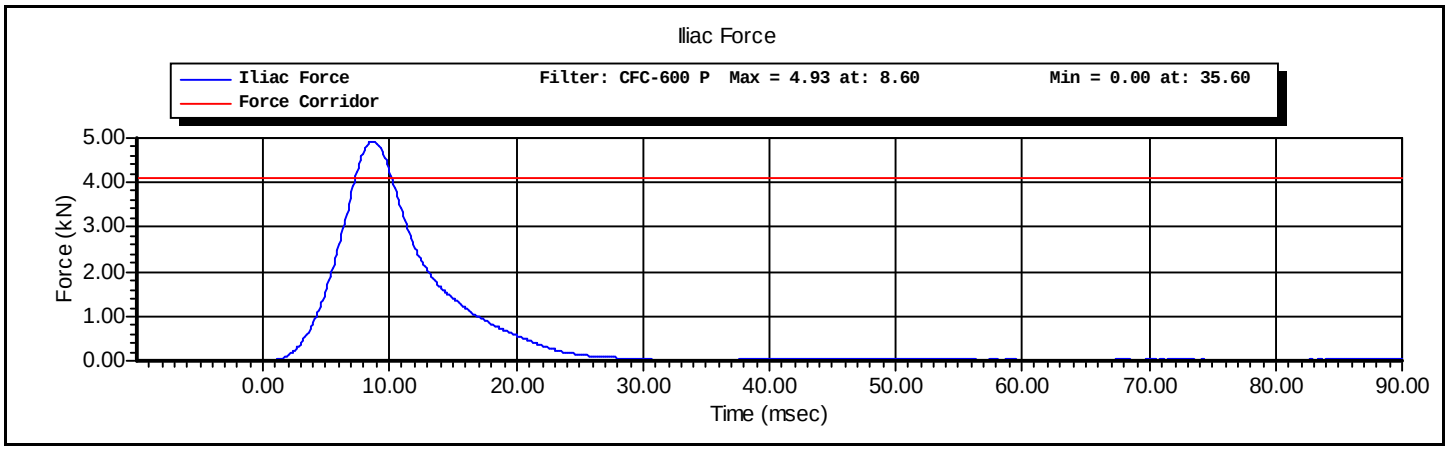
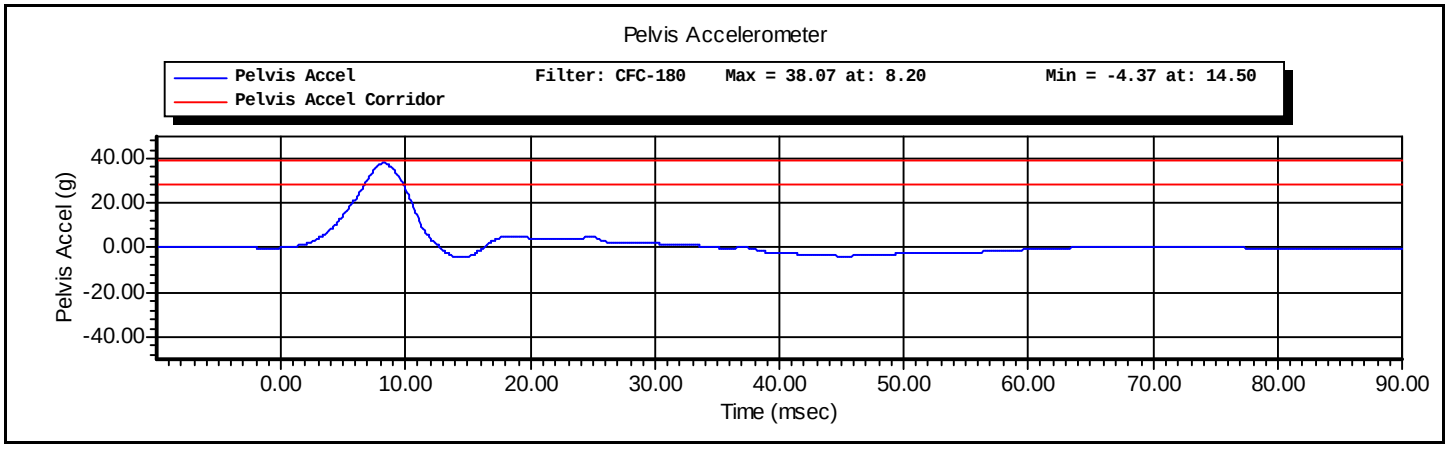
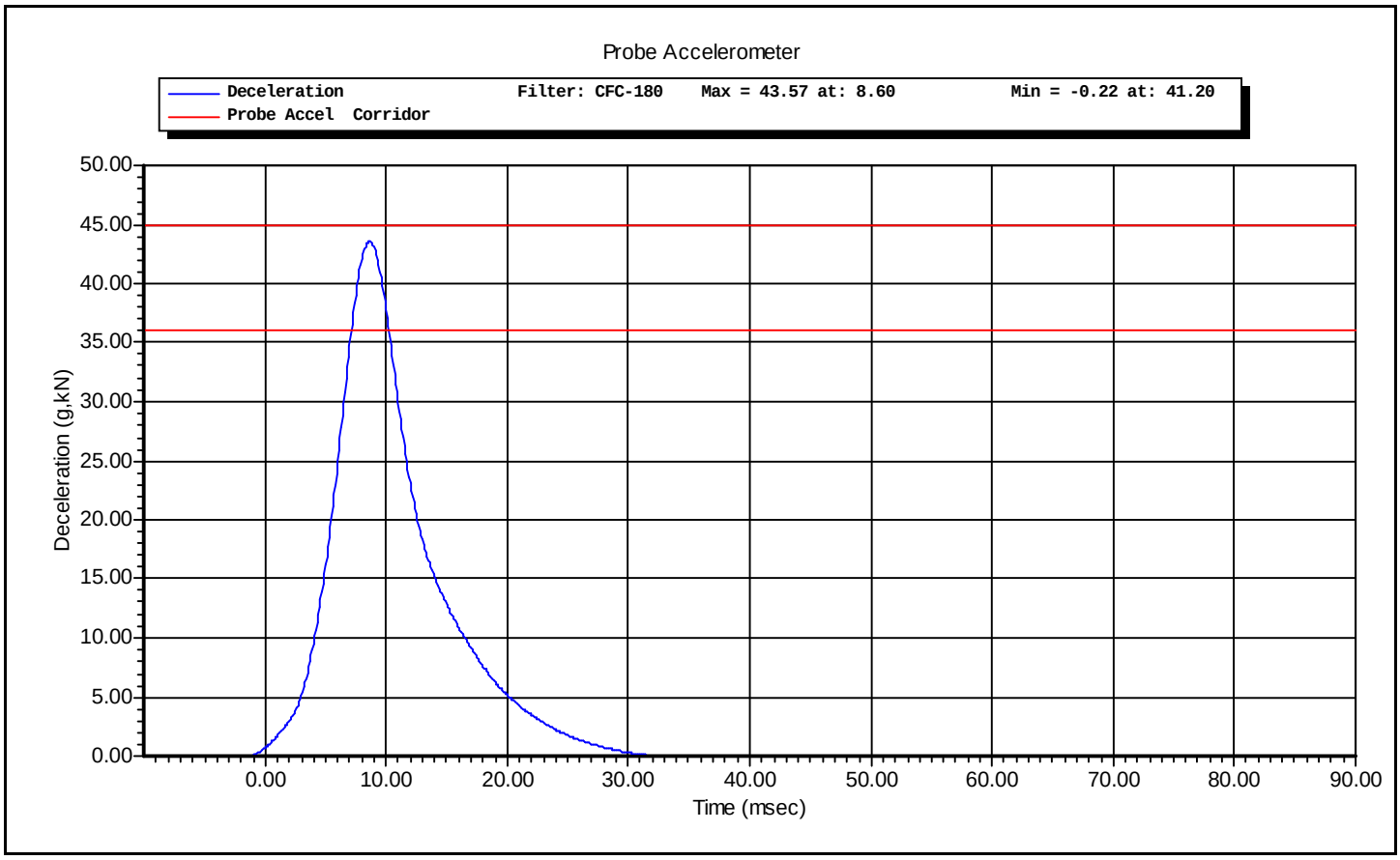
Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 300**		
Test ID:	**Pelvis Iliac**	Test Date:	**10/20/2010**
Test Number:	**2**	Test Time:	**10:31:18 AM**







Test ID: **Pelvis Iliac** Test Time: **10:31:18 AM** Test Date: **10/20/2010**

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VERIFICATION REPORT

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Pelvis Acetabulum**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**11:49:44 AM**

Comments:

Pelvis Plug Used for Certification:
FTSS S/N 12761
Force @ 3mm = 1499N

Pelvis Plug Used for Full Scale Test:
FTSS S/N 12574
Force @ 3mm = 1509N

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.8**	deg C	P
Humidity	10	--	70	**33**	%RH	P
Velocity	6.60	--	6.80	**6.64**	m/s	P
Peak Probe Acceleration	38.0	--	47.0	**45.6**	g	P
Peak Pelvis Acceleration	34.0	--	42.0	**41.5**	g	P
Peak Acetabulum Force	3.60	--	4.30	**3.94**	kN	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P51671**	**10/12/2010**
DentonATD	**3249J**	**LC-275a**	**4/12/2010**

Test ID: **Pelvis Acetabulum** Test Time: **11:49:44 AM** Test Date: **10/20/2010**

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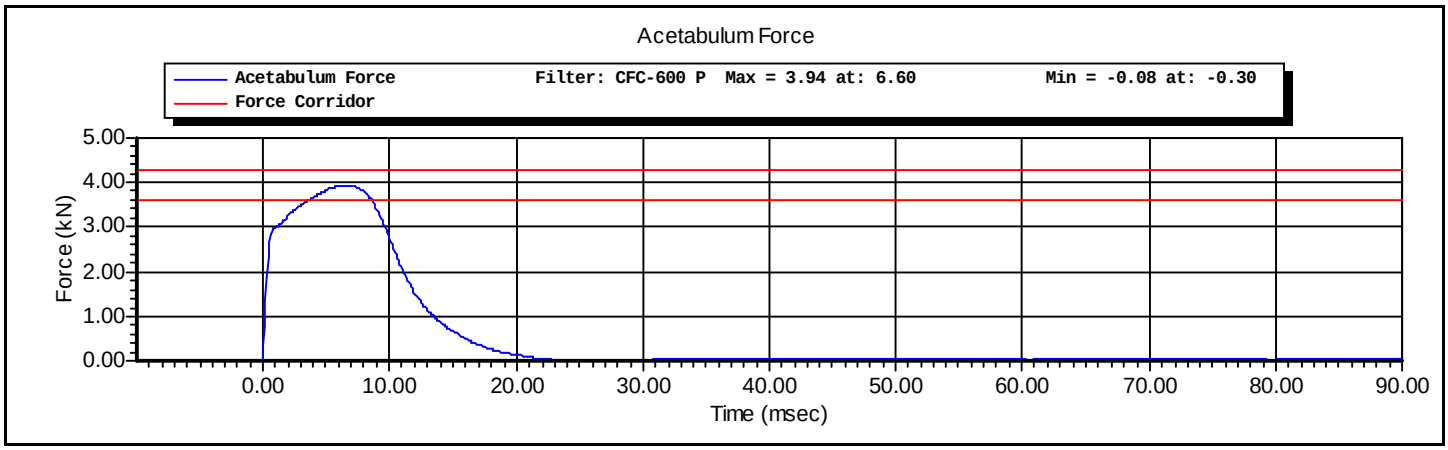
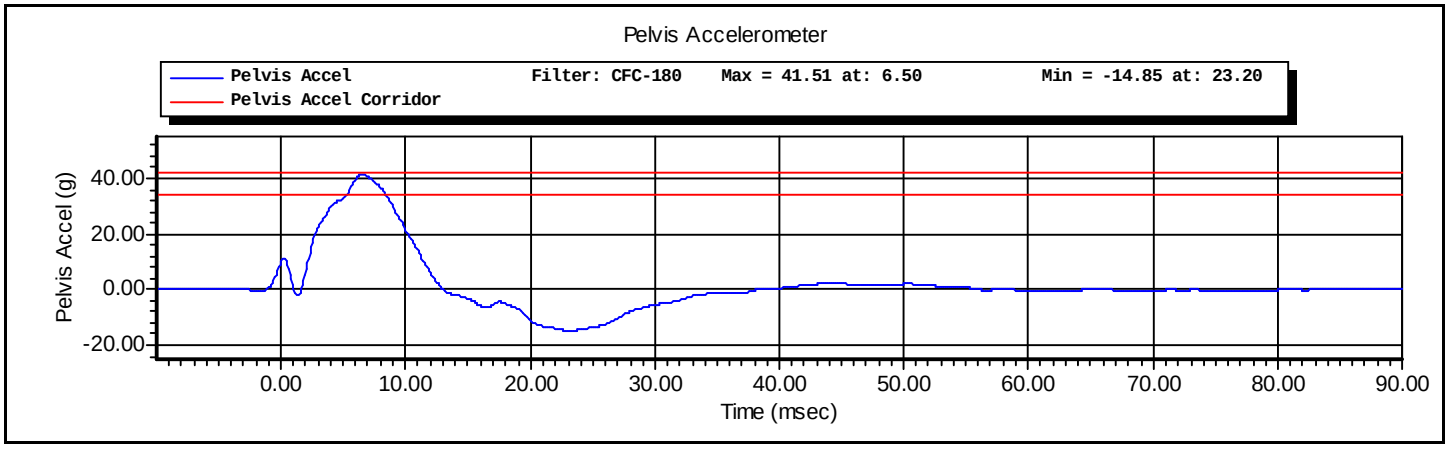
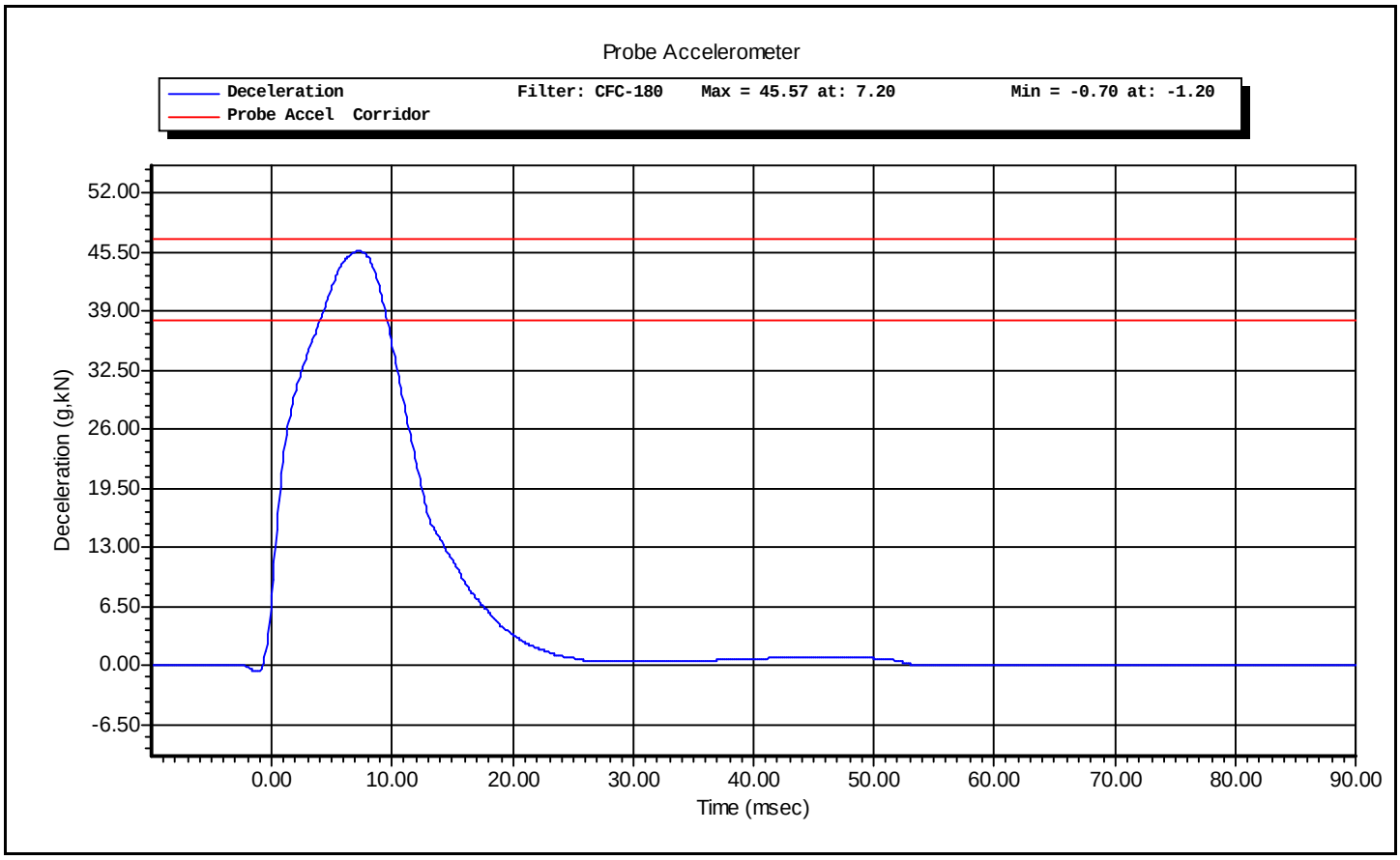
Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**300**		
Test ID:	**Pelvis Acetabulum**	Test Date:	**10/20/2010**
Test Number:	**1**	Test Time:	**11:49:44 AM**

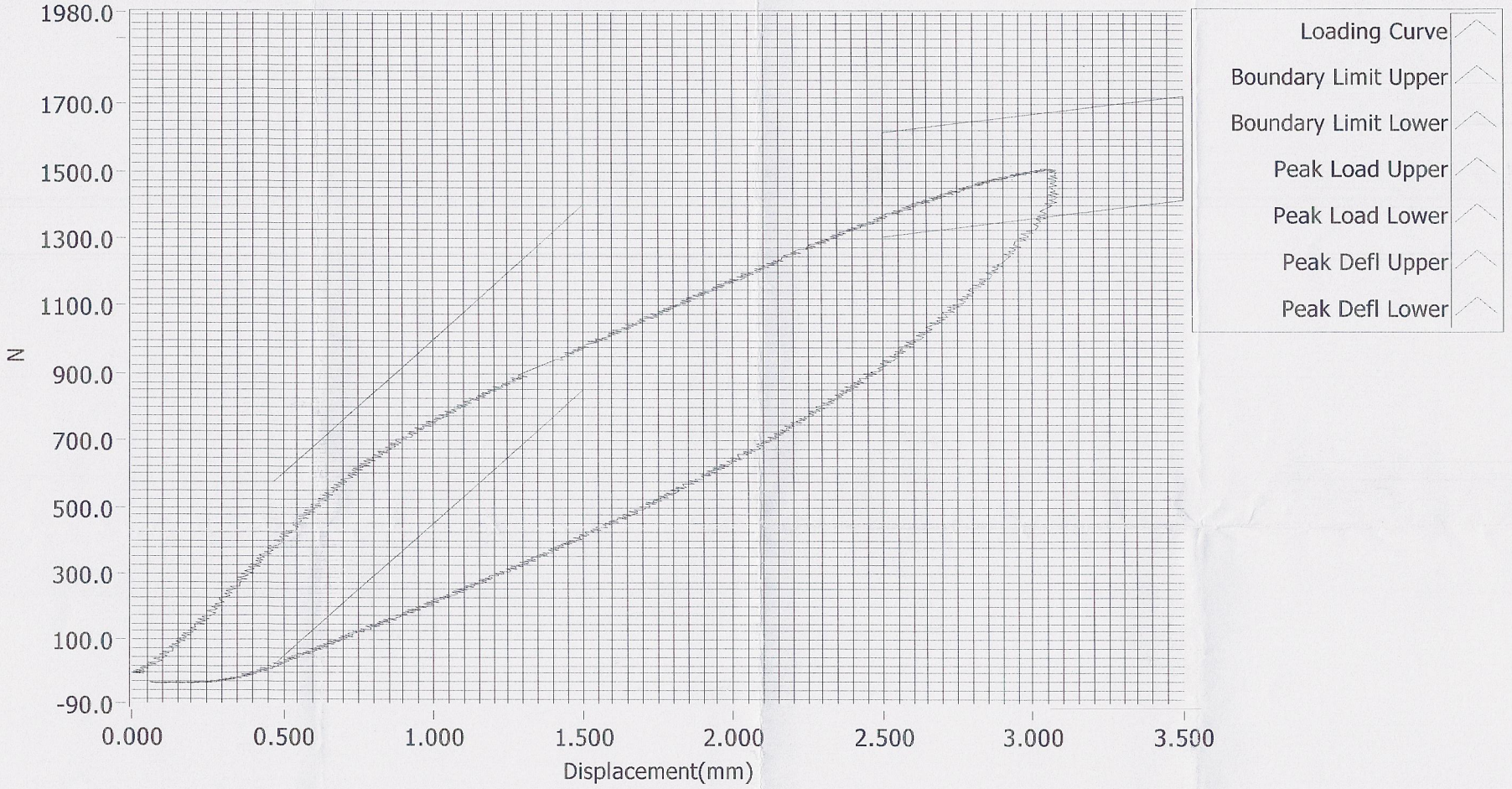






Test ID: **Pelvis Acetabulum** Test Time: **11:49:44 AM** Test Date: **10/20/2010**

Resultant Data - SIDIIs Plug Compression

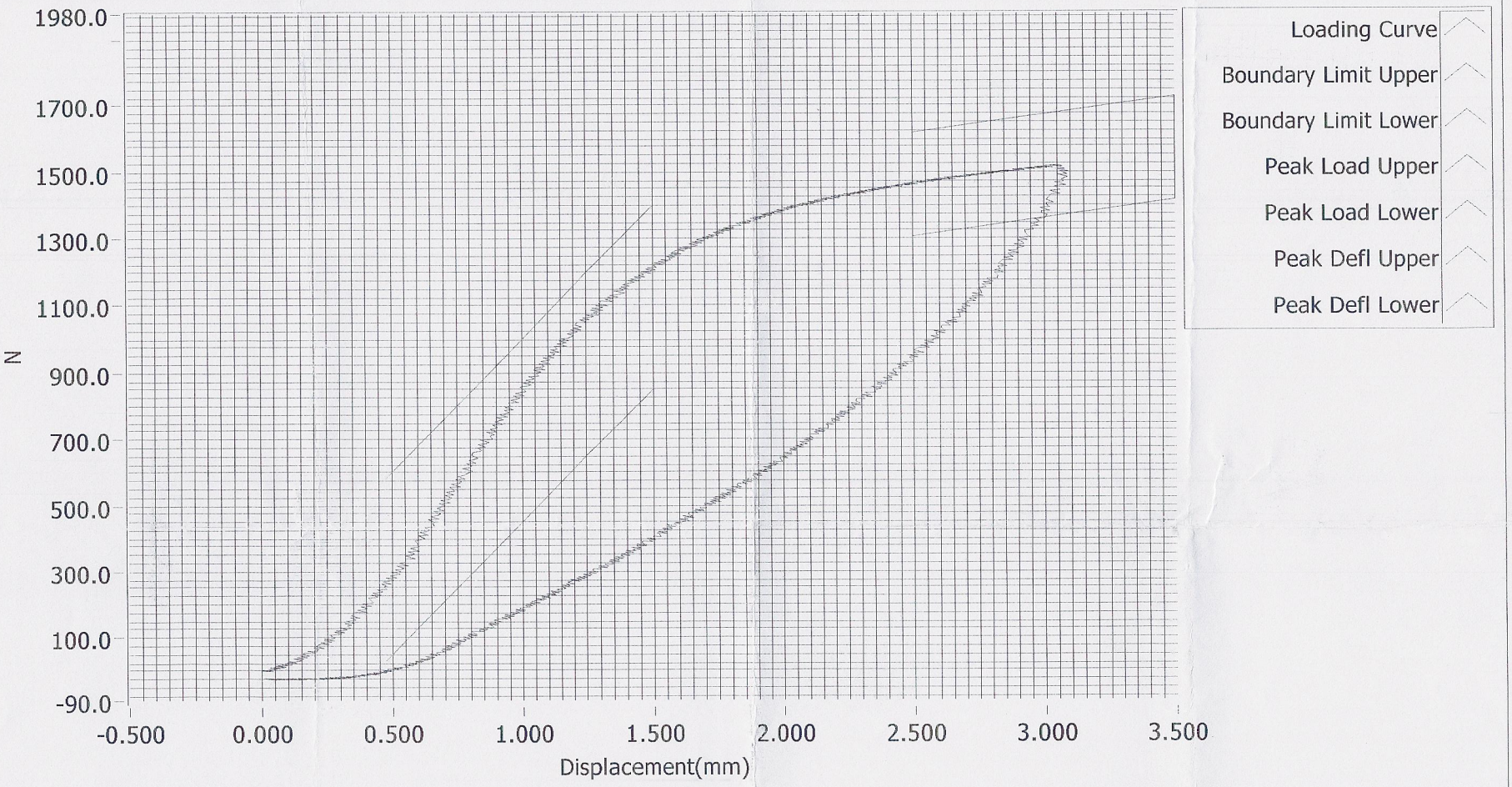


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		7/16/2007	2:38 PM
Cert ID	ATD Serial Number	ATD Type	
	12761	SIDIIs	

Current Date : 7/16/2007 Current Time : 14:40:02

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		7/10/2007	2:43 PM
Cert ID	ATD Serial Number	ATD Type	
	12574	SIDIIs	

Current Date : 7/10/2007 Current Time : 14:44:09

FS