REPORT NUMBER: SNCAP-CAL-11-022

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

Ford Motor Company
2011 Ford Fusion
Four Door Sedan

NHTSA NUMBER: MB0216

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

January 7, 2011

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: _____ Date: _____
Bethany Koetje, Project Engineer

Approved by: _____ Date: _____
David Travale, Program Manager
Transportation Sciences Center

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-11-022	*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 Ford Fusion Four Door Sedan NHTSA No.: MB0216		*5. Report Date* 1/7/2011 *6. Performing Organization Code* CAL
7. Author(s) Bethany Koetje, Project Engineer		*8. Performing Organization Report No.* tr2501
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, 1/7/2011 *14. Sponsoring Agency Code* NVS-111
15. *Supplementary Notes*		

16. Abstract

A 55/28 kph 90^0 Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Ford Fusion Four Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on 10/28/2010.

The impact velocity of the Moving Deformable Barrier (MDB) was 61.85 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 281 mm at level 3. 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	181.72
Maximum Chest Deflection	mm	44	26.29
Total Abdominal Force	N	2500	1124.85
Pubic Symphysis Force	N	6000	2134.10
	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	326.82
Lower Spine Resultant Acceleration	G	82	76.98
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4779.72

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

TABLE OF CONTENTS

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 Ford Fusion Four Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Ford Fusion Four Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.85 km/h (38.43 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 10/28/2010. 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 9 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 Potentiometers
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	181.72
Maximum Chest Deflection	mm	44	26.29
Total Abdominal Force	N	2500	1124.85
Pubic Symphysis Force	N	6000	2134.10

	Passenger ATD (SID-IIs)		
Measurement Description	**Units**	**Threshold**	**Result**
Head Injury Criteria (HIC_{36})	N/A	1000	326.82
Lower Spine Resultant Acceleration	G	82	76.98
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4779.72

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
Side Torso/Pelvis Airbag	Yes	Yes	NA	NA
Seat Belt Pretensioner	Yes	Yes	NA	NA
Seat Belt Load Limiter	Yes	No	NA	NA

GENERAL COMMENTS

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB0216
Model Year	2011
Make	Ford
Model	Fusion
Body Style	Four Door Sedan
VIN	3FAHP0GA4BR126223
Body Color	Maroon
Delivery Date	9/22/2010
Odometer Reading (km/mi)	145/90
Dealer	Van Bortel Ford
Transmission	6-Speed Automatic
Final Drive	Front Wheel Drive
Type/No. Cylinders	Inline 4
Engine Displacement (L)	2.4
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	No
All-Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	Yes
Bucket Seats	Yes
Tilt Steering	Yes
Other	--
Other	

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	8/10

GVWR (kg)	1991
GAWR Front (kg)	1063
GAWR Rear (kg)	928

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				385.0	(A)
DSC x 68.04 (kg)				340.2	(B)
Cargo Weight (RCLW) (kg)				45	(A-B)

* Maximum allowable RCLW is 136 kg

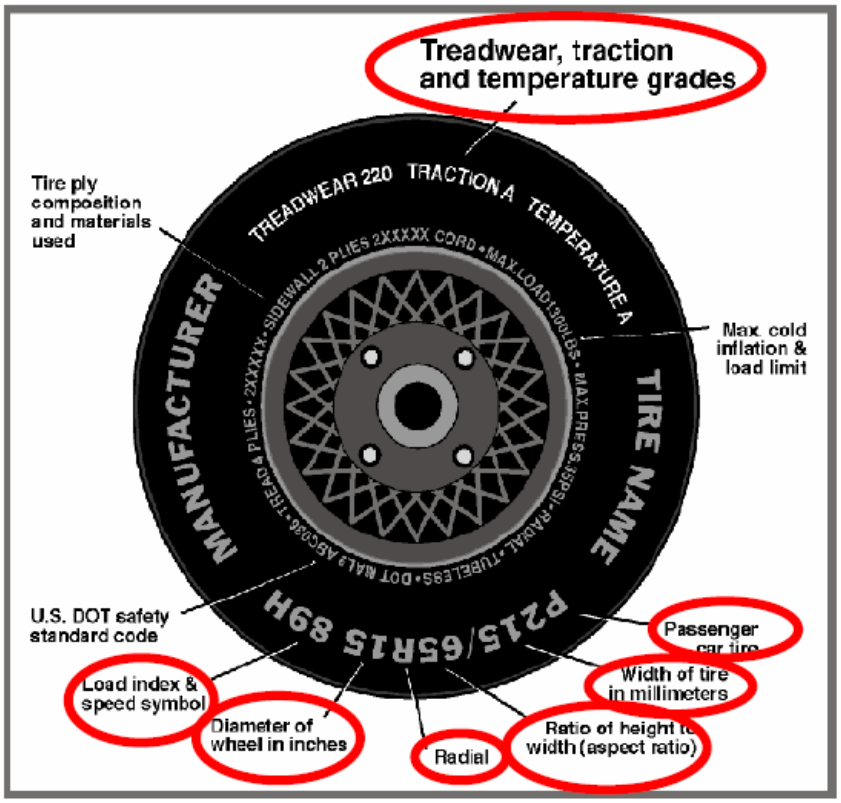
VEHICLE SEAT TYPE

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		X	
Third row seat							

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

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**

VEHICLE TIRE INFORMATION



	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	235	235
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Assurance	Assurance
Treadwear	580	580
Traction	a	a
Temperature Grades	a	a
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 steel, 1 Nylon
Load Index/Speed Symbol	91h	91h
Tire Material	Rubber	Rubber
DOT Safety Code Right	4BXVJA2R3010	4BXVJA2R3010
DOT Safety Code Left	4BXVJA2R3010	4BXVJA2R3010

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

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	464	293	757	502	372	874	502	382	884
Right	kg	443	297	740	442	352	794	449	350	799
Ratio	%	61	39		57	43		56	44	
Totals	kg	907	590	1497	944	724	1668	951	732	1683

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1497	(A)
Sum of Actual Weight of 2 P572 ATDS Used	kg	136.1	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1677	(A+B+C)

TEST VEHICLE ATTITUDE AND CG

Measurement Description	Units	LF	RF	RR	LR	CG (aft of front axle)
Fully Loaded	mm	697	710	699	685	
As Tested (Fully Loaded ± 10 mm at each wheel well)	mm	694	708	692	680	1184

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2730
Total Vehicle Length at Left Side	mm	4763
Total Vehicle Length at Centerline	mm	4843
Total Vehicle Length at Right Side	mm	4767
Weight of Ballast in Cargo Area	kg	11
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	60.9

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	420
Actual Impact Point Aft of Front Axle	mm	440

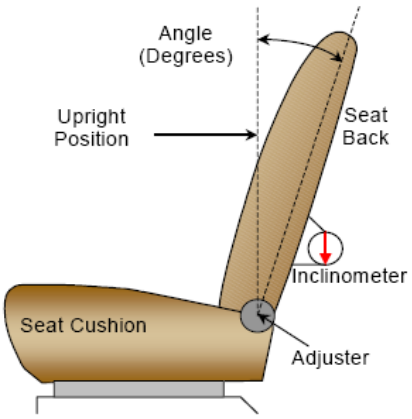
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**

NORMAL DESIGN RIDING POSITION

Driver seat: Driver seat positioned at the Nominal Design Riding Position specified for the 50th percentile male ES2 dummy in Form 1

Passenger Seat: The rear passenger seat back is fixed and cannot be adjusted



FRONT SEAT ASSEMBLY

SEAT BACK ANGLES

	Degrees
Driver w/ Seated Dummy	11
Passenger w/ Seated Dummy	NA

SEAT FORE/AFT POSITIONS

The Driver's seat is positioned at the midpoint of Fore/Aft travel. The Rear Passenger's seat is fixed and is not adjustable in the fore/aft direction

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	236	118
Rear Seat	NA	NA

SEAT BELT UPPER ANCHORAGES

The Driver's upper belt anchorage is placed in the upper most position (detent 0) out of 4 positions. The rear passengers seat belt anchorage is not adjustable

SEAT BELT UPPER ANCHORAGES

	Total # of Positions	Placed in Position #
Driver Seat	4	0
Rear Seat	NA	NA

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

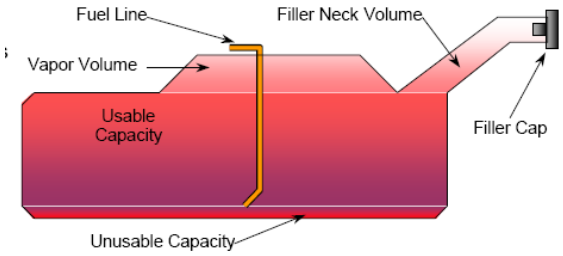
Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	66.2
Usable Capacity of "Optional Tank"	NA
Usable Capacity Used for FMVSS 301	62.9
Actual Amount of Solvent Used	60.9

FUEL PUMP

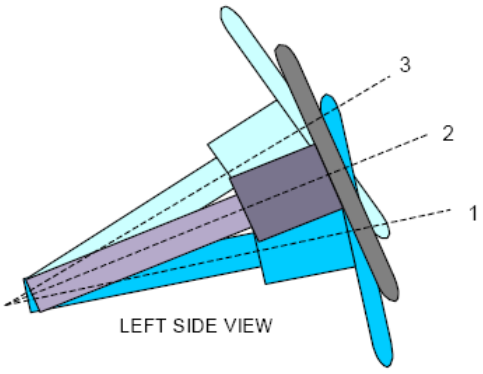
The fuel was removed according to the manufacturers specifications provided in FORM1



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

The steering column was adjusted to the mid-point of the tilt adjustment range and was adjusted to the mid-point of telescoping travel (if applicable)



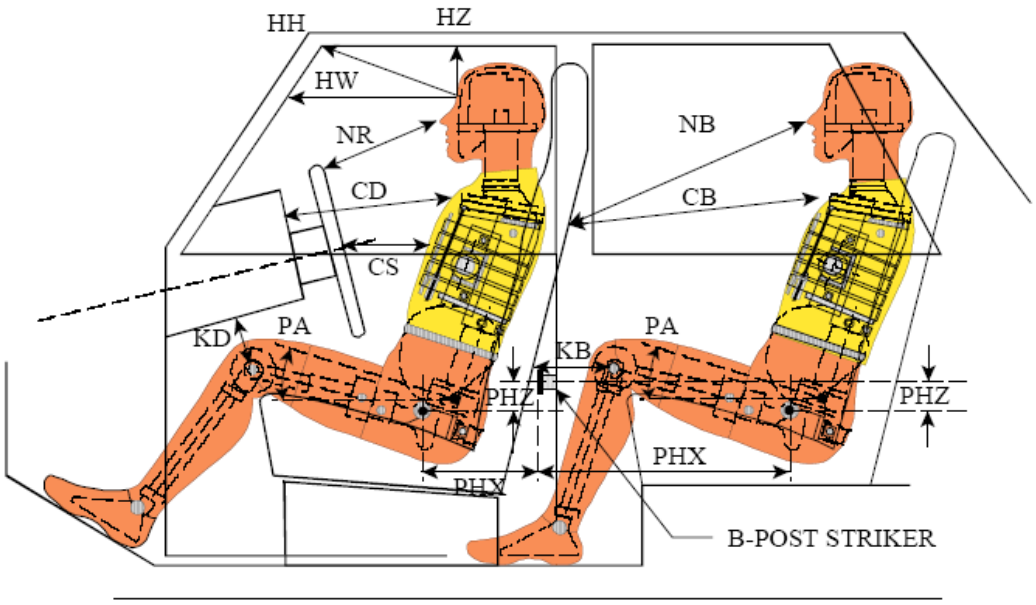
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	-	
Geometric Center – Position 2	67	
Uppermost – Position 3	-	
Telescoping Steering Wheel Travel		30
Test Position	67	15

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**



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

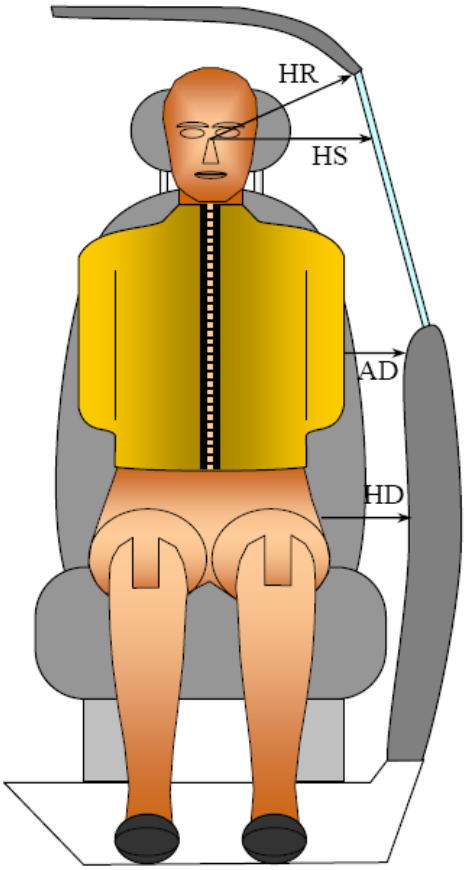
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 033		Passenger S/N 304	
			Length (mm)	Angle	Length (mm)	Angle
HH		Header to Header	298	24		
HW		Header to Windshield	561	0		
HZ	HZ	Head to Roof	155	90	270	90
NR	NB	Nose to Rim/Seat Back	382	-12	612	-7
CD	CB	Chest to Dash/Seat Back	564	6	605	10
CS		Chest to Steering Wheel	284	0		
KDL	KBL	Left Knee to Dash/Seat Back	169	13	318	16
KDR	KBR	Right Knee to Dash/Seat Back	140	28	325	16
PA	PA	Pelvic Angle		22		21
PHX	PHX	H-Point to Striker (X-Axis)	178		270	
PHZ	PHZ	H-Point to Striker (Z-Axis)	142		346	
SA	SA	Seat Back Angle		11 *		NA

* Measurement on the head restraint post

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**

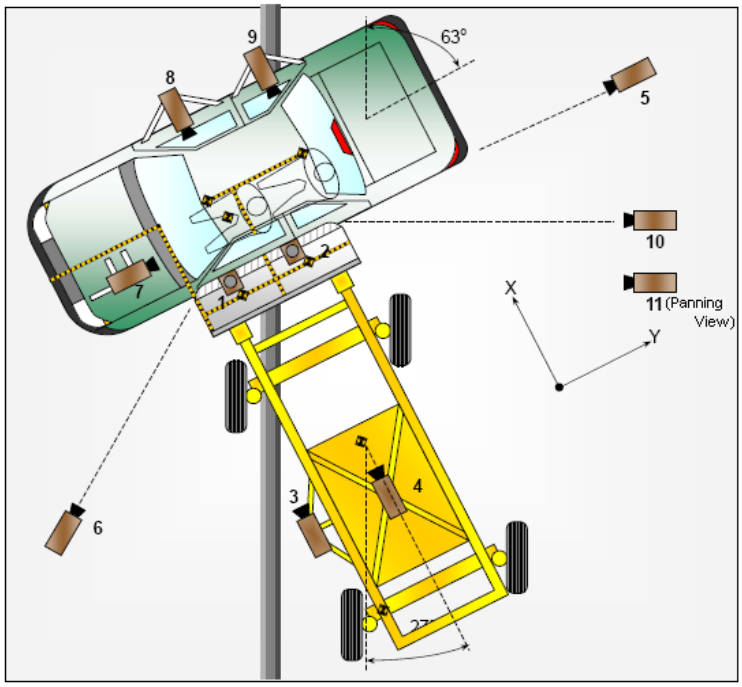


DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Description	Units	Driver S/N 033	Passenger S/N 304
HR	Head to Side Header	mm	193	244
HS	Head to Side Window	mm	339	369
AD	Arm to Door	mm	102	158
HD	H-point to Door	mm	146	163

DATA SHEET NO. 5
CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010



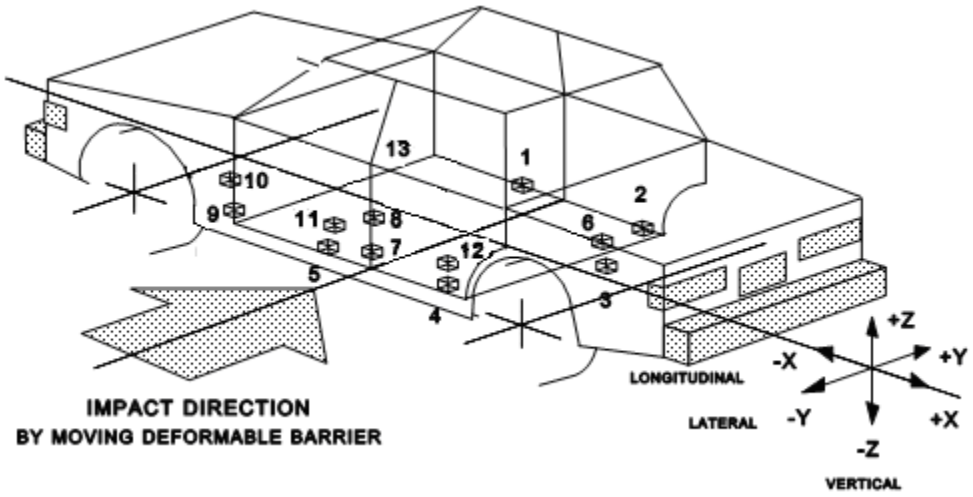
CAMERA LOCATIONS AND DATA

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 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010



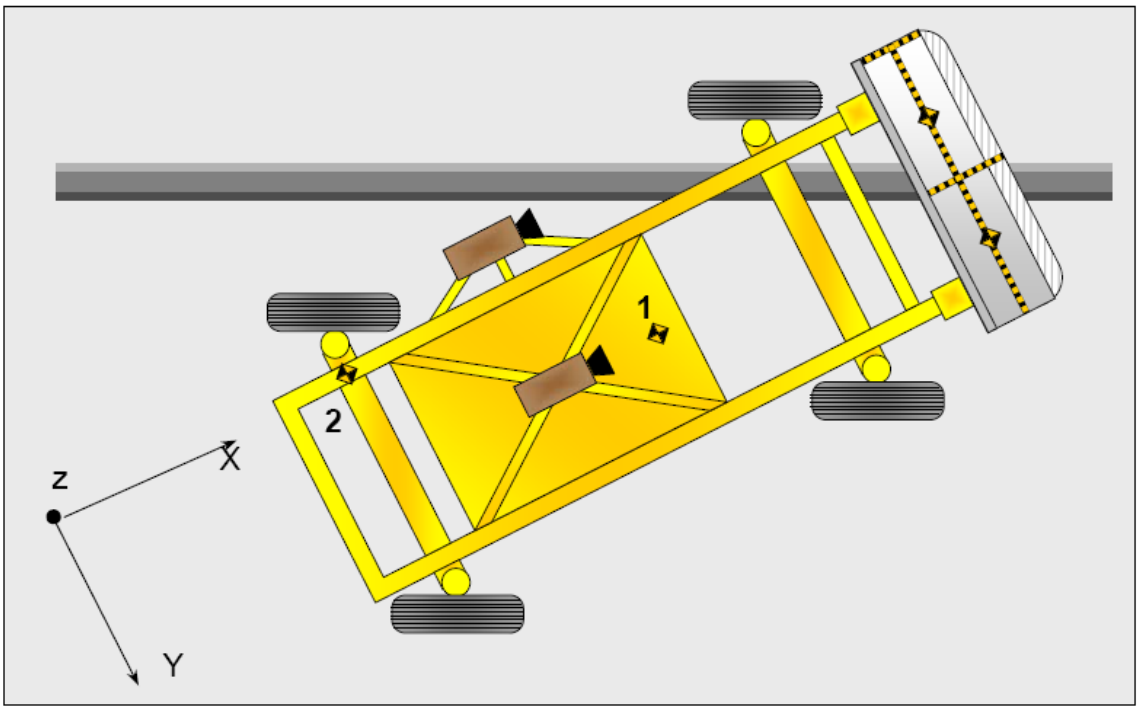
VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3036	636	398
2	Right Sill at Rear Seat	2007	627	364
3	Rear Floorpan Above Axle	2020	322	532
4	Left Sill at Rear Door	1964	-618	362
5	Left Sill at Front Door	2954	-622	383
6	Rt. Rear Occ. Compartment	2227	247	351
7	B-Post Lower	2244	-688	498
8	B-Post Middle	2220	-680	954
9	A-Post Lower	3294	-668	513
10	A-Post Middle	3205	-662	1127
11	Front Seat Track	2347	-555	395
12	Rear Seat Structure	1116	-564	814
13	Vehicle CG	2728	-18	668

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 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side NCAP**	**Test Date:**	**10/28/2010**



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 Ford Fusion** **NHTSA No.:** **MB0216**
Test Program: **Side NCAP** **Test Date:** **10/28/2010**

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	186	441
2	Occupant H-Point	mm	267	622
3	Mid Door	mm	281	761
4	Window Sill	mm	229	1005
5	Window Top	mm	21	1507
	Maximum Penetration	mm	281	761

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 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

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	61.85
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.85
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum
Row	Description	Height	Distance	Direction	Crush
A	Center of Bumper	430	800	Right	217
B	Top of Bumper	542	800	Left	108
C	Mid-Level	682	800	Left	82
D	Top of Stack	811	800	Left	98

MDB INSTRUMENTATION

Accelerometers	5
Contact Switches	2

DATA SHEET NO. 10
POST TEST OBSERVATIONS

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side NCAP **Test Date:** 10/28/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Dummy Type/Serial No.	033	304
Head Contact	Curtain Airbag	Curtain Airbag
Upper Torso Contact	Seat Bolster -Torso / Pelvis Airbag	Rear Door Panel Trim
Lower Torso Contact	Seat Bolster -Torso / Pelvis Airbag	Rear Door Panel Trim
Left Knee Contact	Door Trim Panel	Rear Door Panel Trim
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	None	None
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	B-pillar intruded inboard due to side impact
Sill Separation	None
Windshield Damage	None
Window Damage	Driver and left rear passenger windows broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

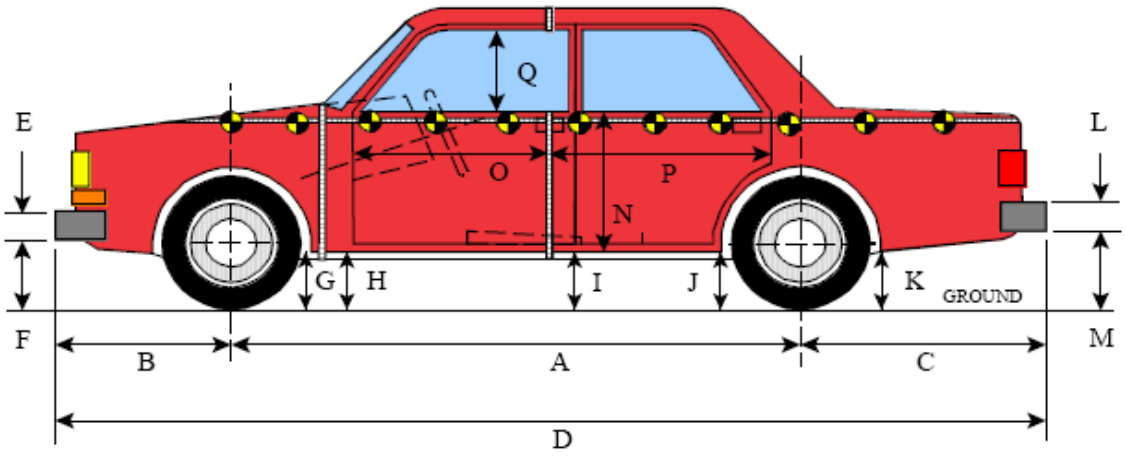
Restraint Type	**Left Front (Driver) Occupant Location 1**		**Left Rear (Passenger) Occupant Location 4**	
	Mounted	**Deployed**	**Mounted**	**Deployed**
Frontal Airbag	Yes	No		
Knee Airbag	No	NA		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes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

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-20
Vertical Offset	mm	+/- 20	-6

DATA SHEET NO. 11
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010



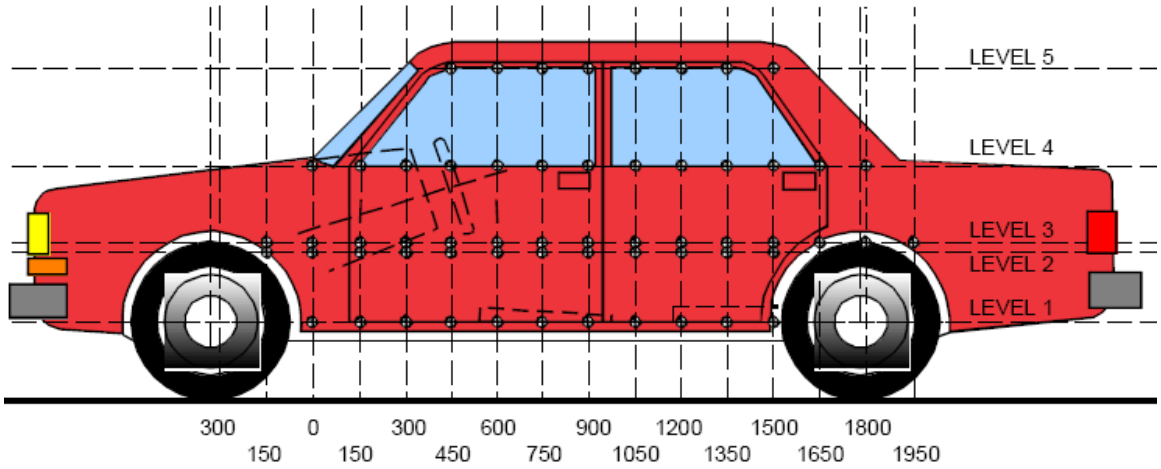
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2730	2701	-29
B	Front Axle to FSOV	1013	1020	7
C	Rear Axle to RSOV	1109	1113	4
D	Total Length at Centerline	4843	4834	-9
E	Front Bumper Thickness	280	280	0
F	Front Bumper Bottom to Ground	225	226	1
G	Sill Height at Front Wheel Well	182	184	2
H	Sill Height at Front Door Leading Edge	182	186	4
I	Sill Height at B Pillar	188	226	38
J1	Sill Height at Rear Wheel Well	187	205	18
J2	Pinch Weld Height at Rear Wheel Well	159	158	-1
K	Sill Height Aft of Rear Wheel Well	200	203	3
L	Rear Bumper Thickness	344	344	0
M	Rear Bumper Bottom to Ground	281	290	9
N	Sill Height to Window Bottom Sill	696	645	-51
O	Front Door Leading Edge to Impact CL	835	718	-117
P	Rear Door Trailing Edge to Impact CL	1062	1045	-17
Q	Front Window Opening	430	426	-4
R	Right Side Length	4767	4755	-12
S	Left Side Length	4763	4745	-17
T	Vehicle Width at B Post	1819	1606	-213

DATA SHEET NO. 12
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side NCAP**	**Test Date:**	**10/28/2010**



LEFT SIDE VIEW

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	441
2	Occupant H-Point	622
3	Mid-Door	761
4	Window Sill	1005
5	Window Top	1507

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 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-300	--	--	--	816	--	--	--	--	814	--	--	--	--	2	--
-150	--	--	914	832	--	--	--	897	826	--	--	--	17	6	--
0	887	905	905	844	--	865	883	882	835	--	22	22	23	9	--
150	887	896	904	854	--	771	727	738	788	--	116	169	166	66	--
300	886	896	906	859	--	757	668	671	765	--	129	228	235	94	--
450	886	896	907	865	--	742	654	660	741	--	144	242	247	124	--
600	885	896	908	872	--	730	651	678	716	--	155	245	230	156	--
750	884	896	909	877	--	720	646	670	693	--	164	250	239	184	--
900	883	896	909	880	579	705	641	669	676	579	178	255	240	204	0
1050	882	897	909	884	592	696	630	673	697	586	186	267	236	187	6
1200	878	895	907	886	597	693	630	659	706	583	185	265	248	180	14
1350	875	891	905	887	600	708	635	648	664	579	167	256	257	223	21
1500	869	888	902	886	600	716	631	635	657	583	153	257	267	229	17
1650	865	884	898	884	598	733	635	617	656	590	132	249	281	228	8
1800	860	881	894	883	590	785	688	635	674	591	75	193	259	209	-1
1950	--	886	895	888	569	--	832	760	776	571	--	54	135	112	-2
2100	--	--	--	887	--	--	--	--	851	--	--	--	--	36	--
2250	--	--	--	864	--	--	--	--	843	--	--	--	--	21	--
2400	--	--	--	854	--	--	--	--	841	--	--	--	--	13	--
2550	--	--	--	841	--	--	--	--	836	--	--	--	--	5	--
2700	--	--	--	824	--	--	--	--	826	--	--	--	--	-2	--
2850	--	--	--	801	--	--	--	--	809	--	--	--	--	-8	--

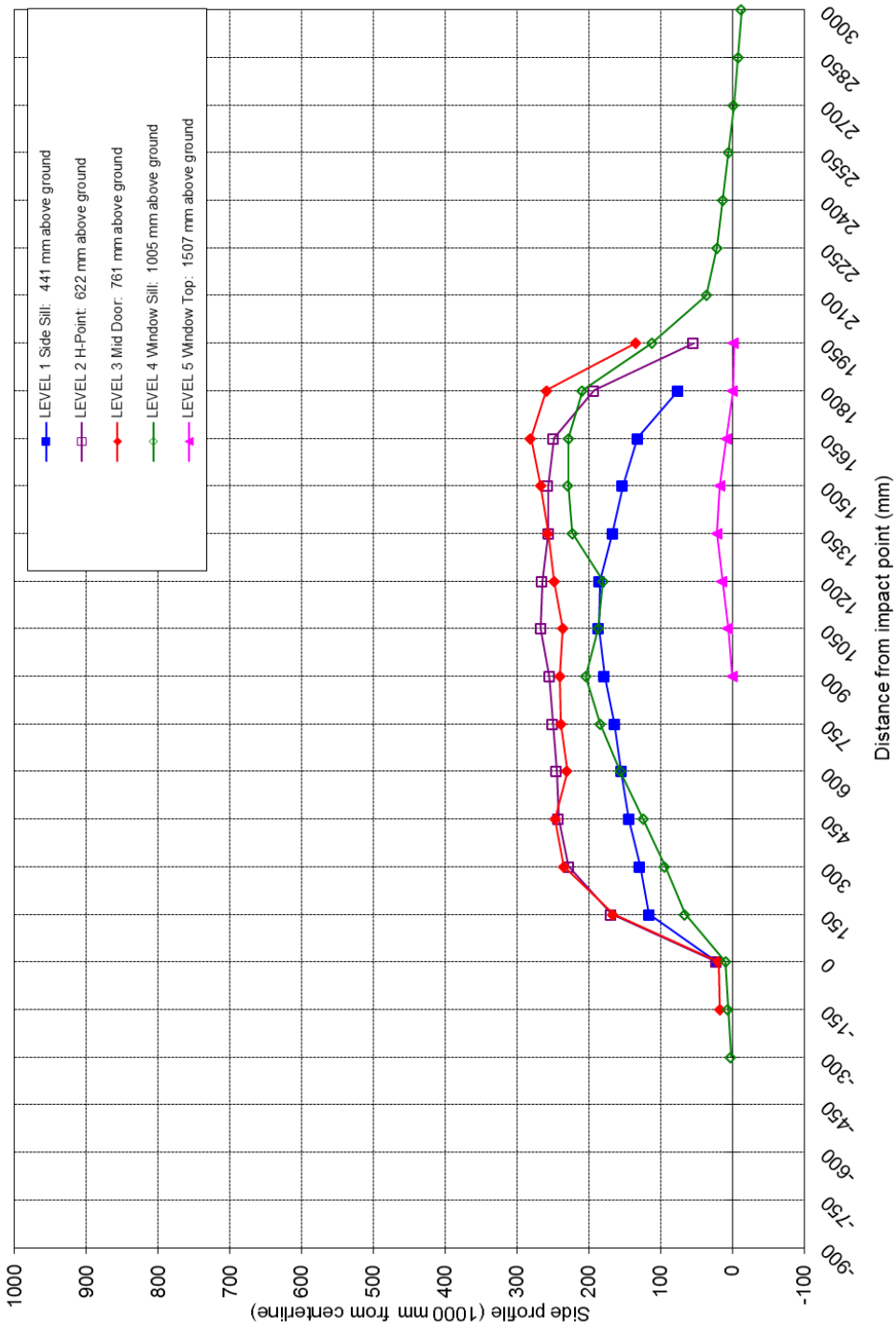
MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	186	267	281	229	21
Distance From Impact (mm)	1050	1050	1650	1500	1350

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.

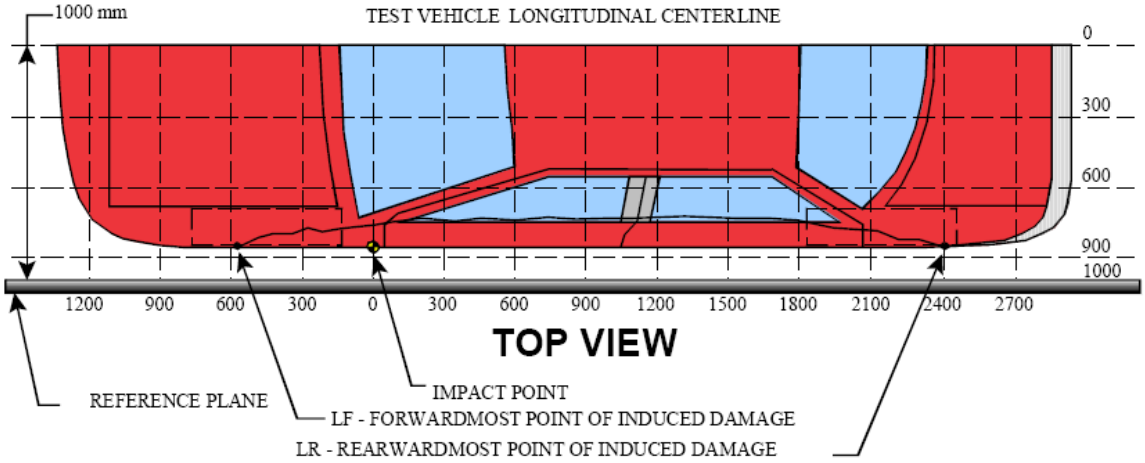
DATA SHEET NO. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**



DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

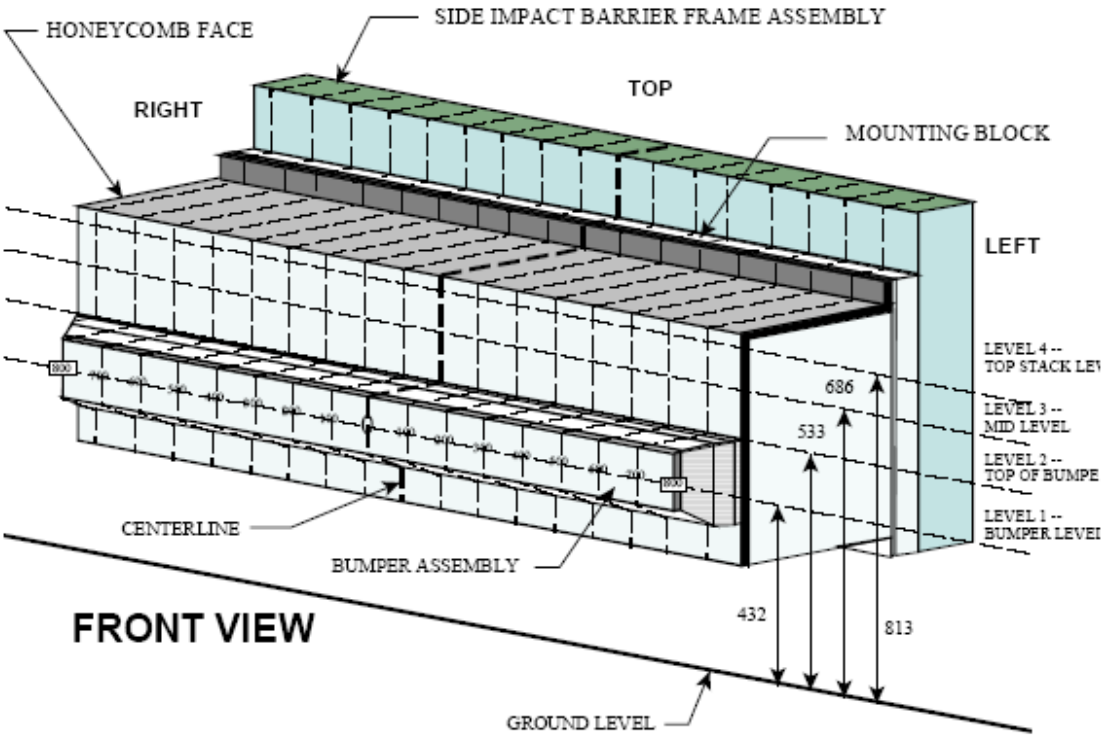


DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Maximum Static Crush (mm)
1	2550	4	159	164	5
2	2010	4	112	194	82
3	1470	3	97	362	265
4	930	2	104	361	257
5	0	3	93	336	243
6	-150	3	86	103	17

DATA SHEET NO. 14
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle:	**2011 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**



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	217	175	148	134	127	126	125	126	124	121	121	123	126	128	133	144	161
2	105	105	86	84	79	72	71	75	73	74	79	81	84	86	91	101	108
3	35	18	13	17	21	30	54	59	41	25	18	19	21	25	31	44	82
4	51	17	10	14	26	50	86	75	63	48	27	19	30	38	56	77	98

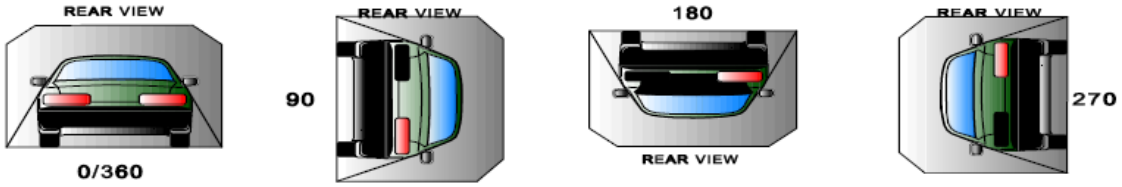
DATA SHEET NO. 15A
FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Ford Fusion **NHTSA No.:** MB0216
Test Program: Side MDB NCAP **Test Date:** 10/28/2010

Test Time: 2:00pm **Temperature:** 22° 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	1:14	5:00	6:14
90 to 180	1:03	5:00	6:03
180 to 270	1:04	5:00	6:04
270 to 360	1:09	5:00	6:09

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

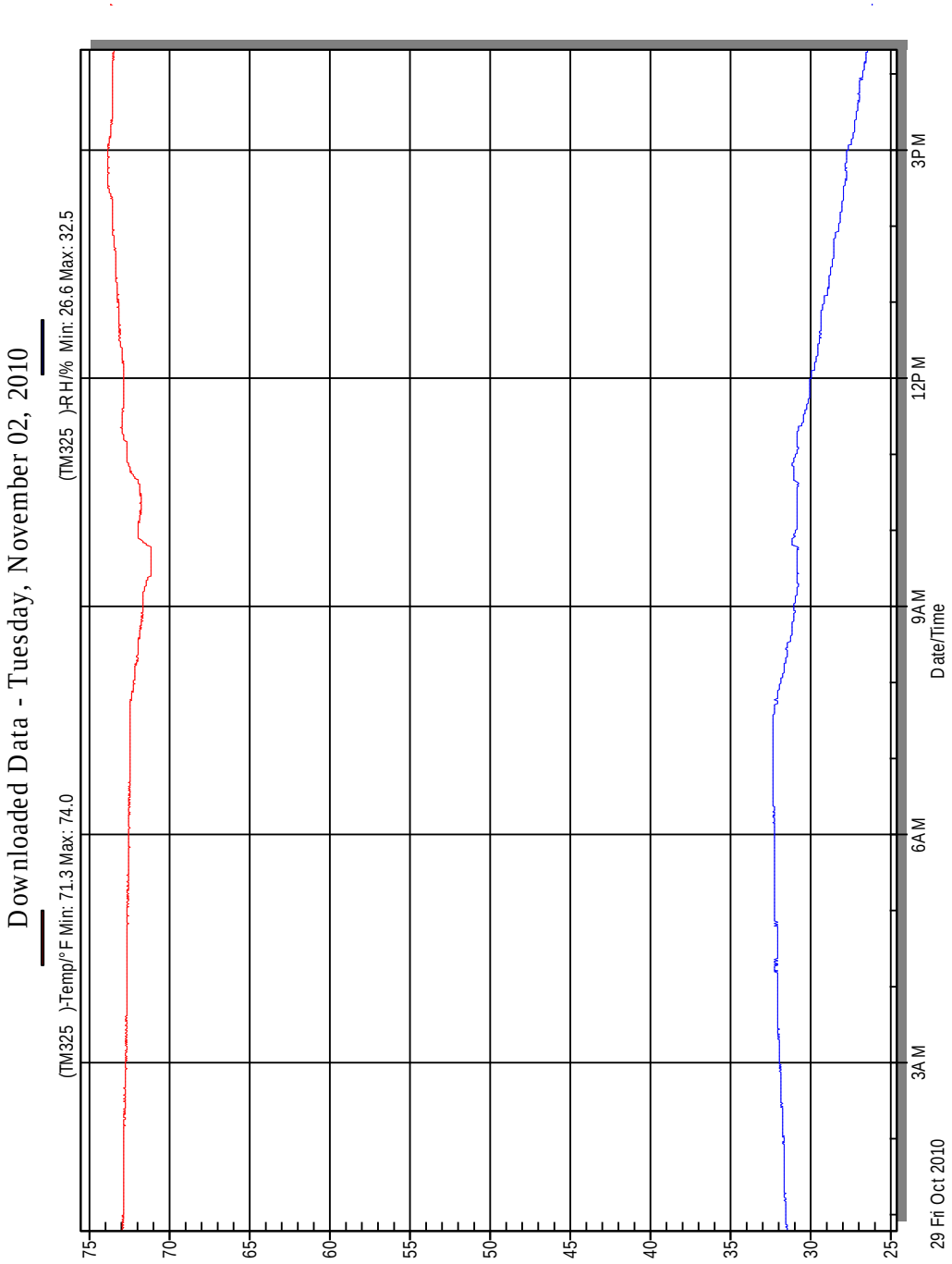
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	None	None	NA	NA
90 to 180	None	None	NA	NA
180 to 270	None	None	NA	NA
270 to 360	None	None	NA	NA

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 Ford Fusion**	**NHTSA No.:**	**MB0216**
Test Program:	**Side MDB NCAP**	**Test Date:**	**10/28/2010**



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

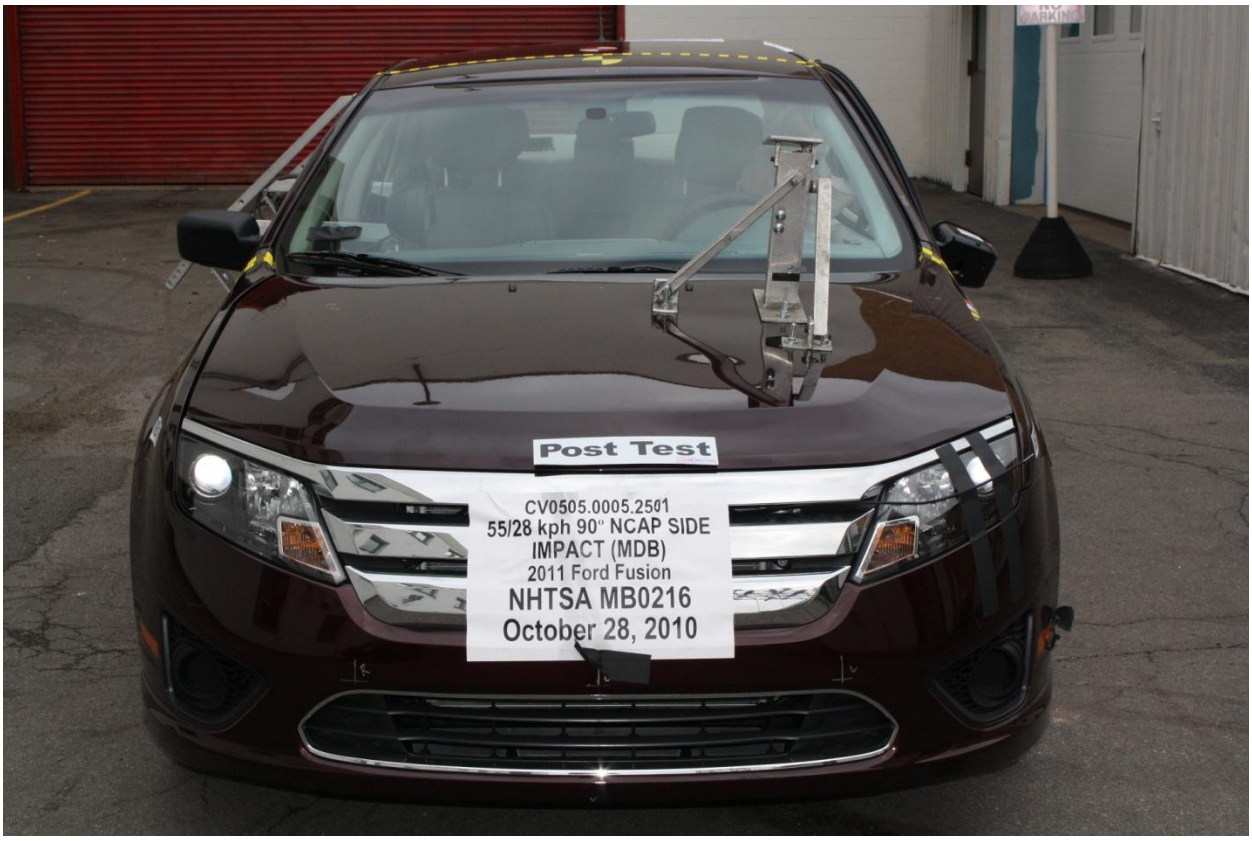


Figure A-4: Post-Test Frontal View of Test Vehicle

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

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

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

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

Figure A-9: Pre-Test Left Rear ¾ View of Test Vehicle

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

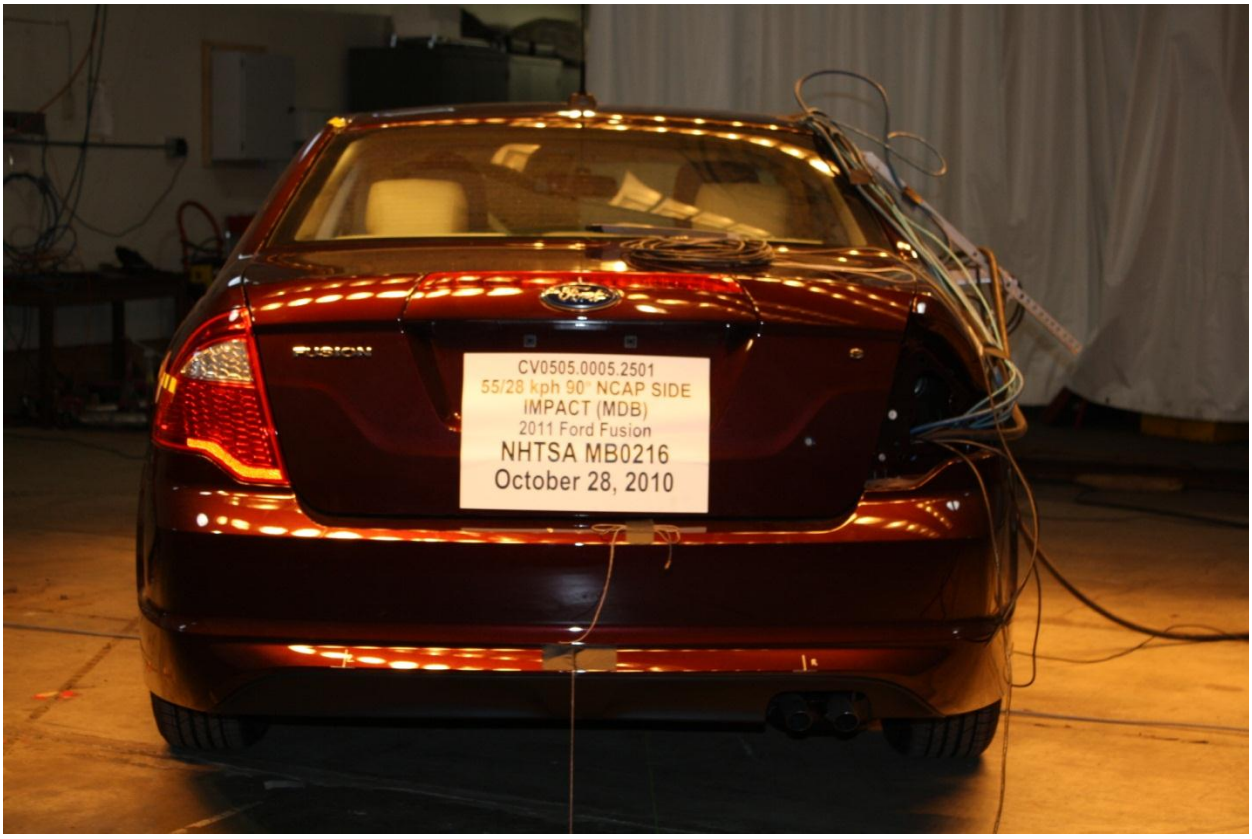


Figure A-11: Pre-Test Rear View of Test Vehicle

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

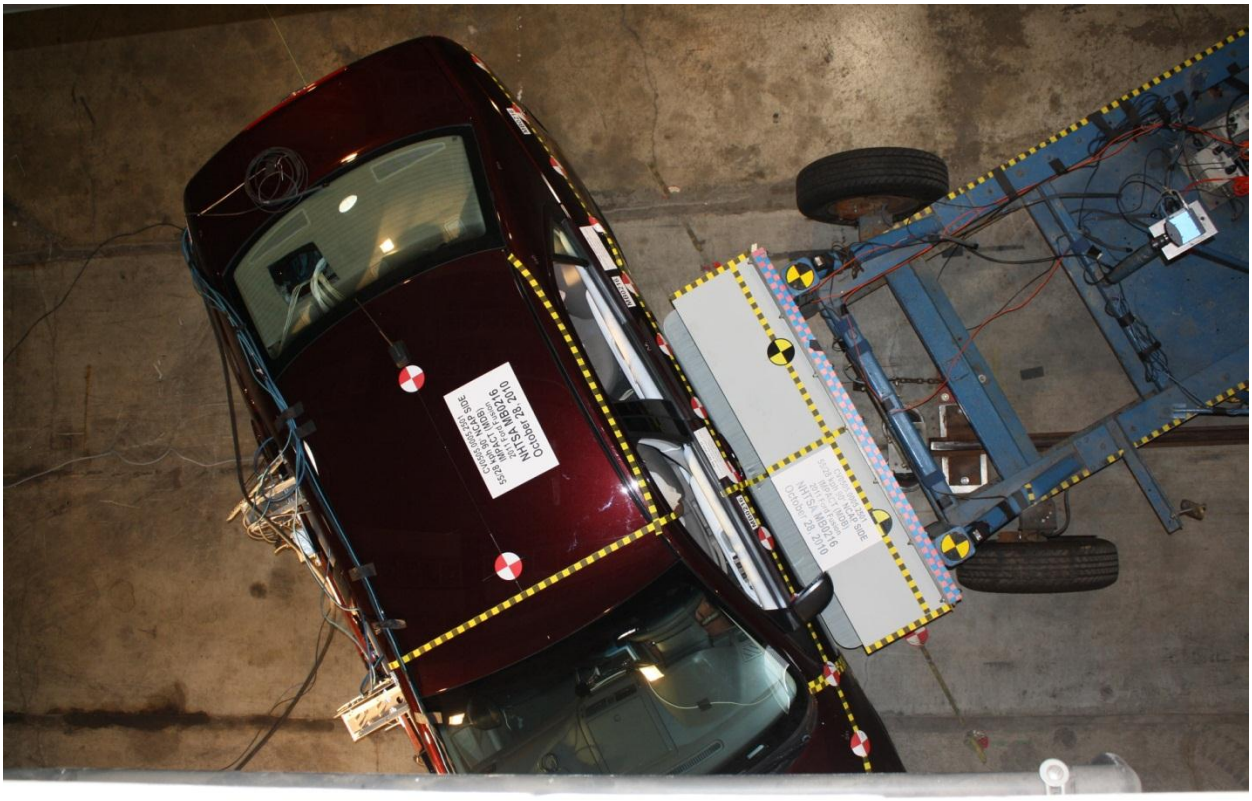


Figure A-15: Pre-Test Overhead View of the Test Vehicle and MDB

Photo Not Available

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

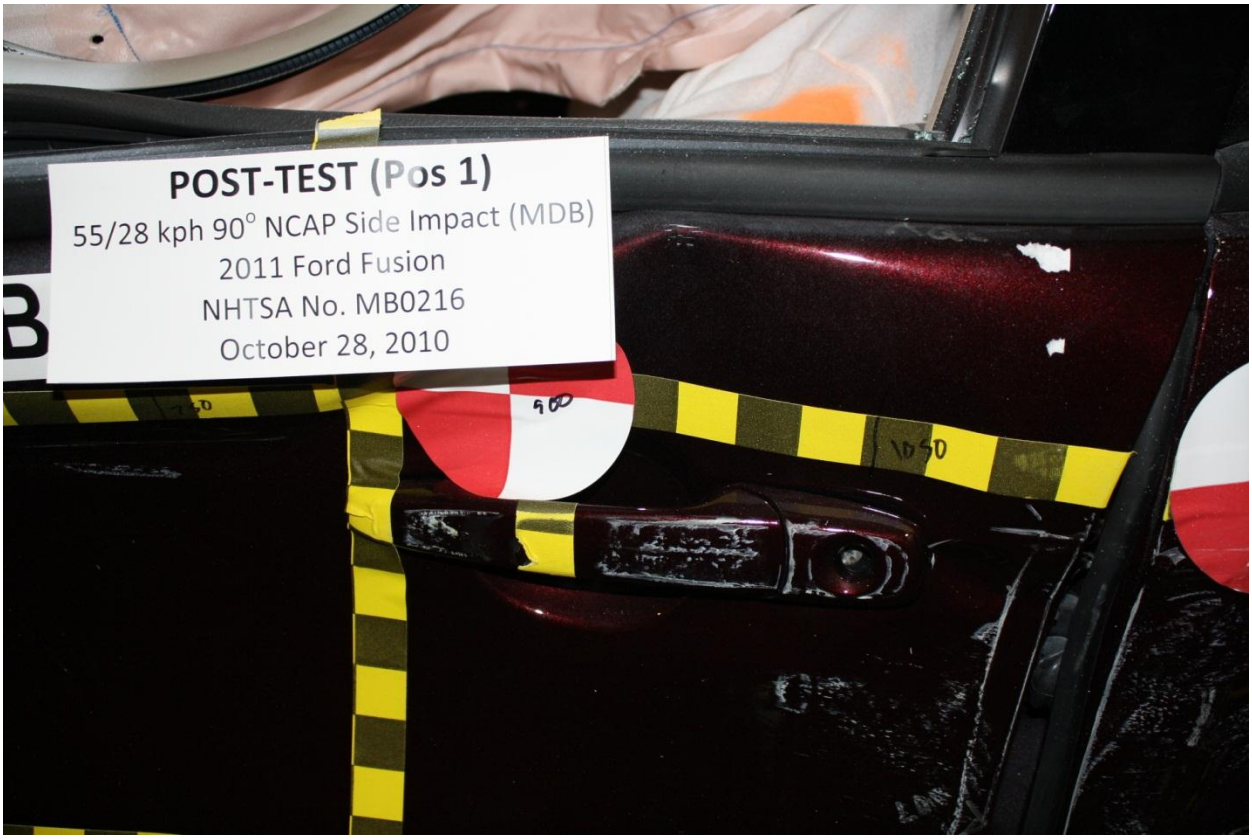


Figure A-22: Post-Test Left Front Door Latch Close-up

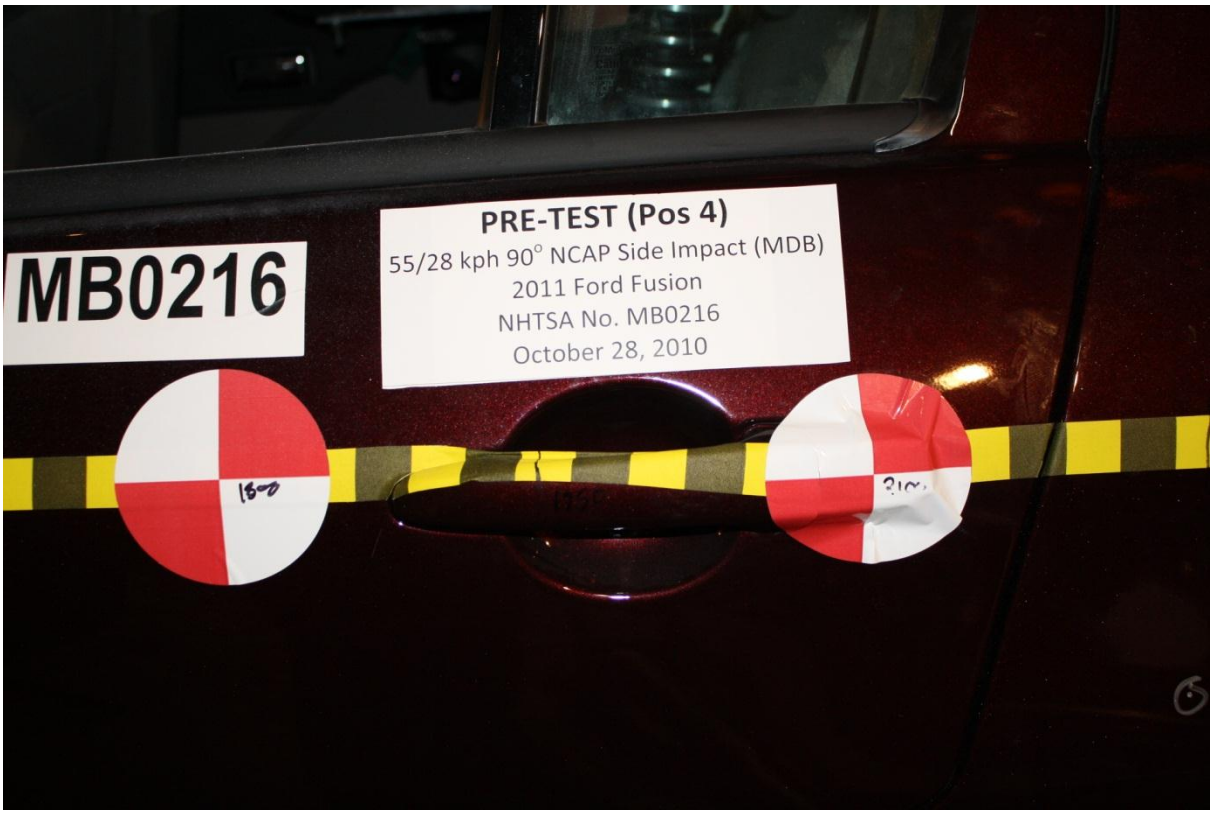


Figure A-23: Pre-Test Left Rear Door Latch Close-up

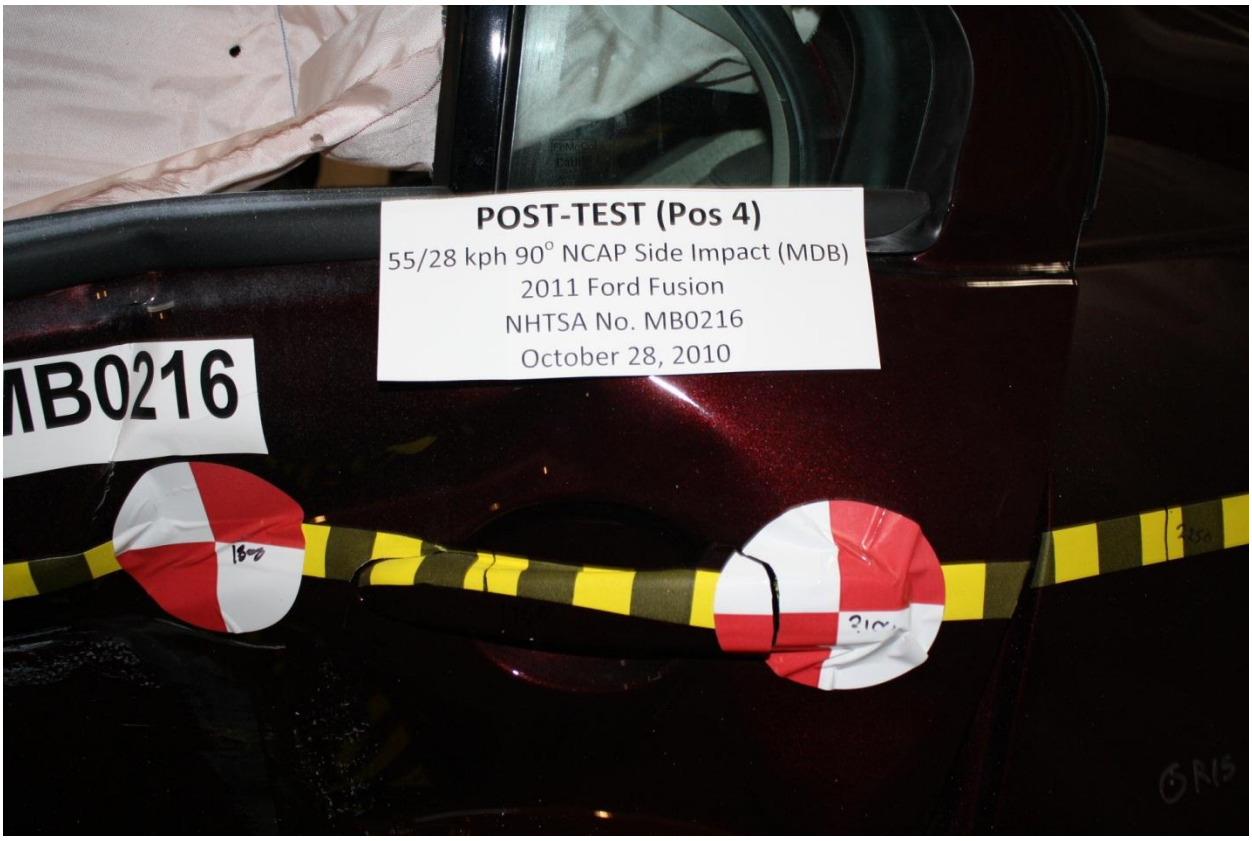


Figure A-24: Post-Test Left Rear Door Latch Close-up

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

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

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

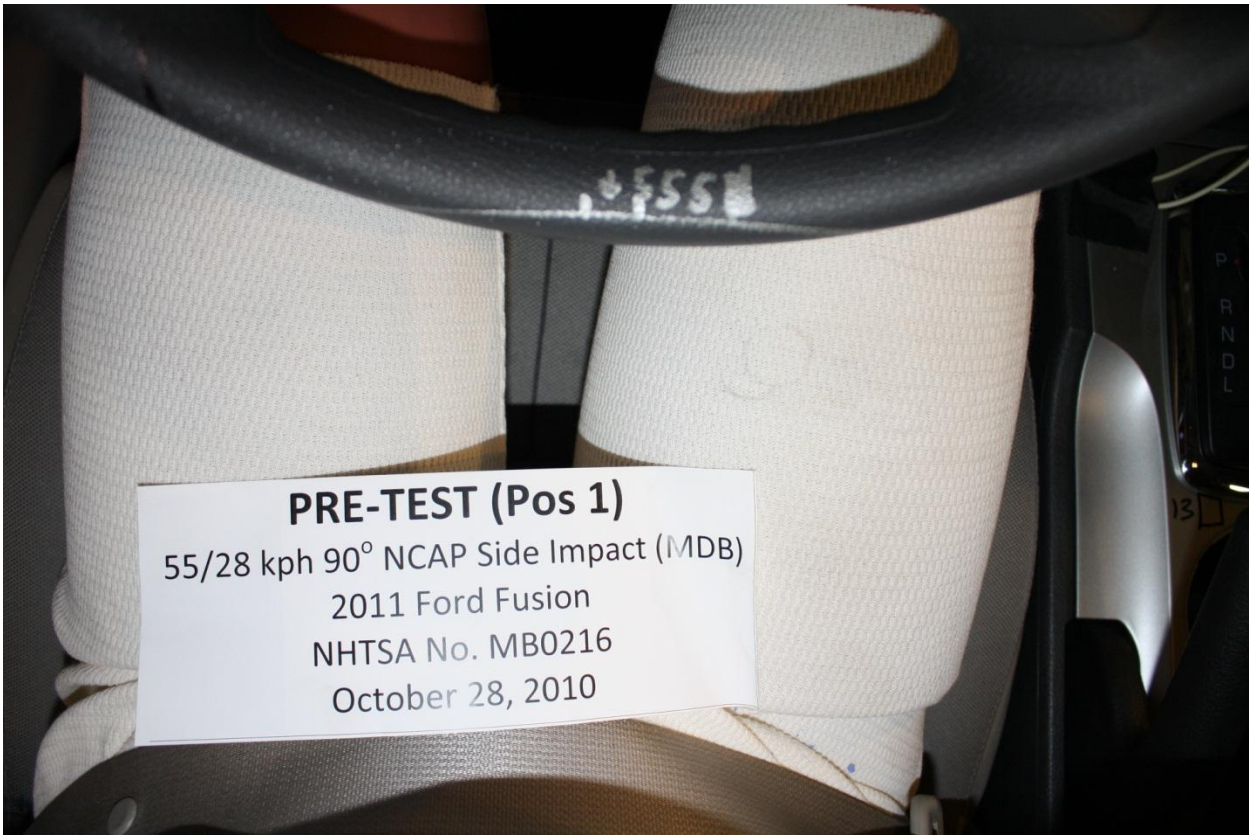


Figure A-33: Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan

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

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

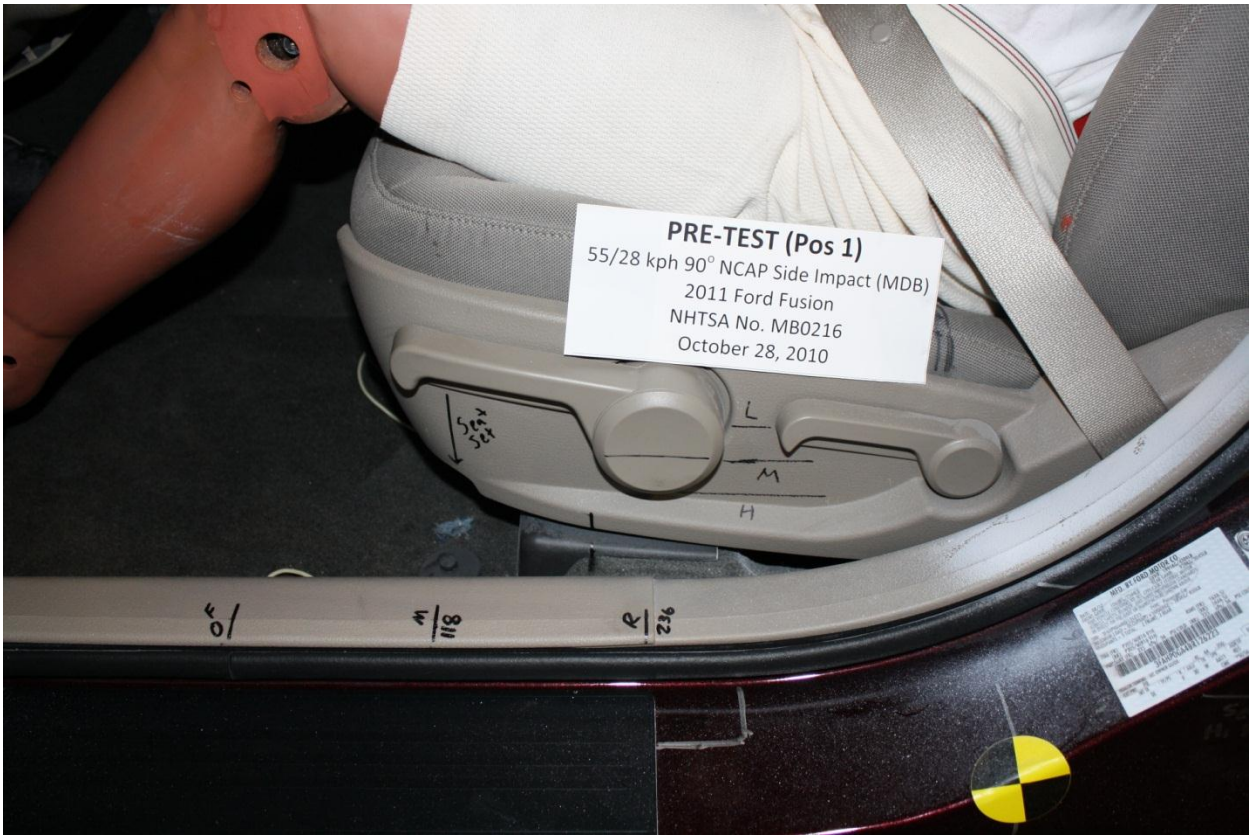


Figure A-38: Pre-test Close-up Left Side View of Driver Seat Track Showing Seat Positioning

Photo Not Available

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

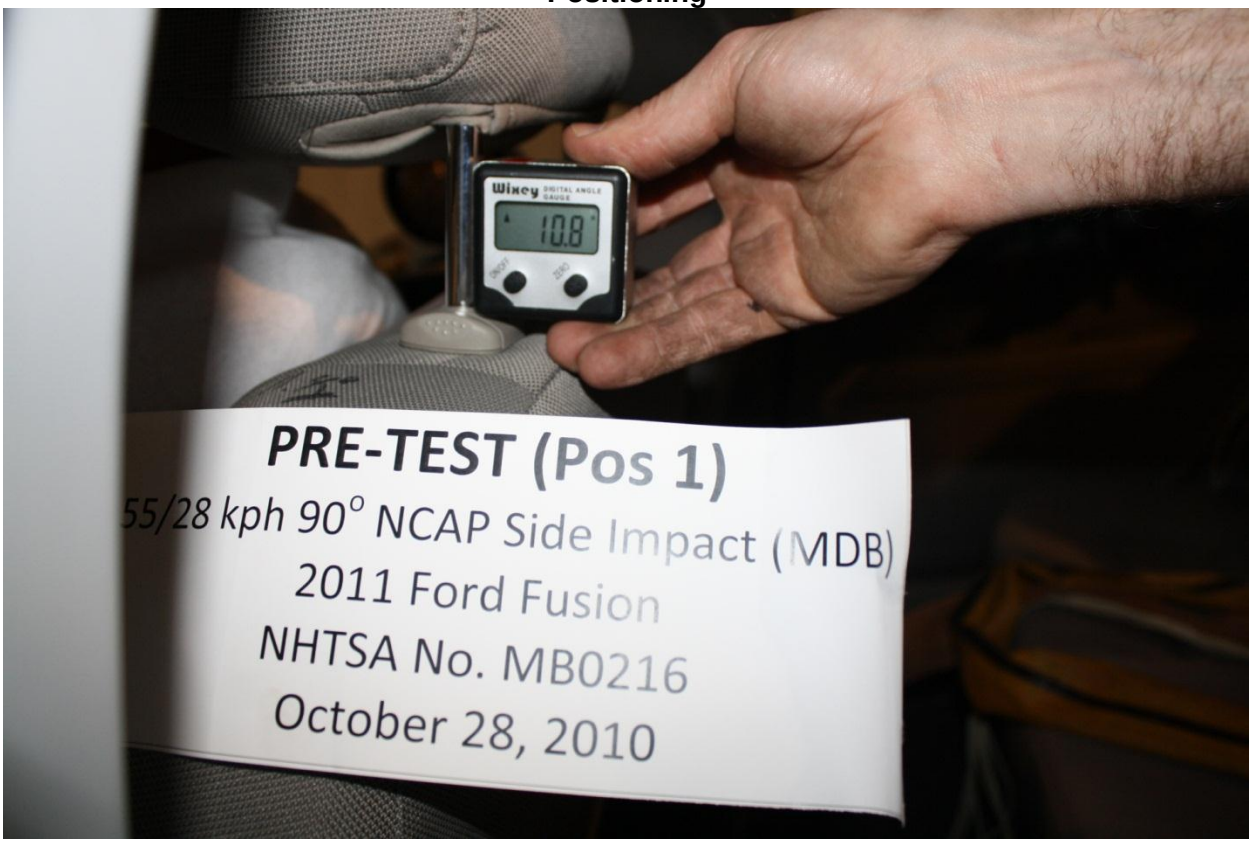


Figure A-40: Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position

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

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

Photo Not Applicable

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

Photo Not Applicable

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

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

Photo Not Applicable

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

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

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

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

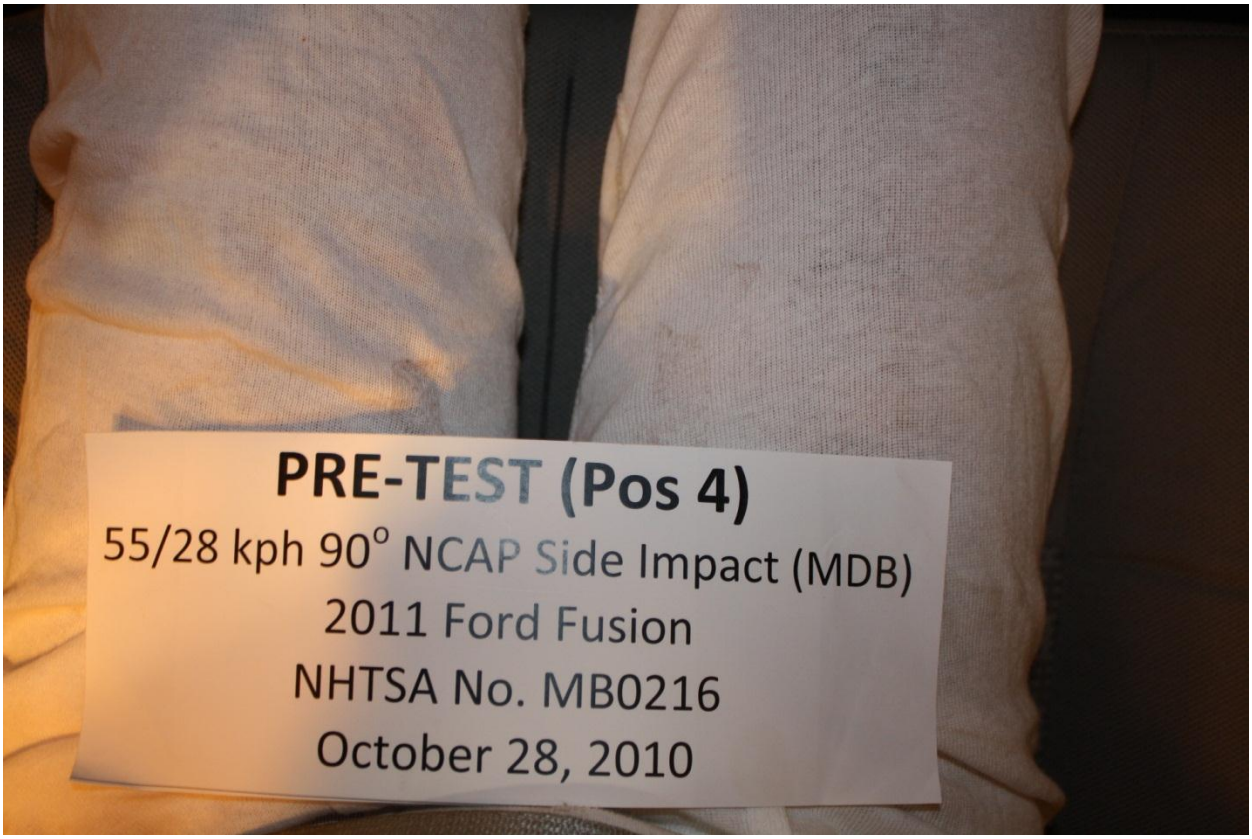


Figure A-59: Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan

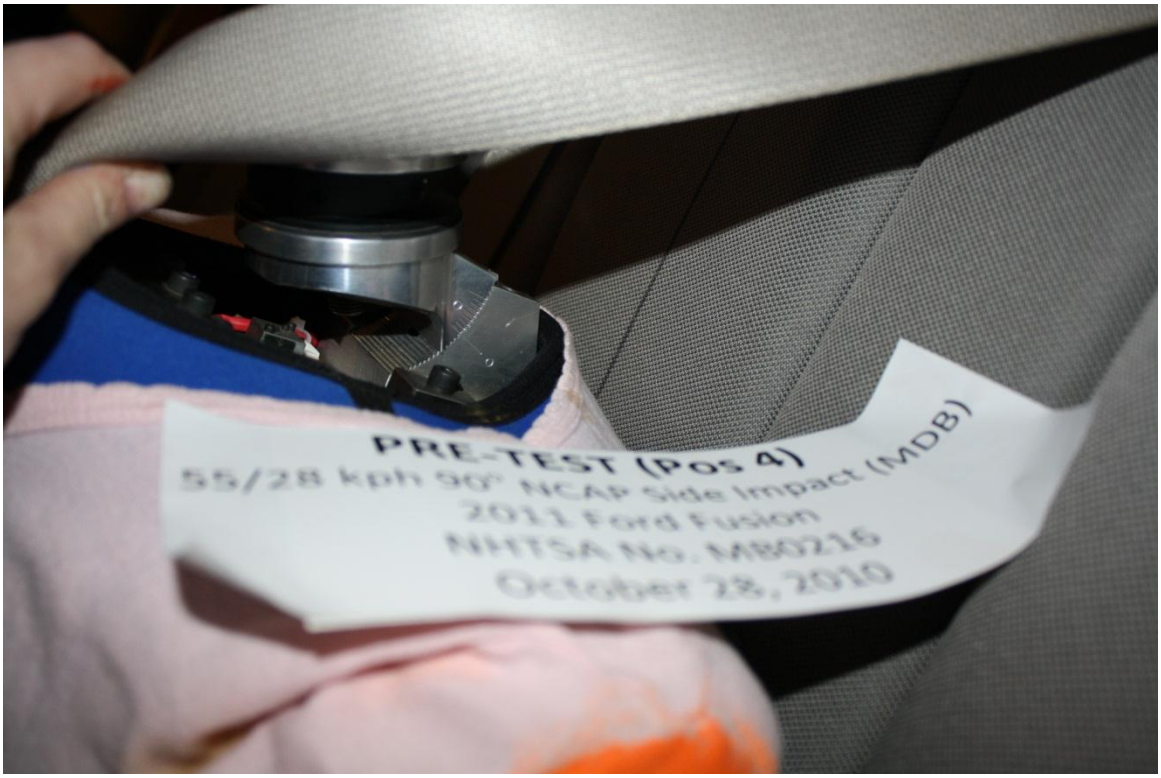


Figure A-60: Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket

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

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

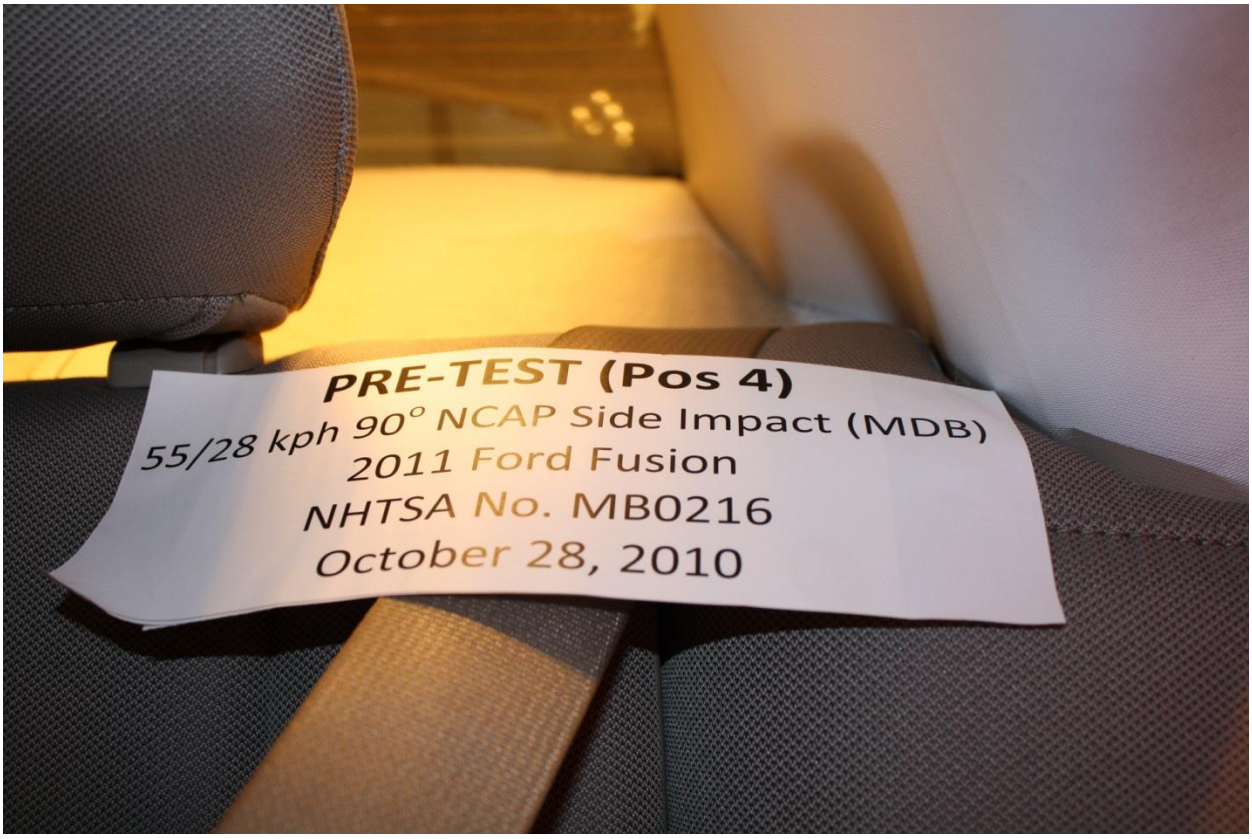


Figure A-63: Pre-Test View of Belt Anchorage for Rear Passenger Dummy to Show Position

Photo Not Applicable

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

Photo Not Applicable

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

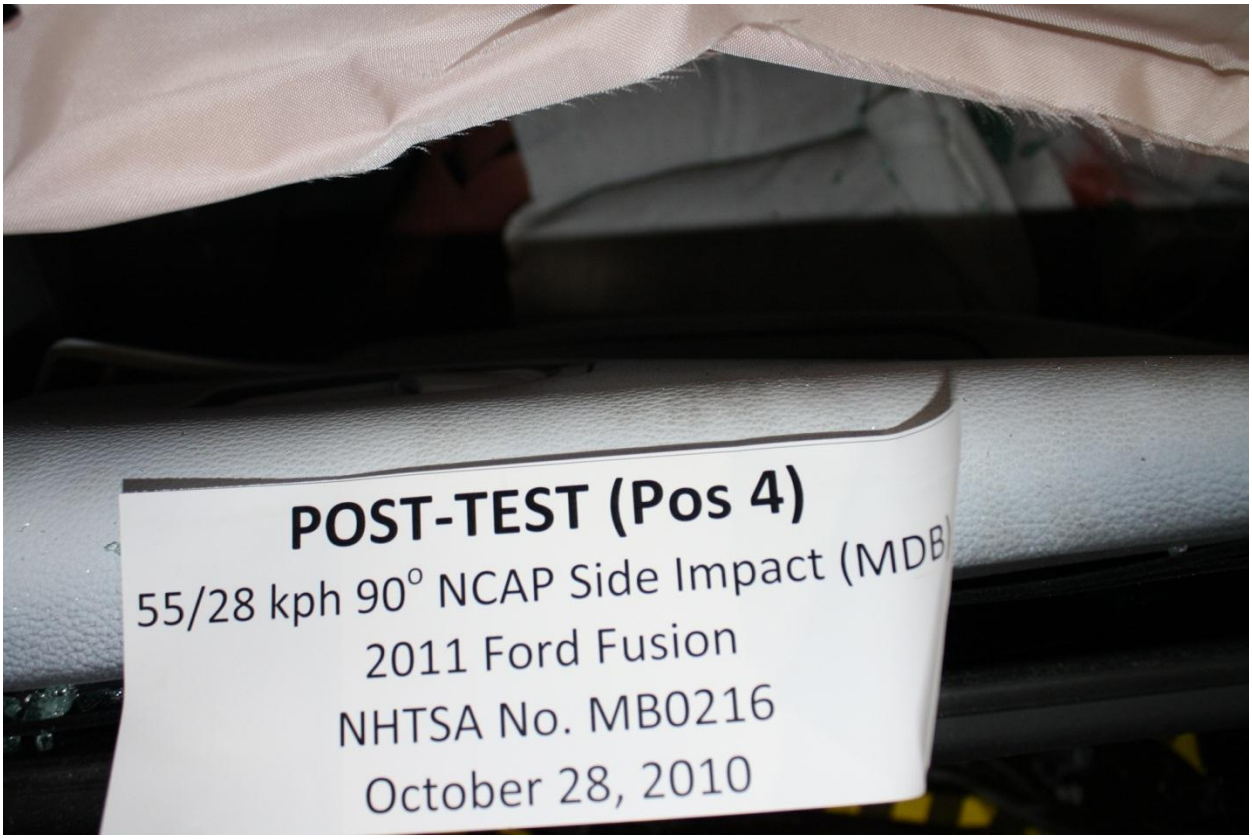


Figure A-68: Post-Test Passenger Dummy and Door Clearance View

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

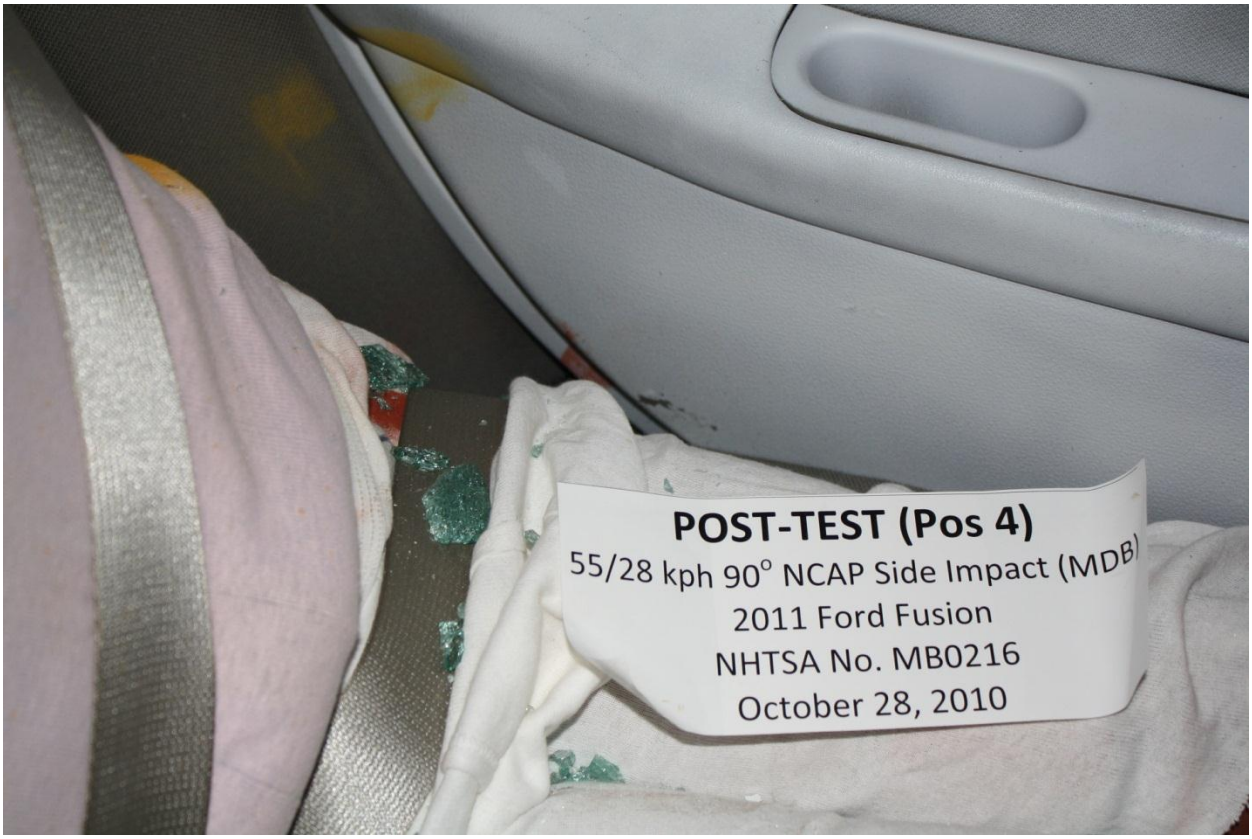


Figure A-77: Post-Test Rear Passenger Dummy Close-Up Pelvis Contact View

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

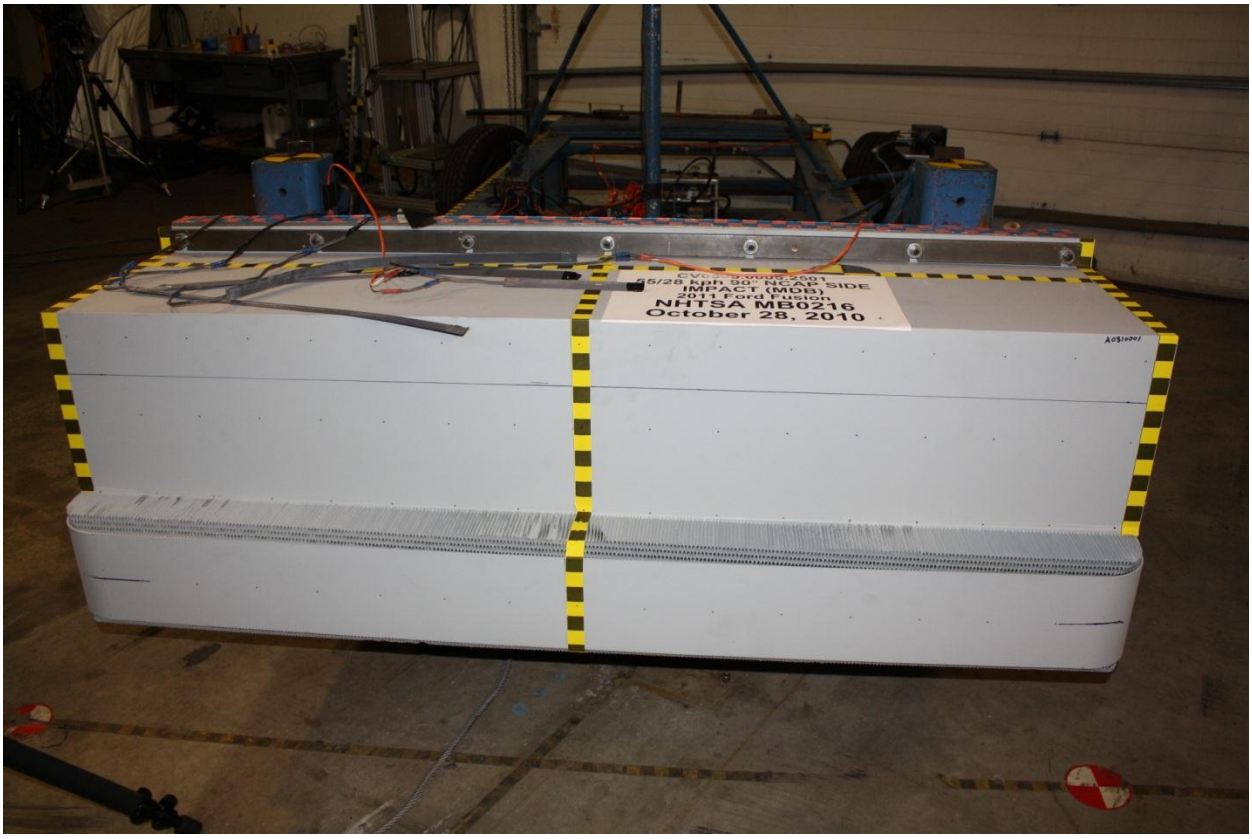


Figure A-81: Pre-Test Front View of MDB Impactor Face

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

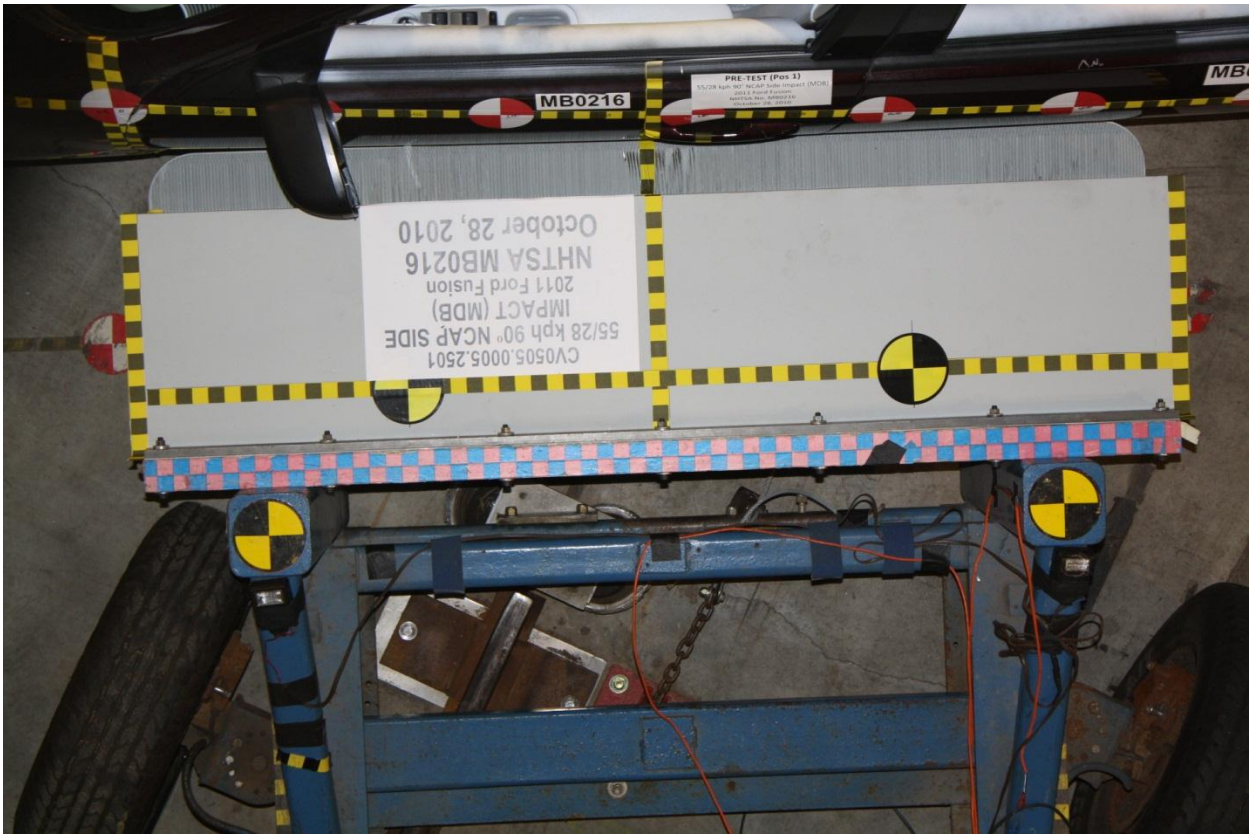


Figure A-83: Pre-Test Top View of MDB Impactor Face

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

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

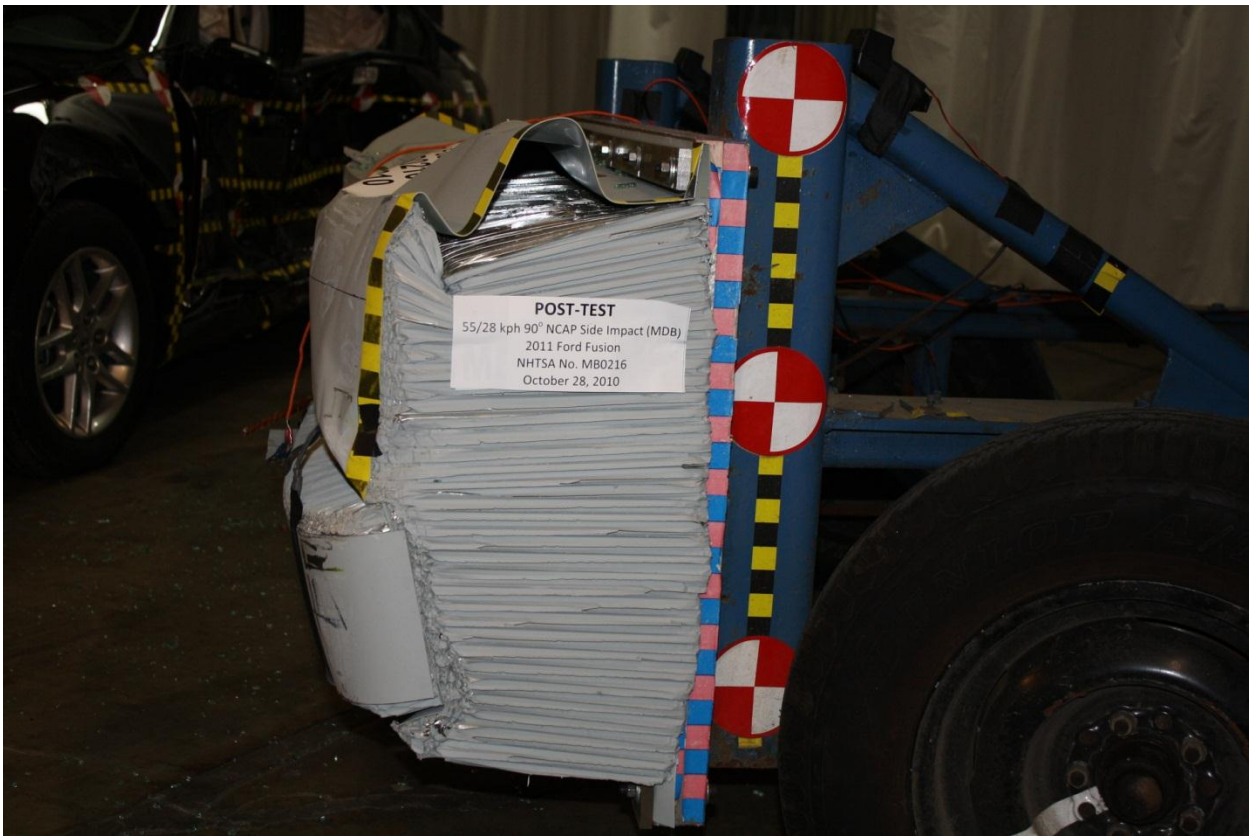


Figure A-86: Post-Test Left Side View of MDB Impactor Face

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

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

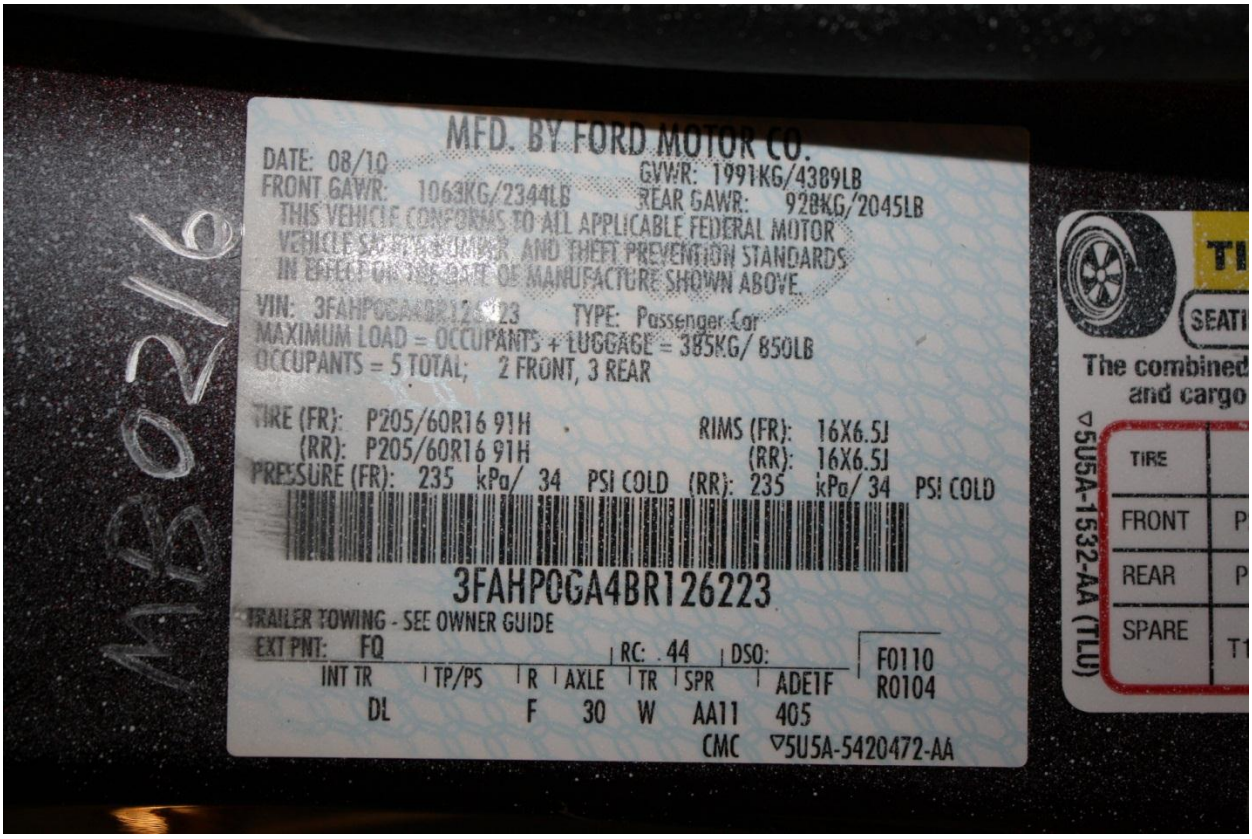


Figure A-89: Close-Up View of Vehicle's Certification Label

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

Photo Not Available

Figure A-91: Pre-Test Ballast View

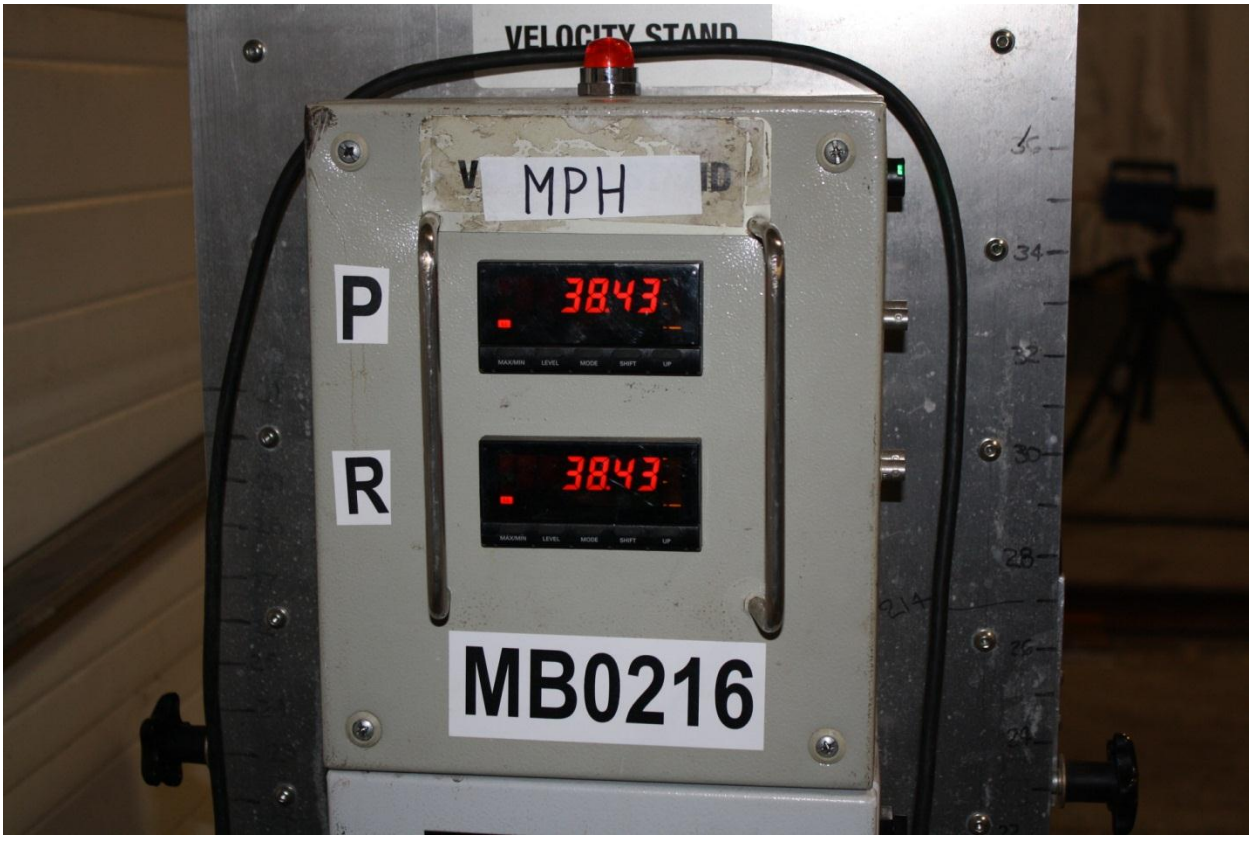


Figure A-92: Post-Test Primary and Redundant Speed Trap Read-Out

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)

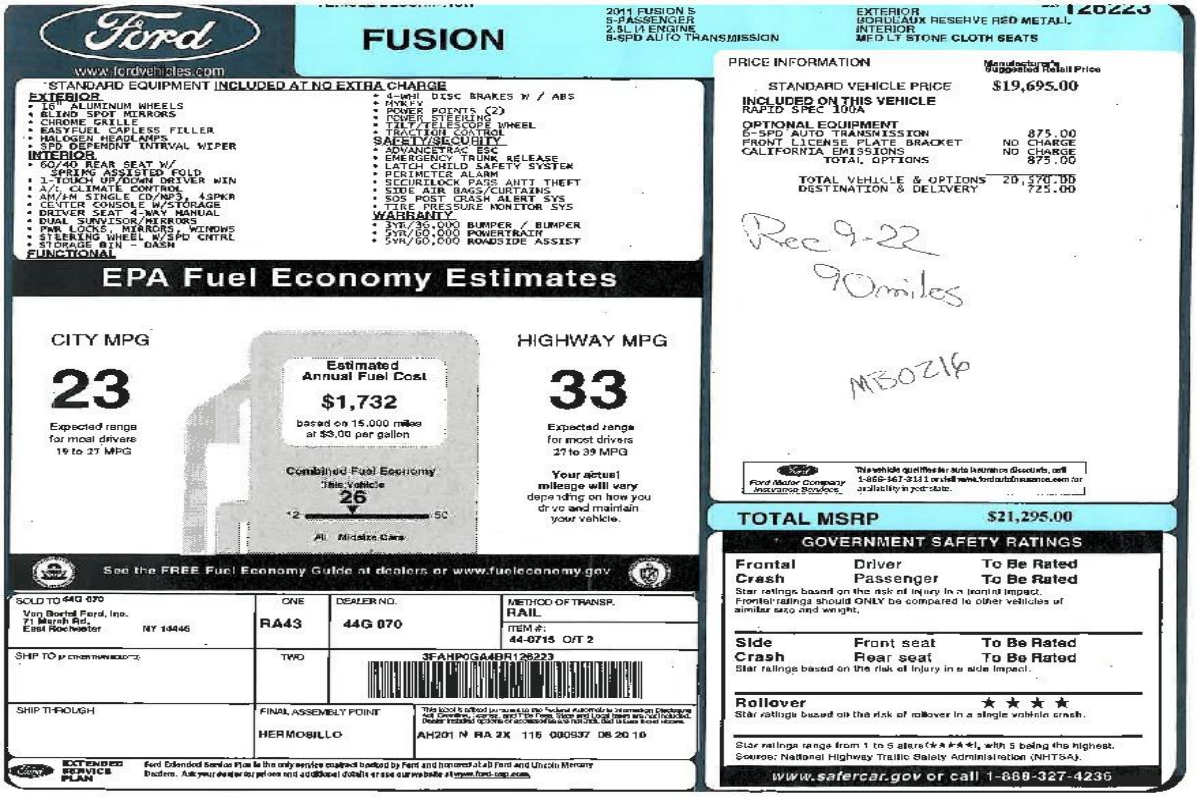


Figure A-99: Monroney Label

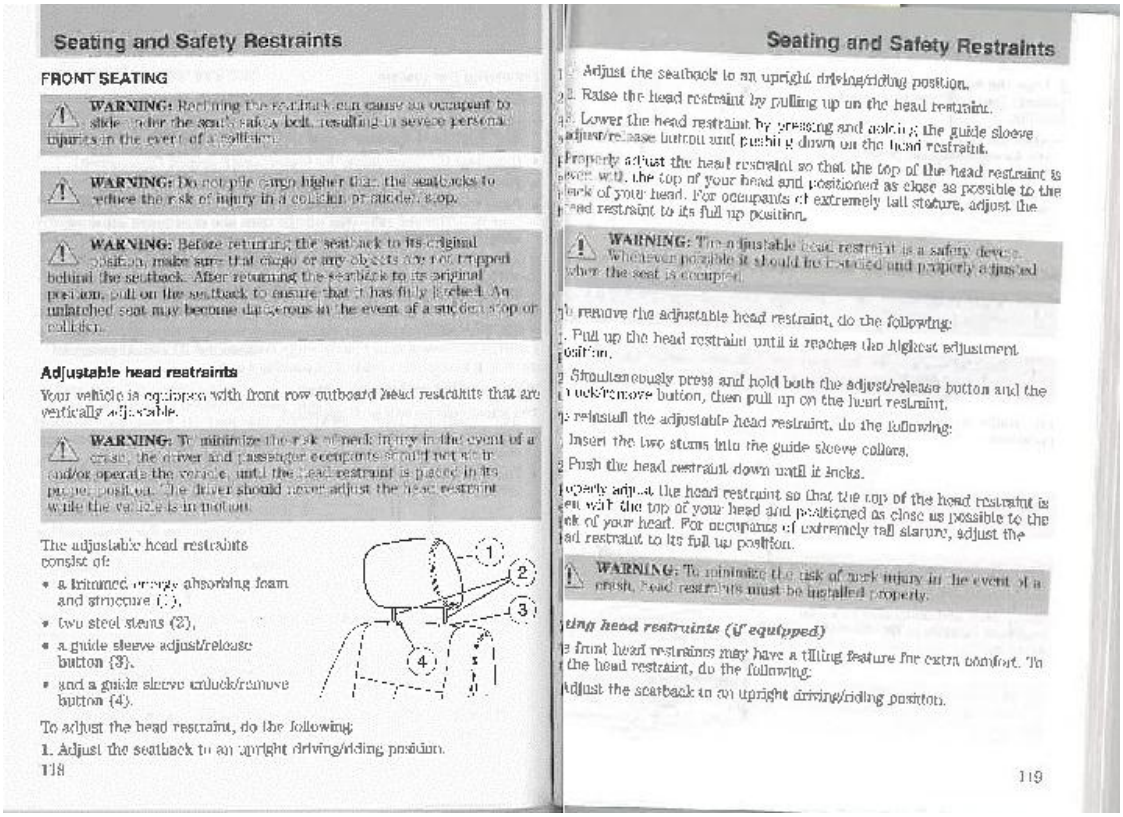


Figure A-100: Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

Seating and Safety Restraints

REAR SEATS

Second-row adjustable head restraints

Your vehicle is equipped with outboard and center head restraints that are vertically adjustable.

WARNING: To minimize the risk of neck injury in the event of a crash, the driver and passengers occupants should not operate the vehicle until the head restraint is locked in the proper position. The driver should never adjust the head restraint while the vehicle is in motion.

Outboard head restraints

The outboard adjustable head restraints consist of:

- a trimmed padded assembly (1),
- and stationary (2),
- two steel stems (3),
- a guide sleeve adjust/release button (3),
- and a guide sleeve adjust/remove button (4).

To adjust the outboard head restraints, do the following:

1. Raise the head restraint by pulling up on the head restraint.
2. Lower the head restraint by pushing and holding the guide sleeve adjust/release button and pushing down on the head restraint.

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

WARNING: The adjustable head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

To remove the outboard head restraints, do the following:

1. Pull up the head restraint until it reaches the highest adjustment position.
2. Simultaneously press and hold both the adjust release button and the unlock/remove button, then pull the head restraint upward. (You may have to fold the seat forward in order to pull the headrest out.)

125

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

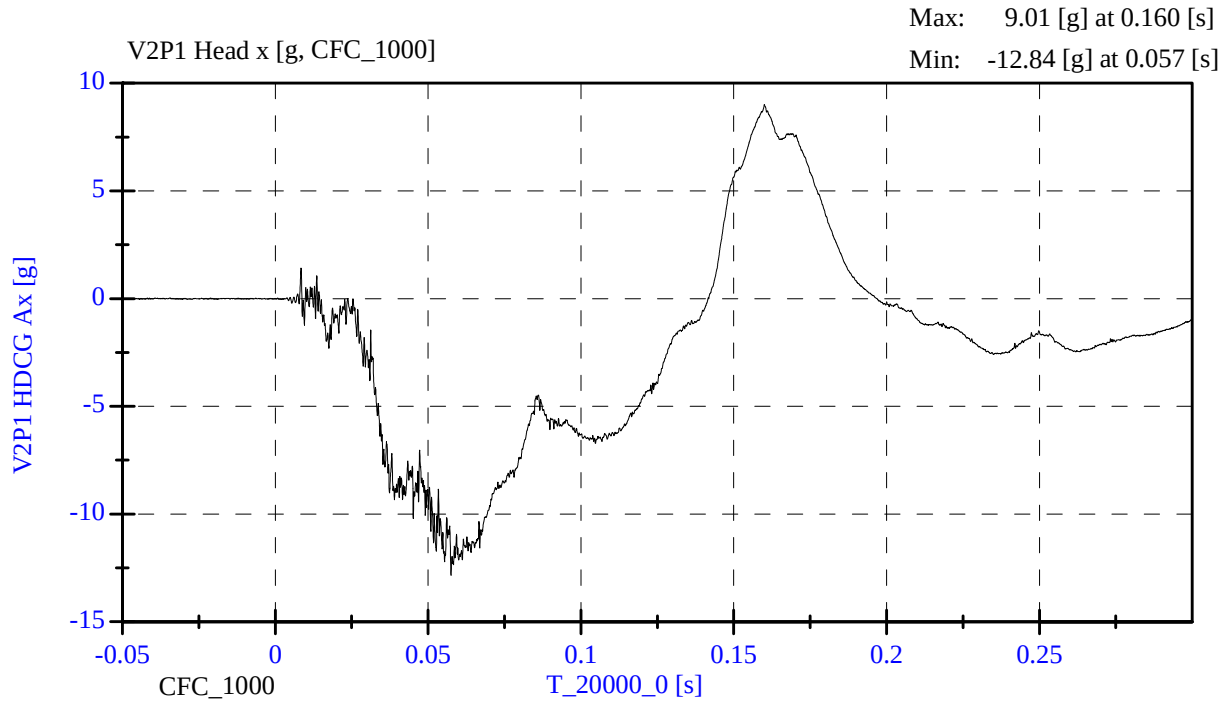
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Passenger Side Airbag Timing (if applicable)
Passenger Side Curtain Airbag Timing (if different from Driver)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (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)

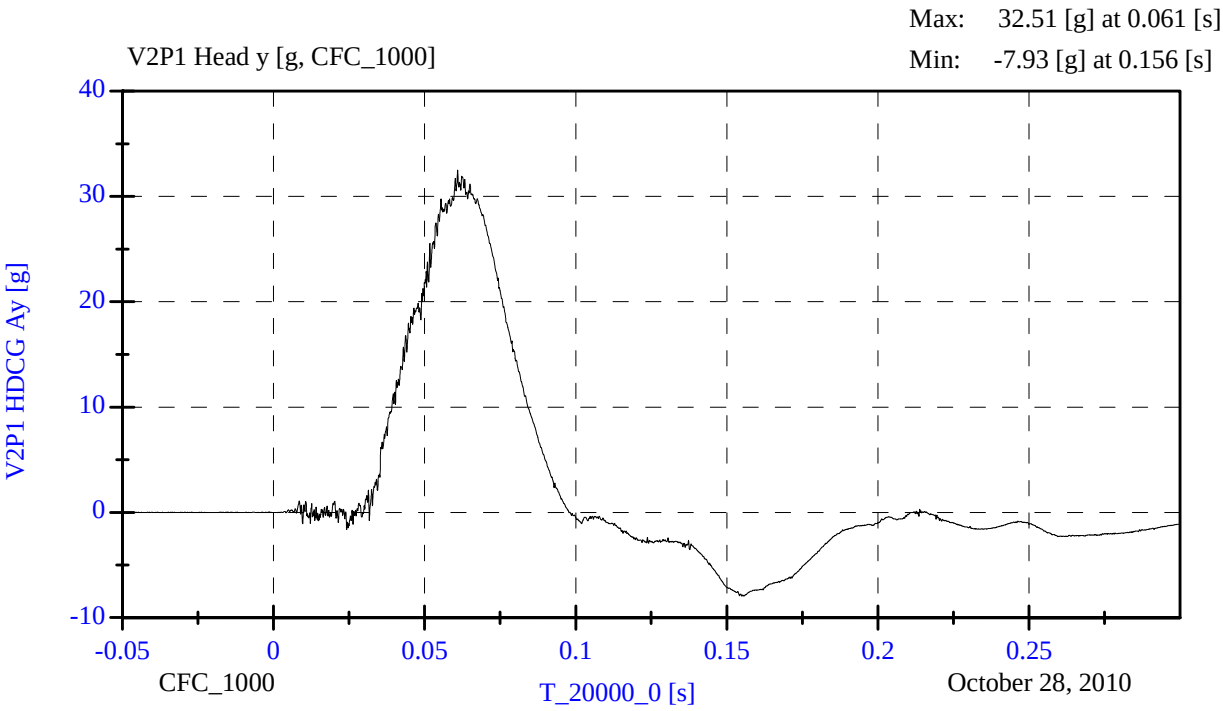
Rear Seat Track Acceleration (Y)
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)

MDB Instrumentation Data

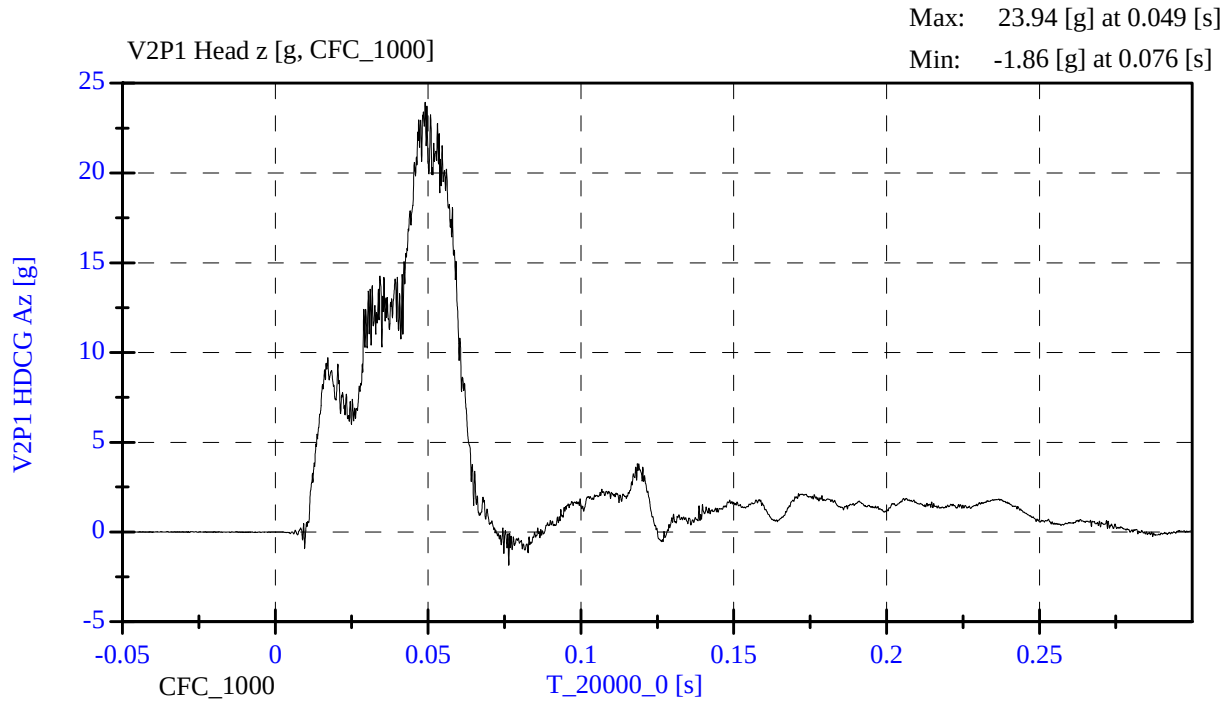
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

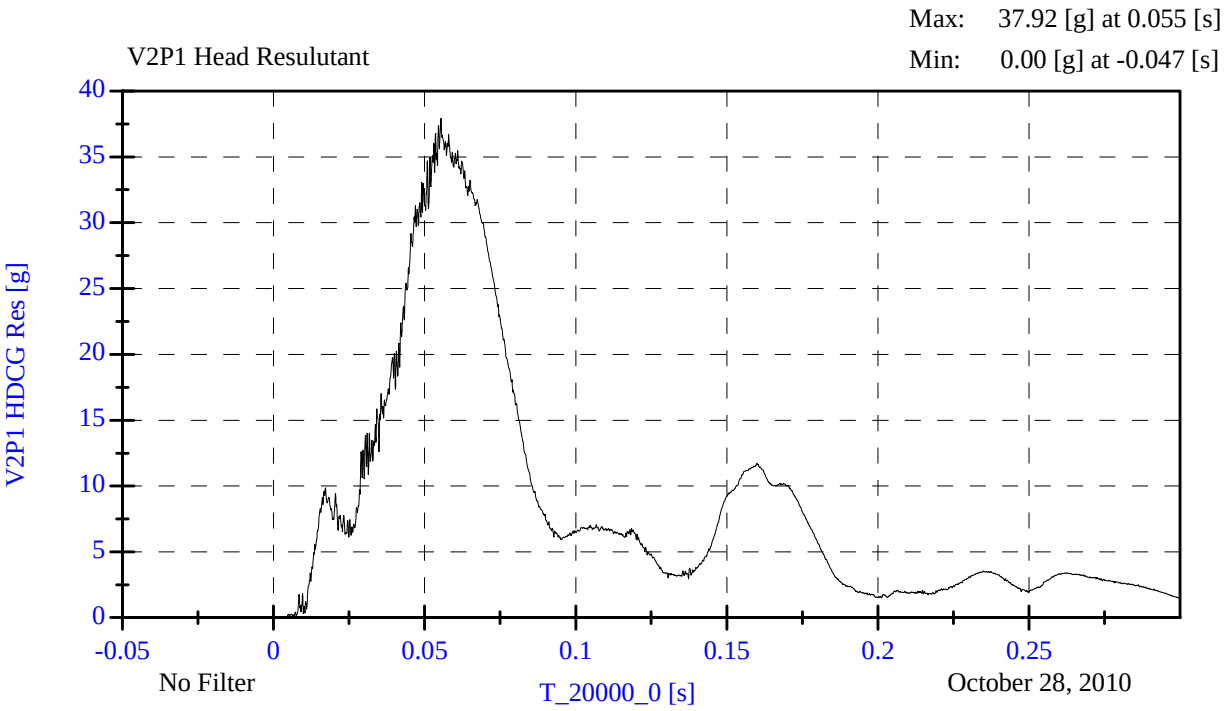
MB0216 SNCAP 2011 Ford Fusion





MB0216 SNCAP 2011 Ford Fusion

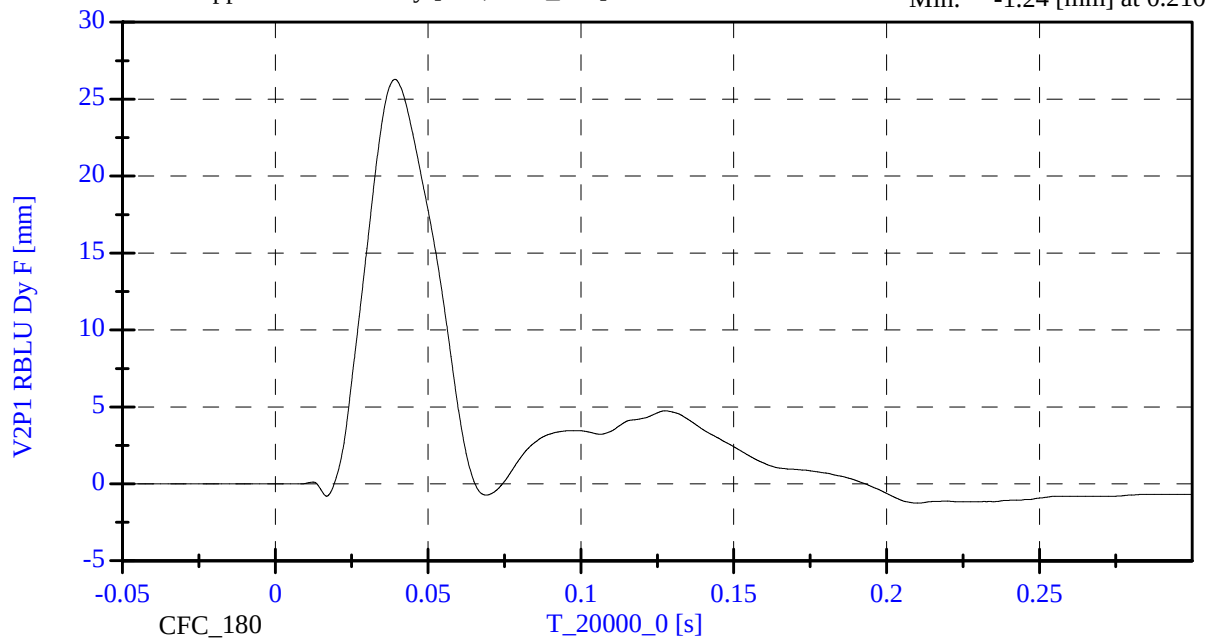




MB0216 SNCAP 2011 Ford Fusion

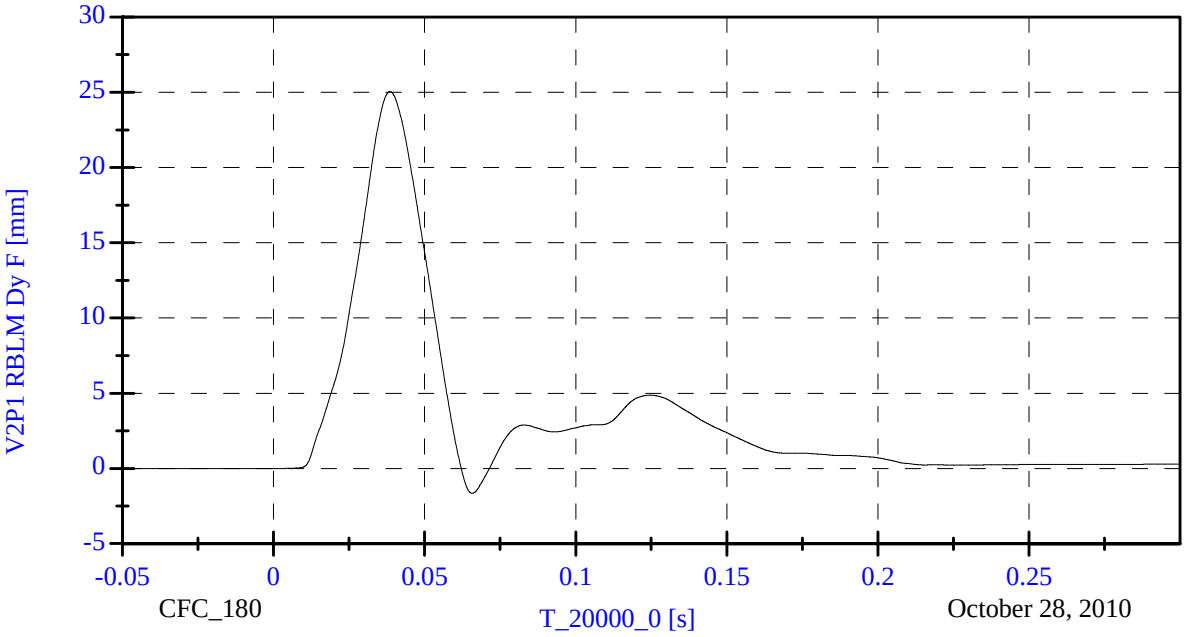
Max: 26.29 [mm] at 0.039 [s]
Min: -1.24 [mm] at 0.210 [s]

V2P1 Upper Thorax Rib Dy [mm, CFC_180]



Max: 25.05 [mm] at 0.039 [s]
Min: -1.65 [mm] at 0.066 [s]

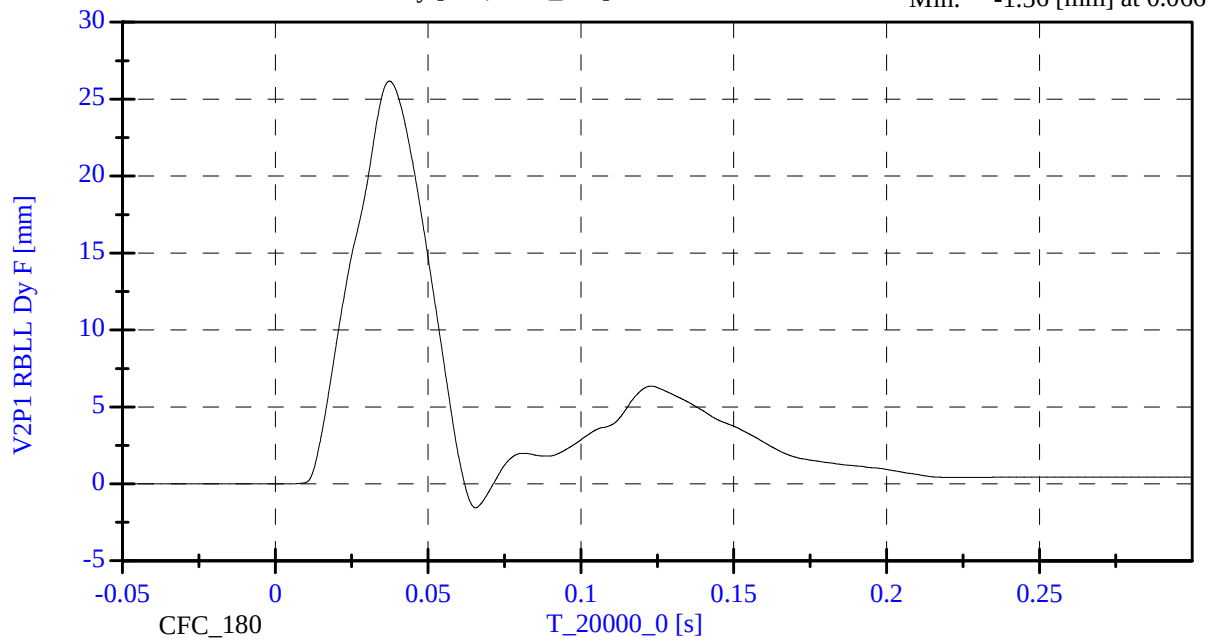
V2P1 Middle Thorax Rib Dy [mm, CFC_180]



MB0216 SNCAP 2011 Ford Fusion

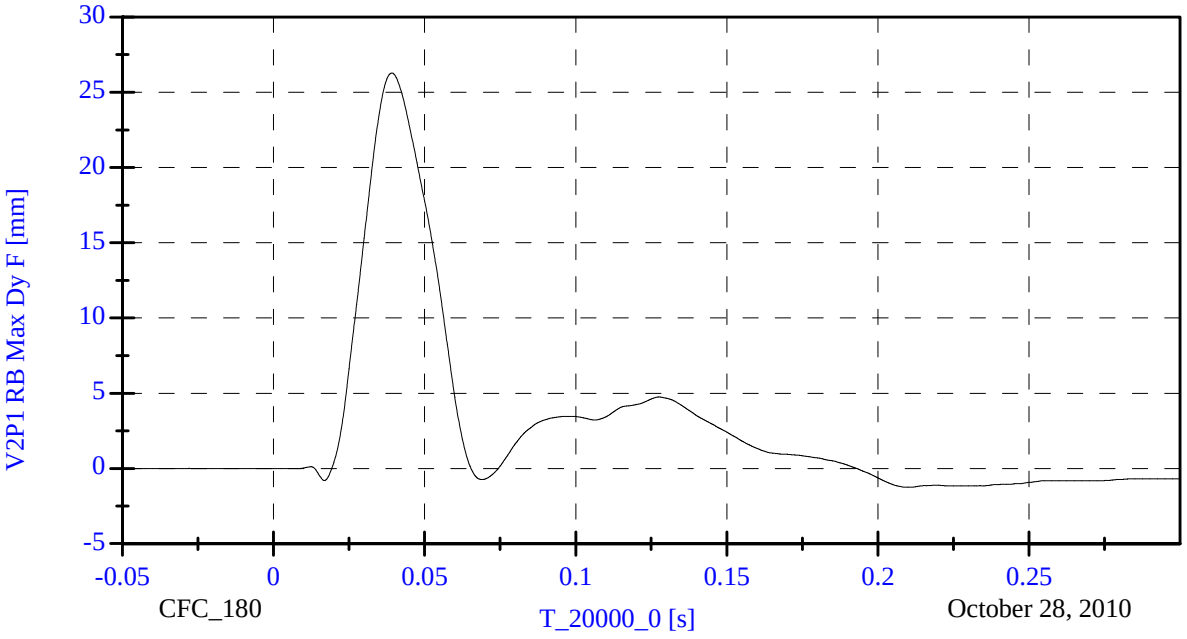
Max: 26.18 [mm] at 0.037 [s]
Min: -1.56 [mm] at 0.066 [s]

V2P1 Lower Thorax Rib Dy [mm, CFC_180]



Max: 26.29 [mm] at 0.039 [s]
Min: -1.24 [mm] at 0.210 [s]

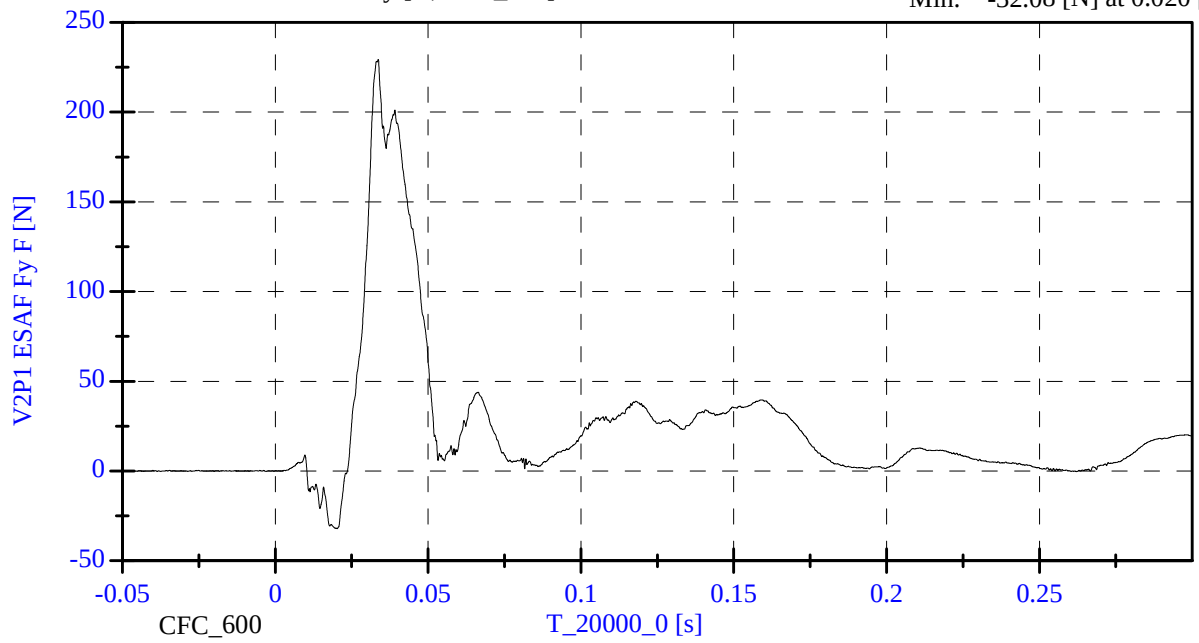
V2P1 Thorax Rib Dy Maximum [mm, CFC_180]



MB0216 SNCAP 2011 Ford Fusion

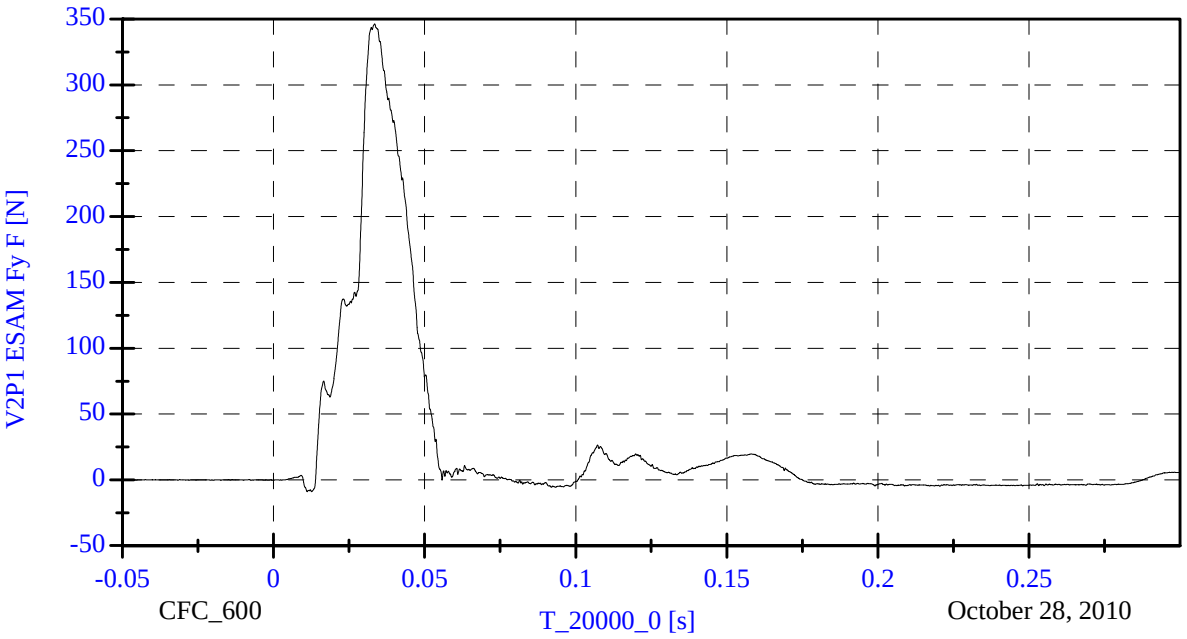
Max: 229.35 [N] at 0.034 [s]
Min: -32.08 [N] at 0.020 [s]

V2P1 Front Abdomen Fy [N, CFC_600]

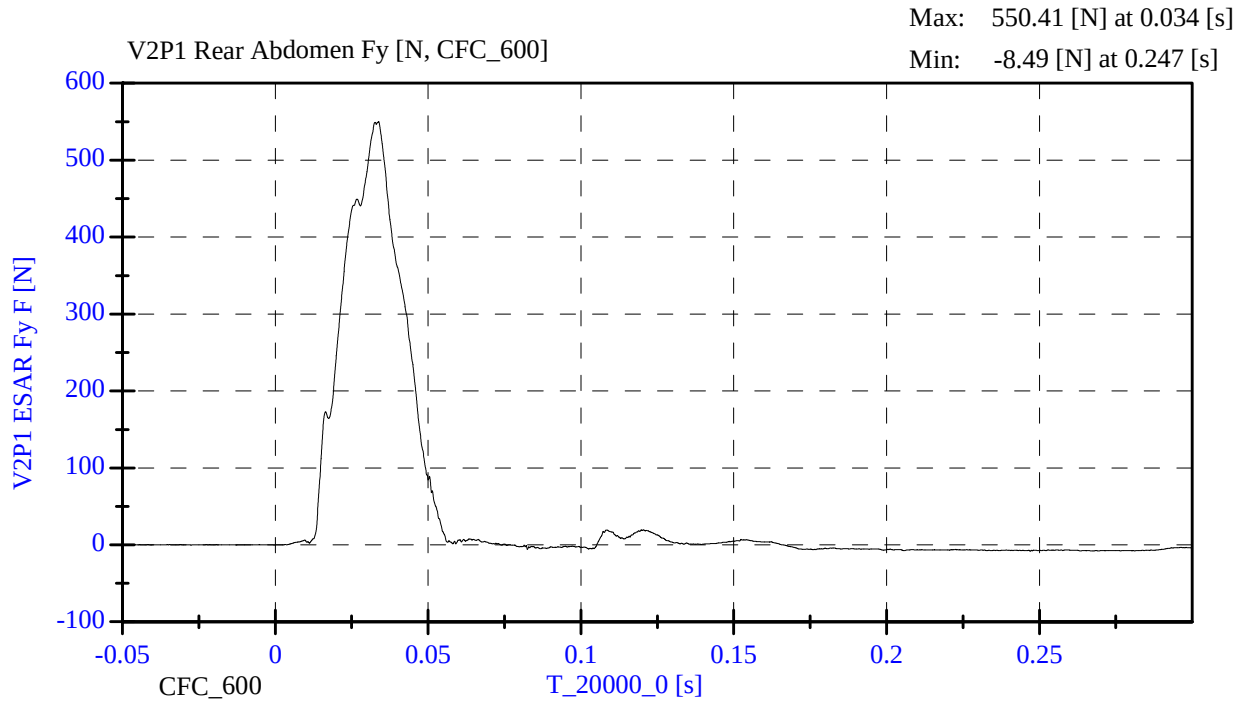


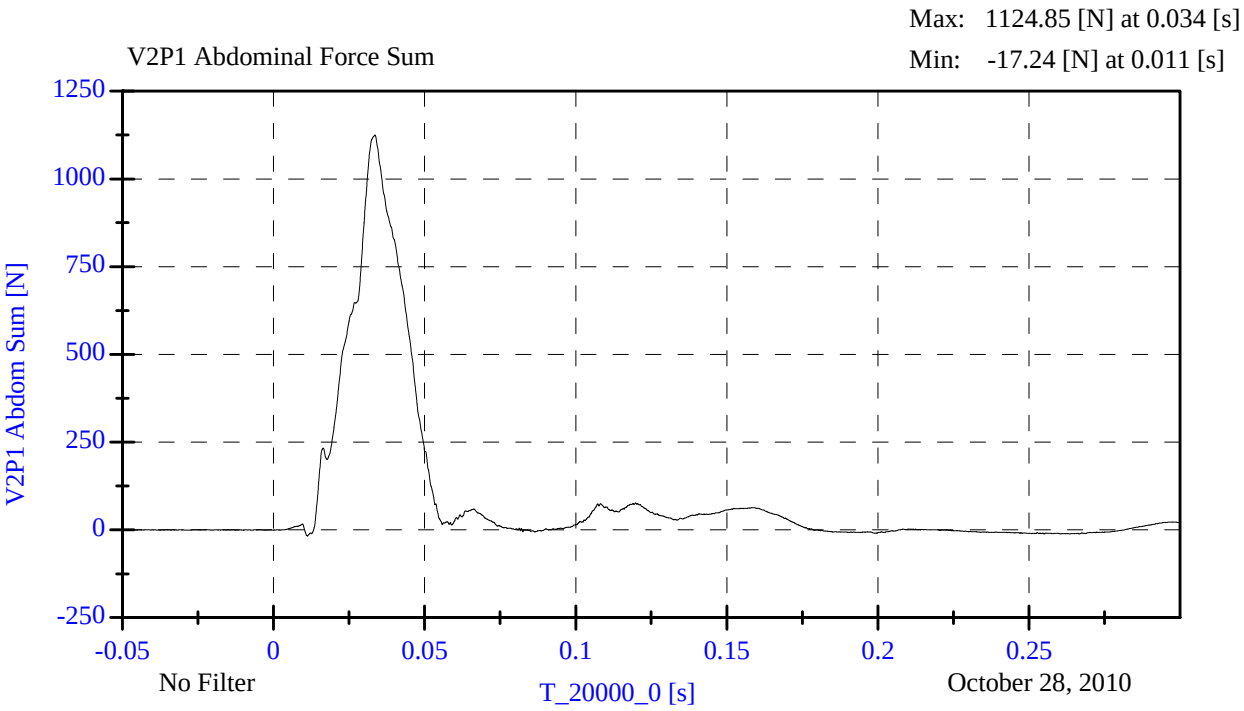
Max: 346.36 [N] at 0.034 [s]
Min: -8.91 [N] at 0.013 [s]

V2P1 Middle Abdomen Fy [N, CFC_600]

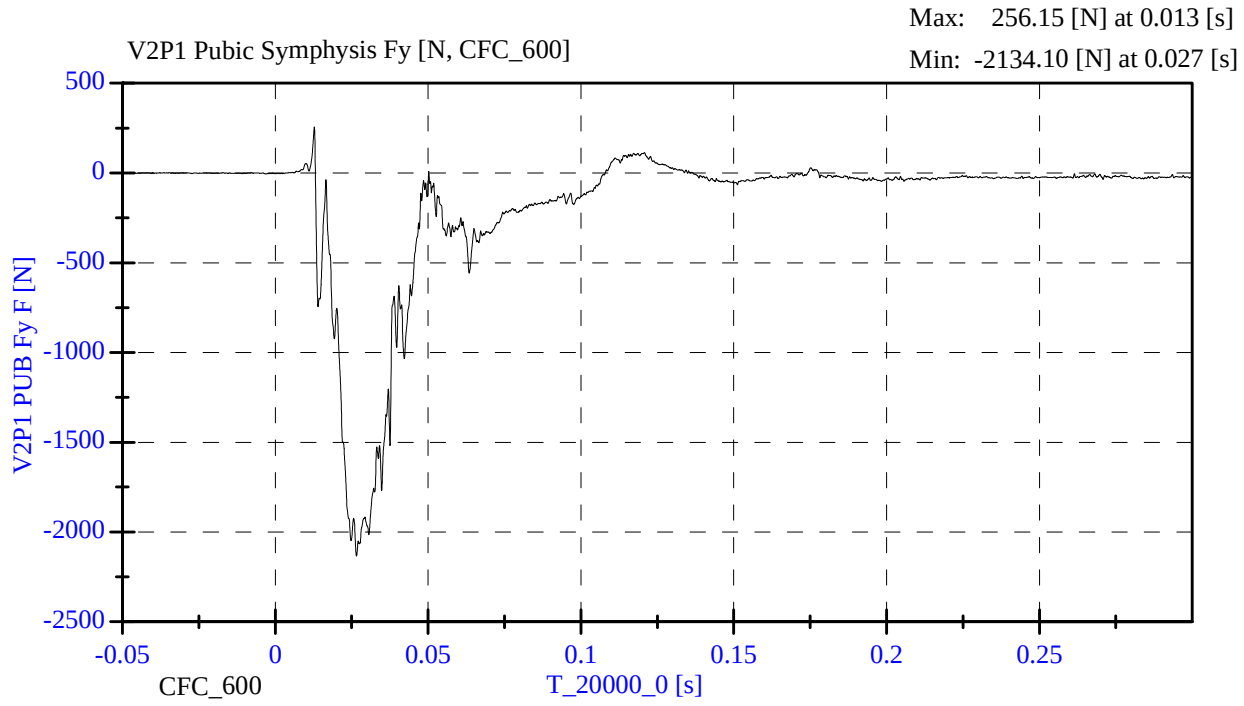


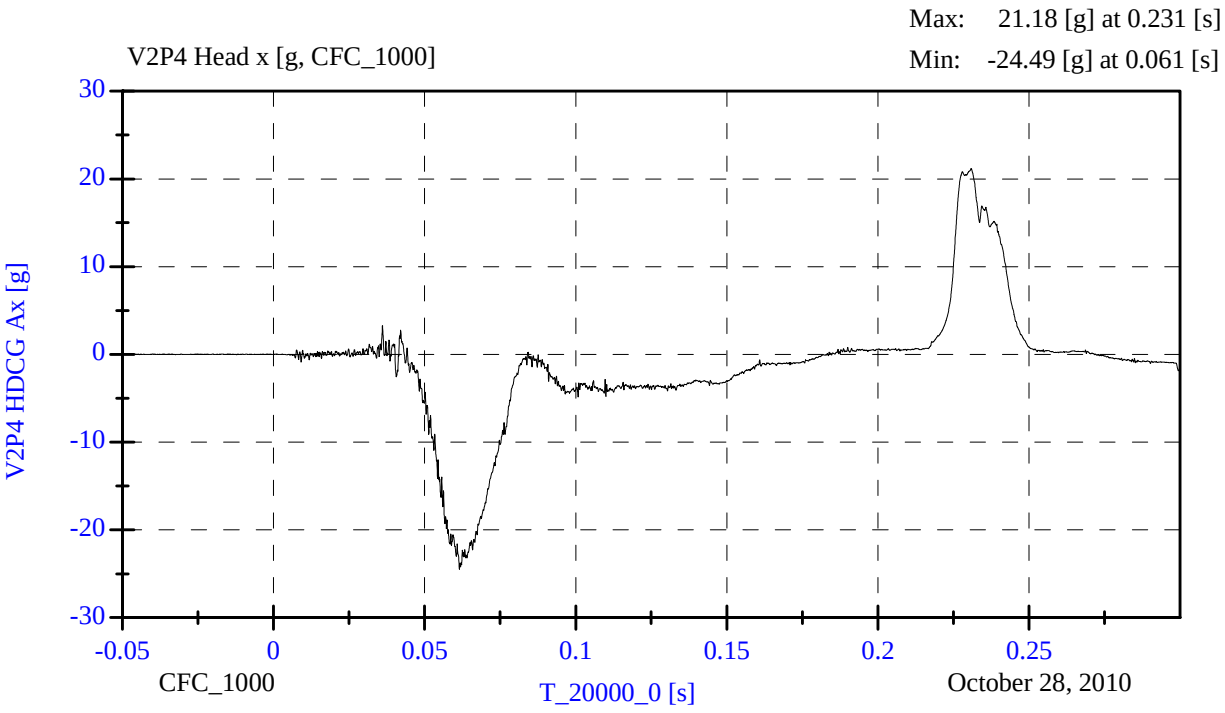
MB0216 SNCAP 2011 Ford Fusion



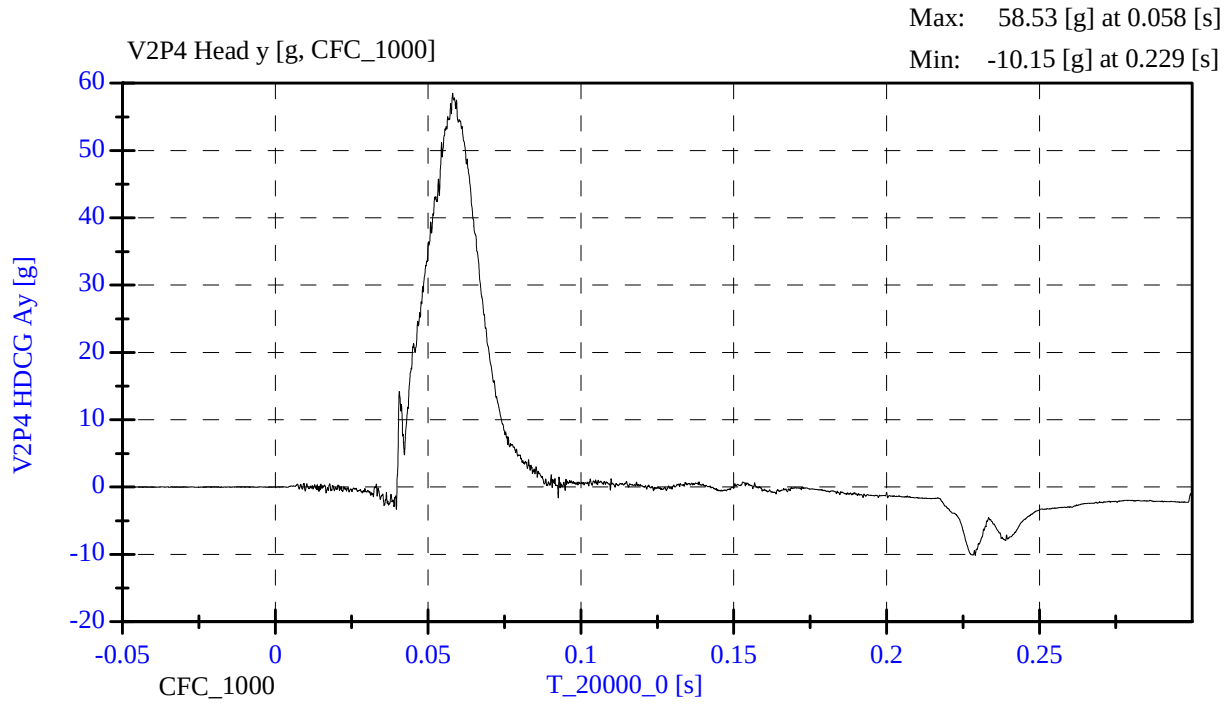


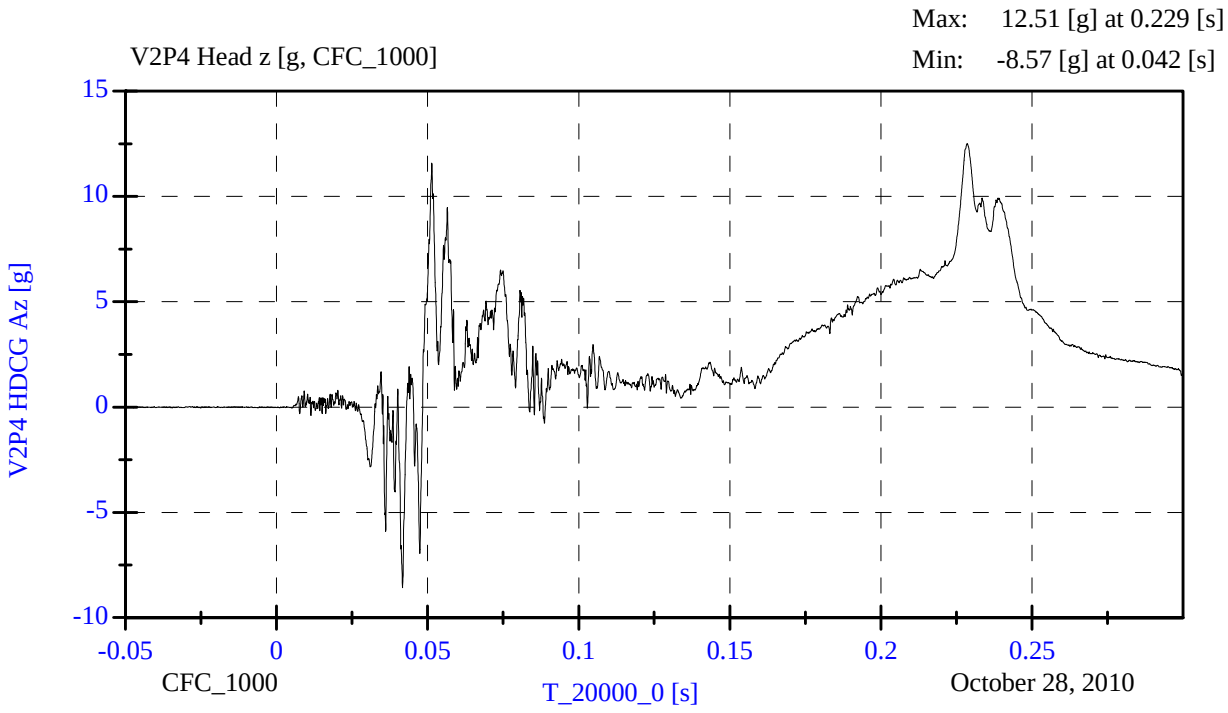
MB0216 SNCAP 2011 Ford Fusion



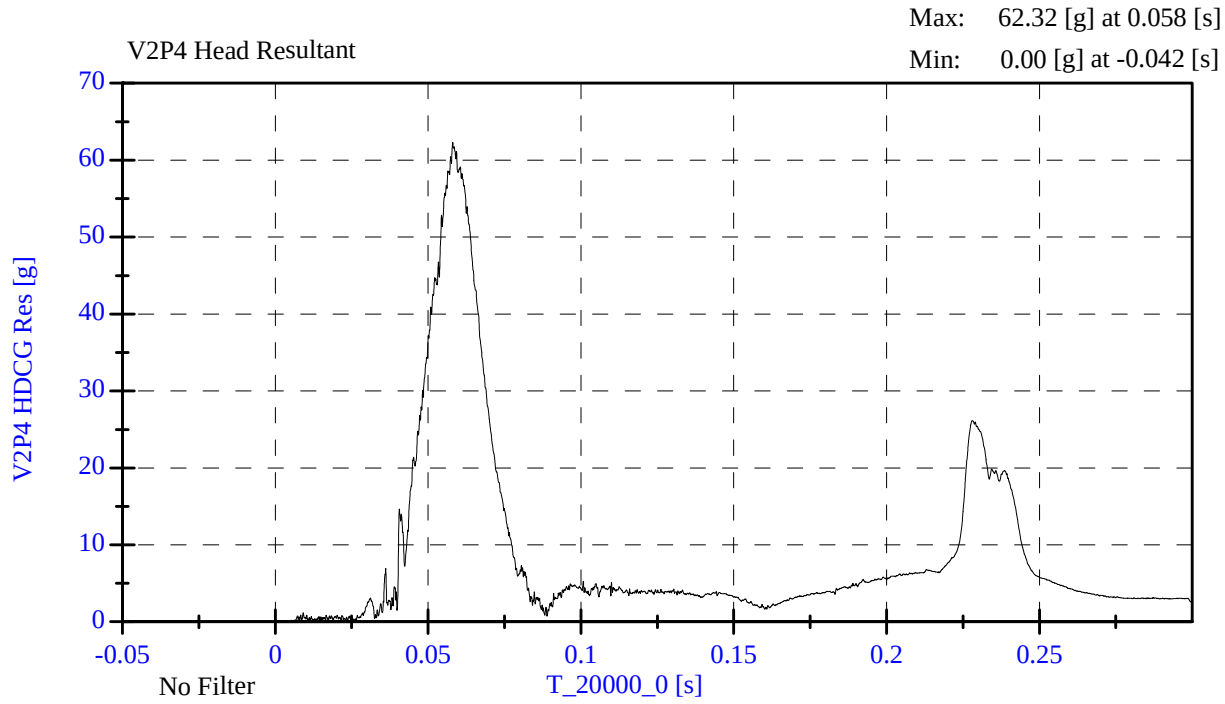


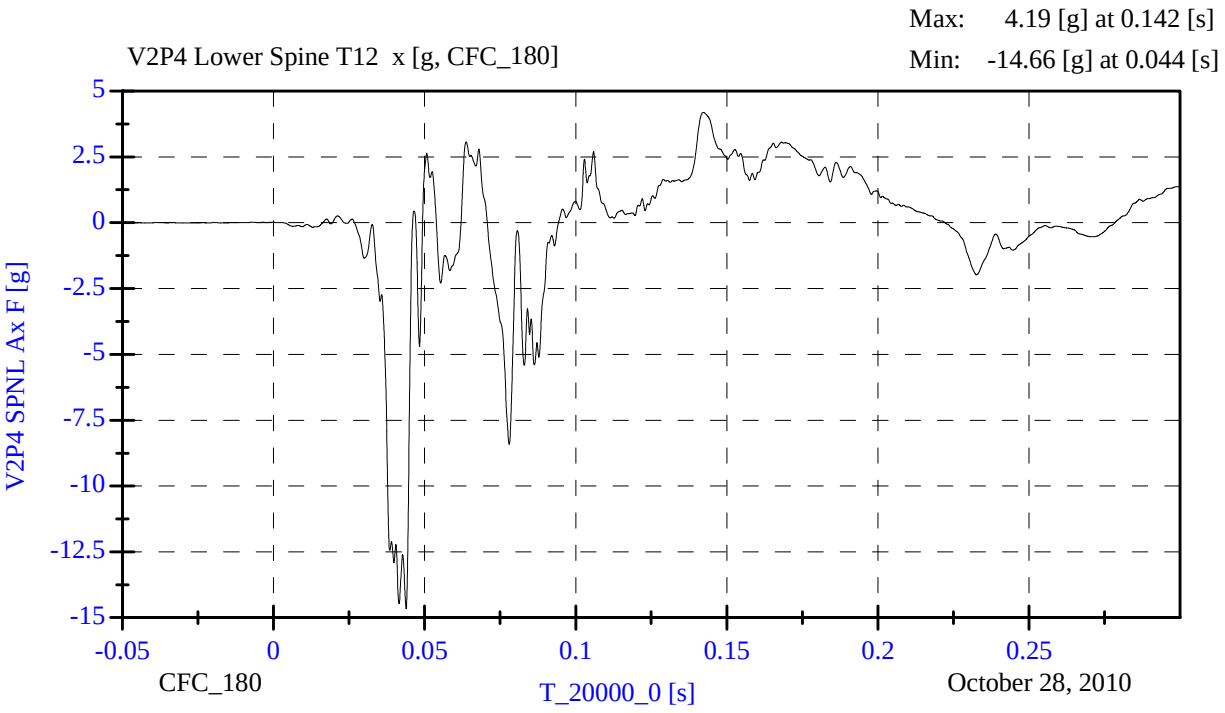
MB0216 SNCAP 2011 Ford Fusion



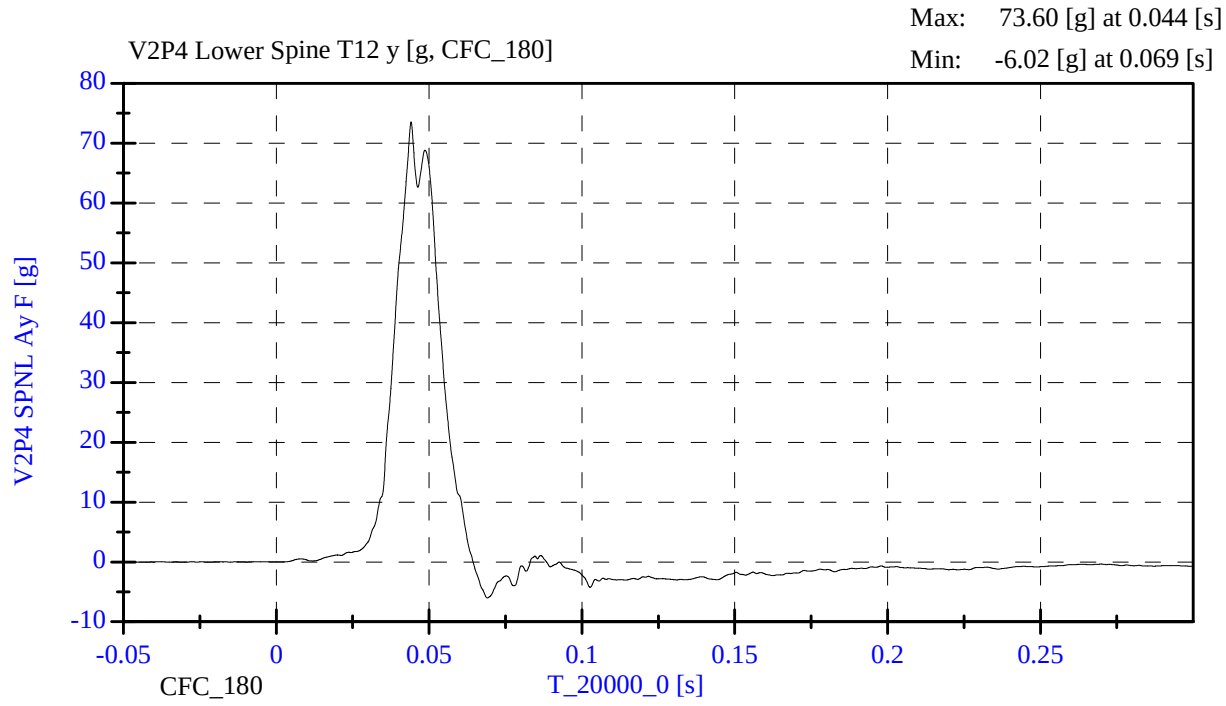


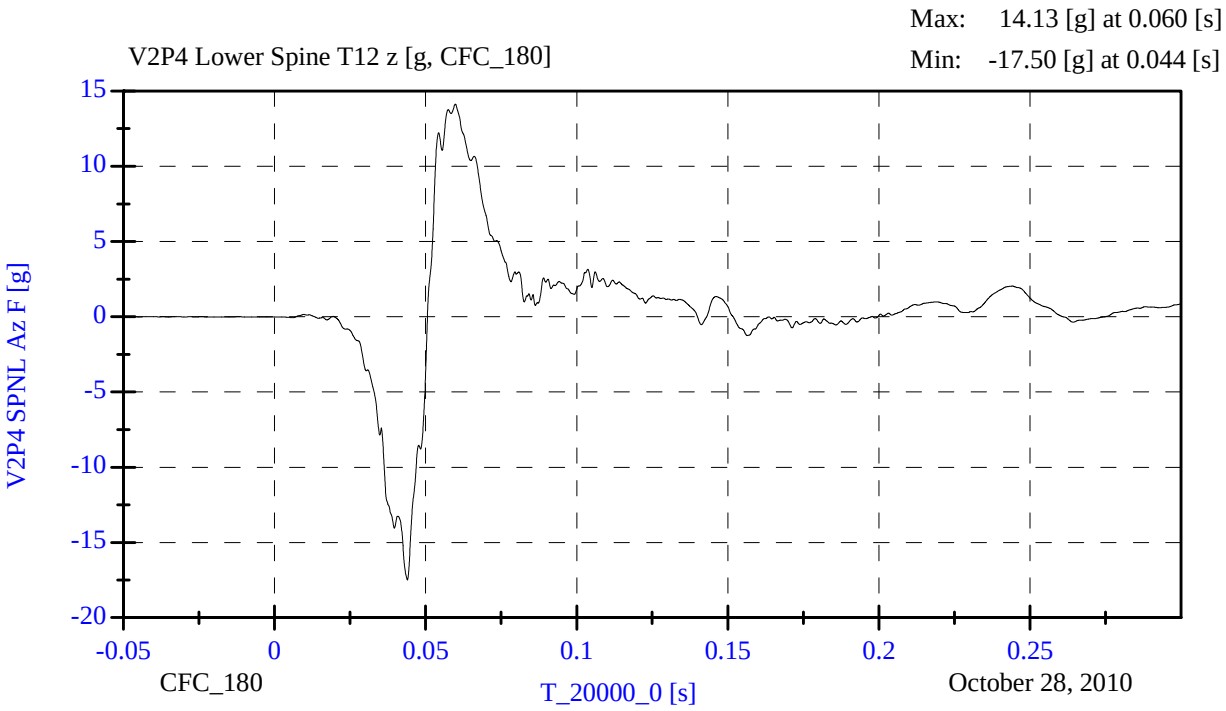
MB0216 SNCAP 2011 Ford Fusion



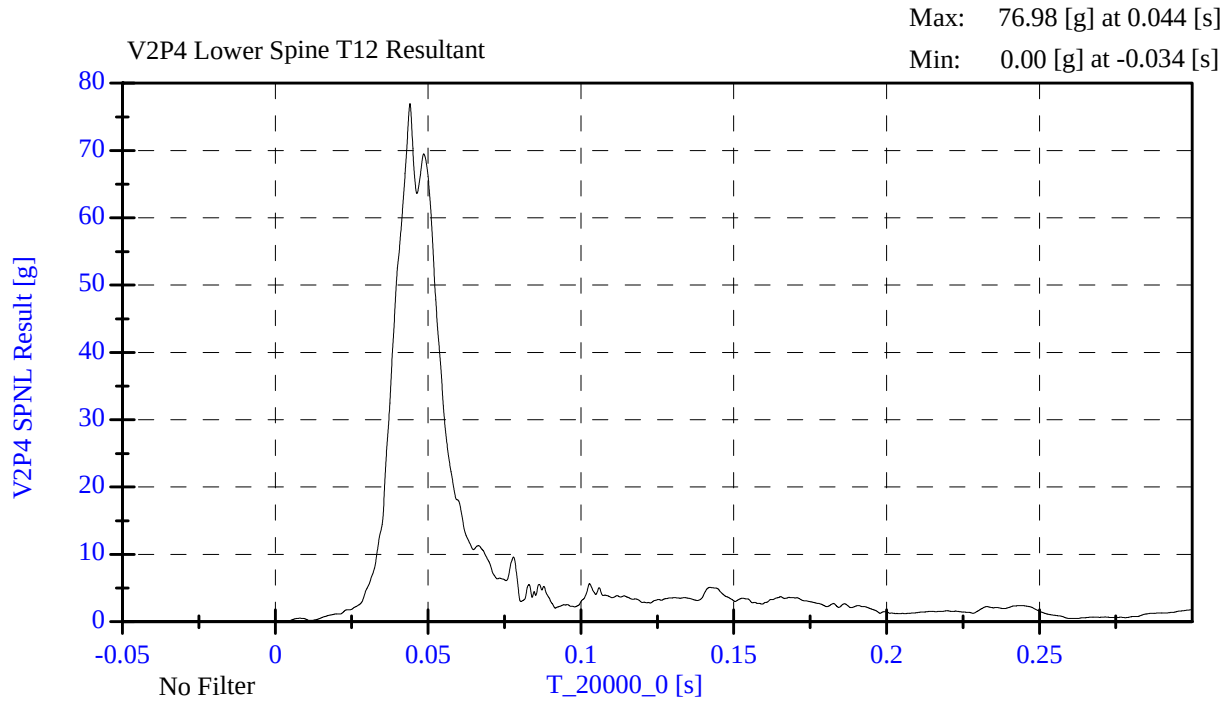


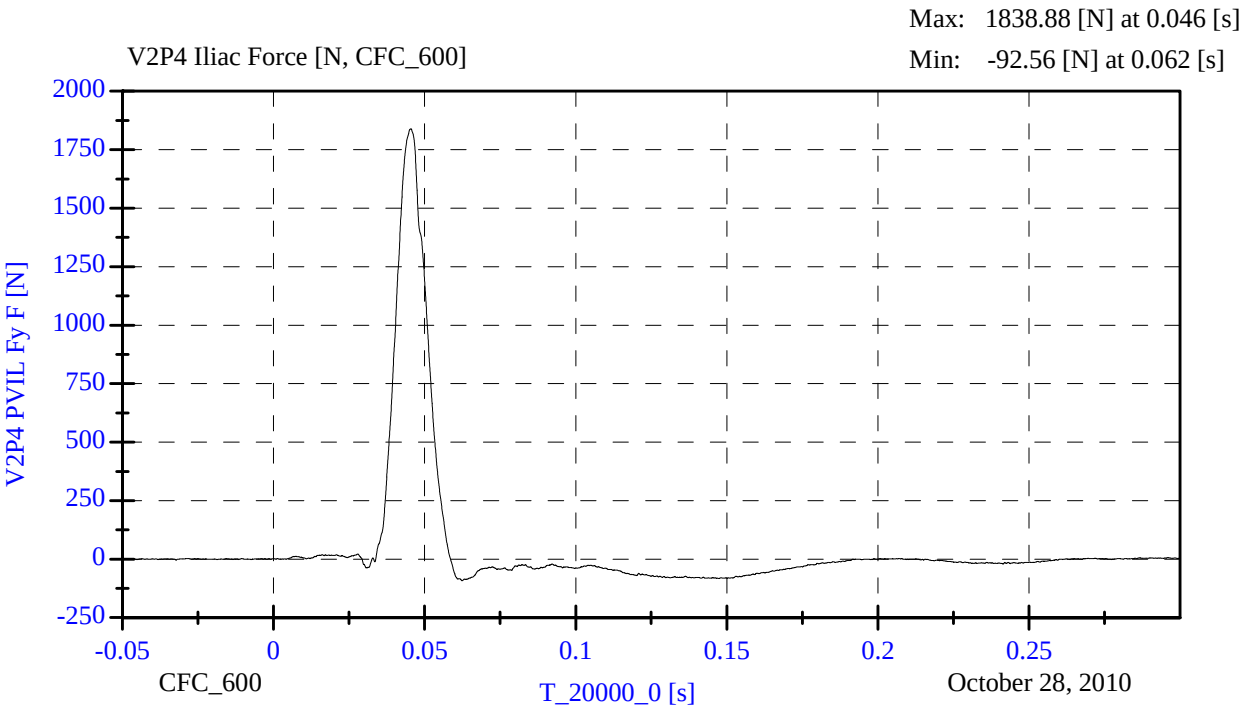
MB0216 SNCAP 2011 Ford Fusion



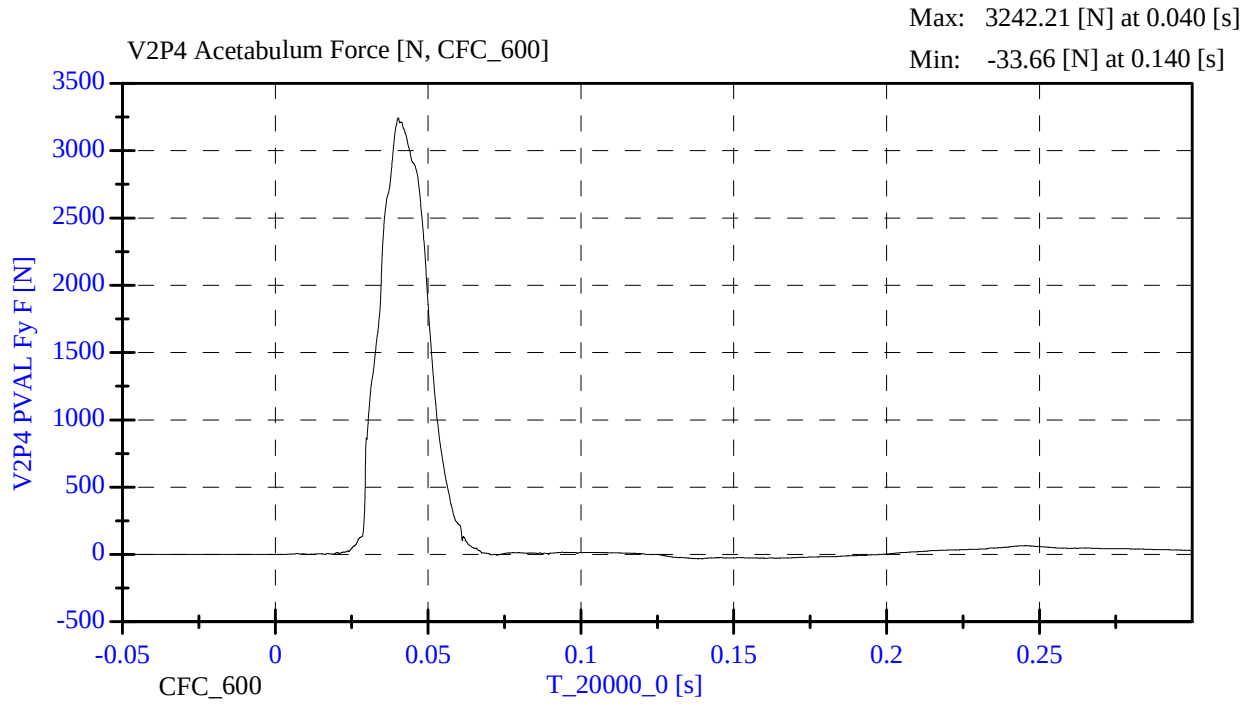


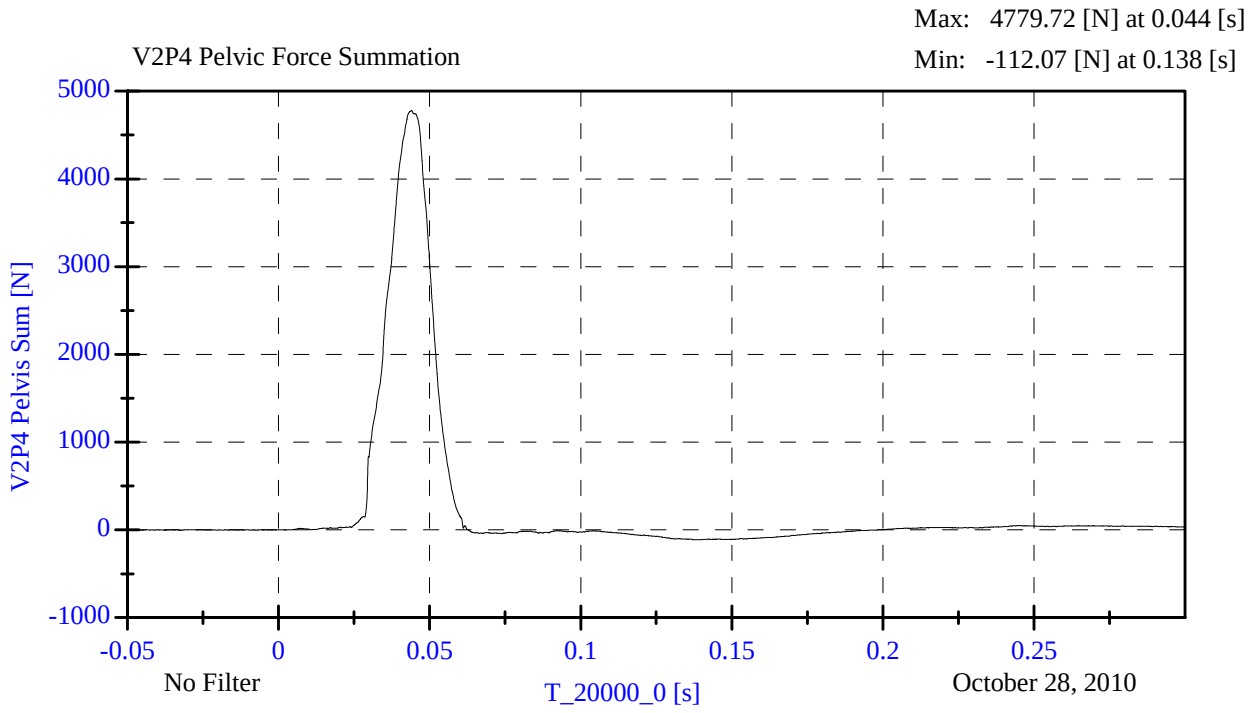
MB0216 SNCAP 2011 Ford Fusion





MB0216 SNCAP 2011 Ford Fusion





APPENDIX C

DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

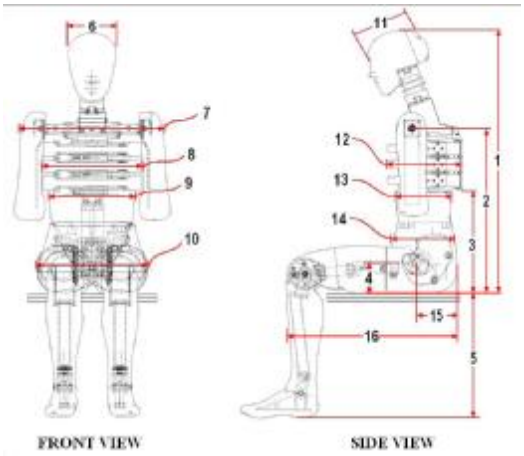
Es-2re No: 033

CONFIGURED FOR LEFT SIDE IMPACT

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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: 10/26/2010

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**2**	Test Time:	**9:40:04 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**48**	%RH	P
Resultant Acceleration	125	--	155	**142**	g	P
Oscillation	0.0	--	15.0	**5.8**	%	P
Fore-Aft Acceleration	-15.00	--	15.00	**5.70**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

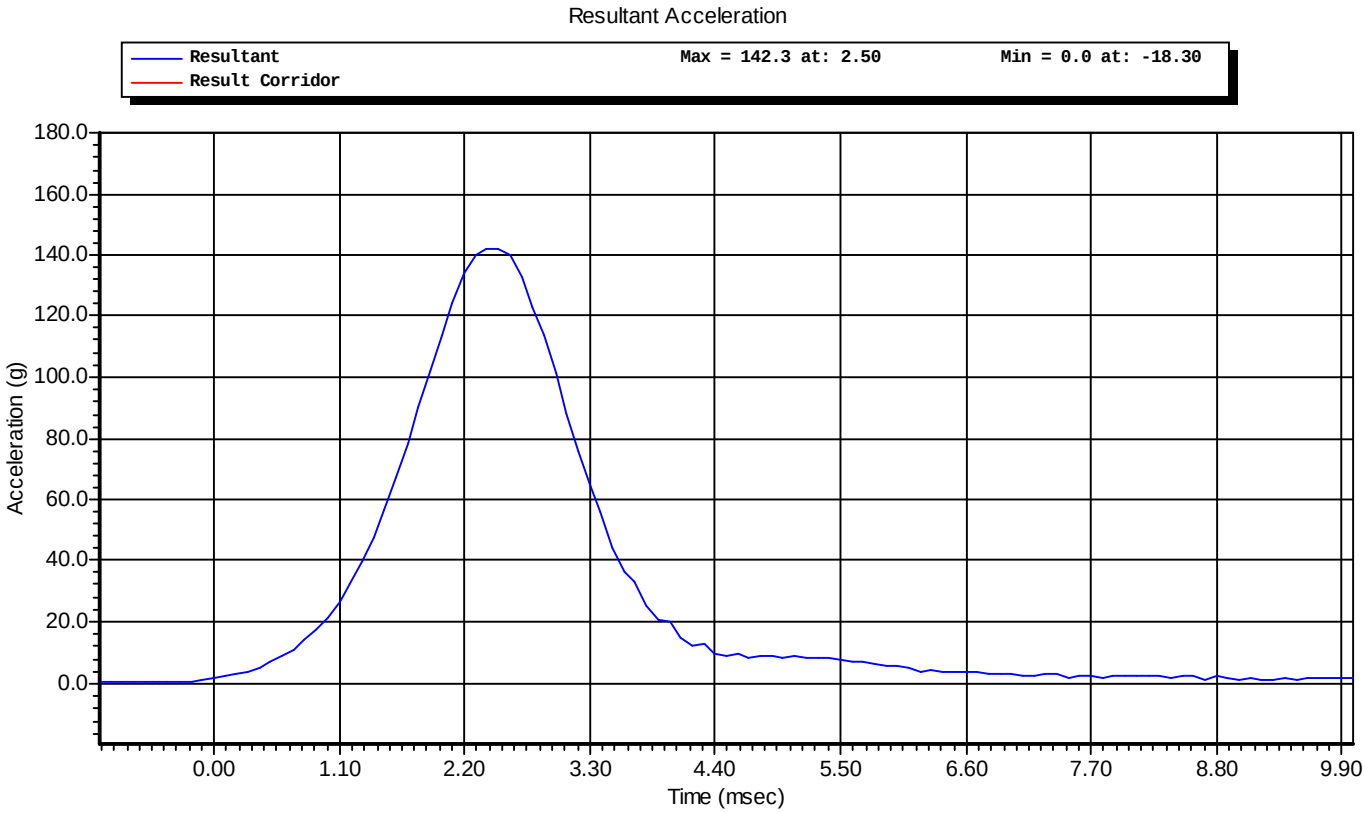
REFERENCE EQUIPMENT

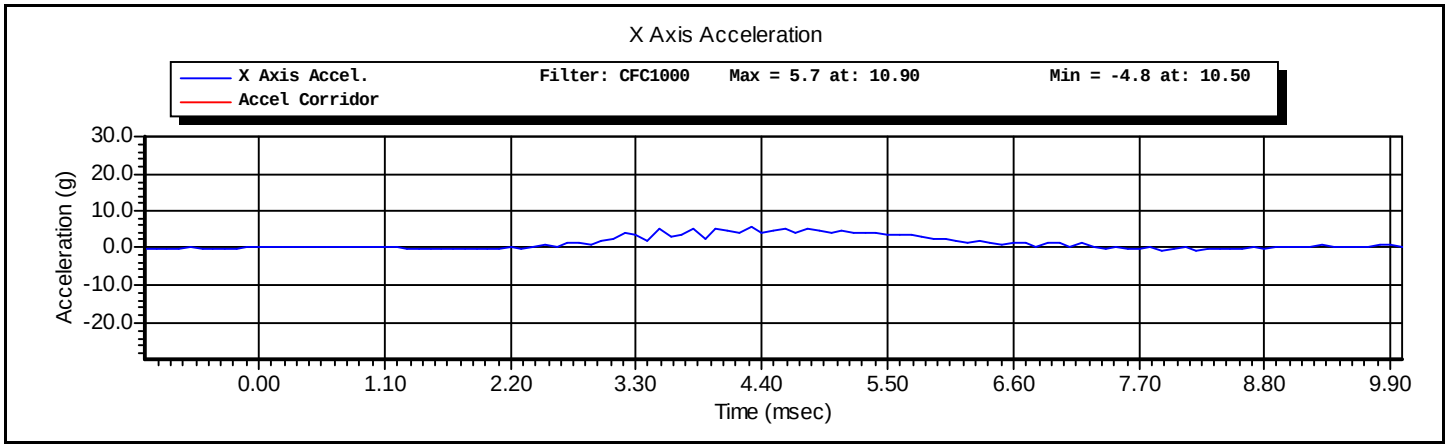
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51681**	**9/20/2010**
Endevco	**7264-2000**	**P51949**	**5/26/2010**
Endevco	**7264-2000**	**P51695**	**9/20/2010**

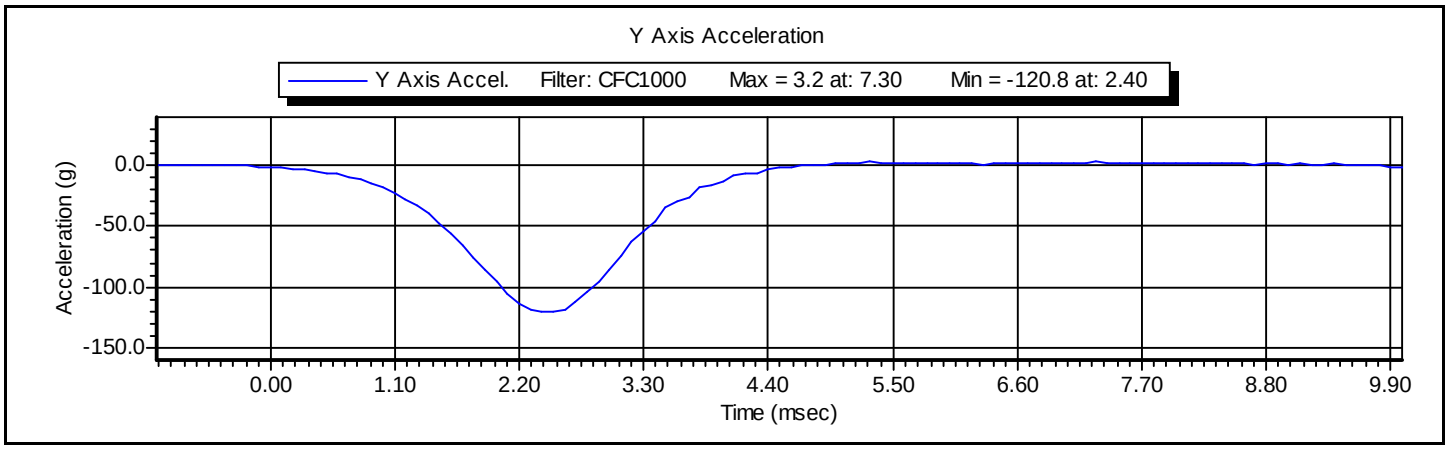
Test ID: **Head Drop** Test Time: **9:40:04 AM** Test Date: **10/25/2010**

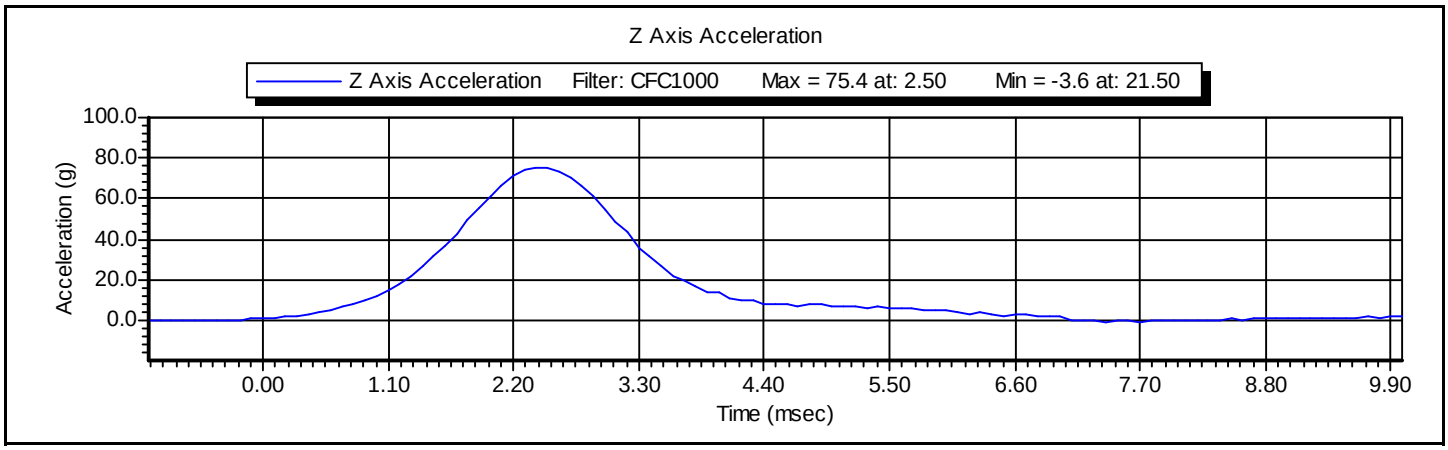
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**2**	Test Time:	**9:40:04 AM**









Test ID: **Head Drop** Test Time: **9:40:04 AM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 Flextion**	Test Date:	**10/22/2010**
Test Number:	**2**	Test Time:	**12:01:05 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**28**	%RH	P
Velocity	3.30	--	3.50	**3.44**	m/s	P
Maximum Neck Flexion Angle	49.0	--	59.0	**51.0**	degrees	P
Time At Maximum Neck Flexion	54.0	--	66.0	**59.9**	ms	P
Decay to Zero Degrees	53.0	--	88.0	**57.8**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

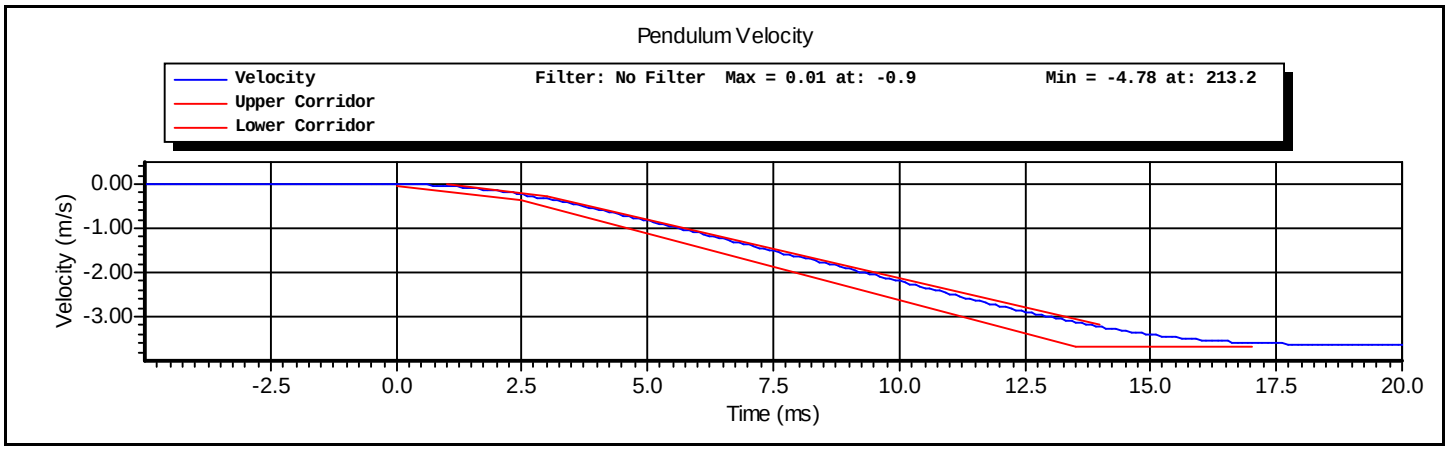
REFERENCE EQUIPMENT

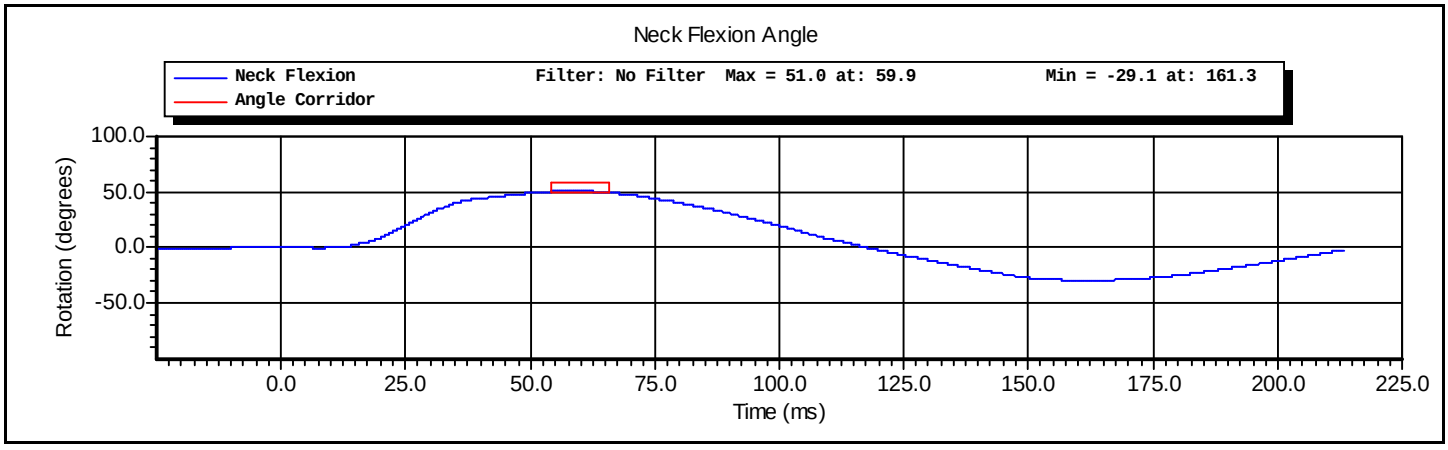
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

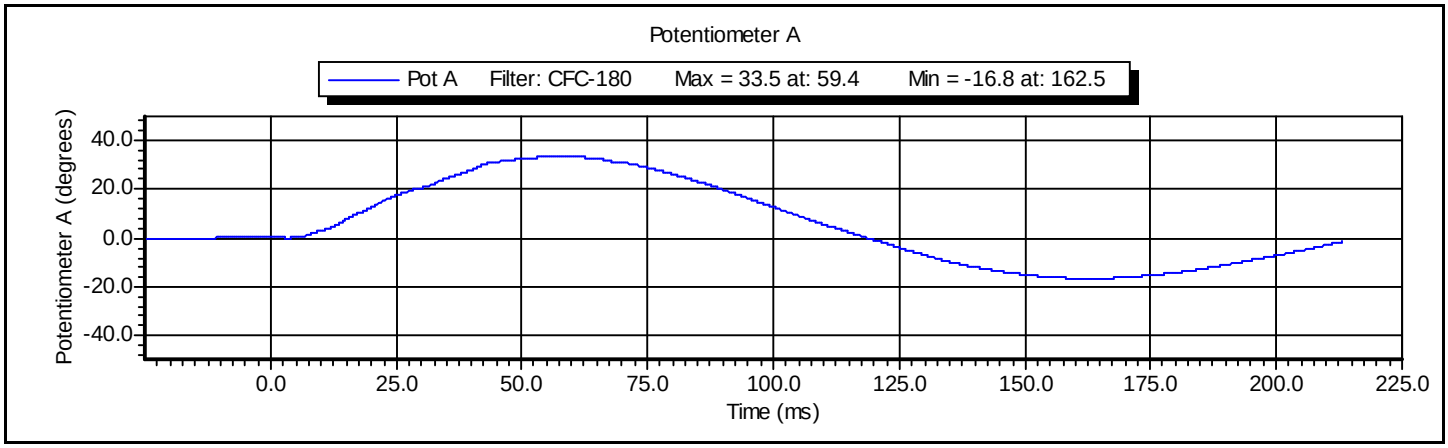
Test ID: **Neck Flextion** Test Time: **12:01:05 PM** Test Date: **10/22/2010**

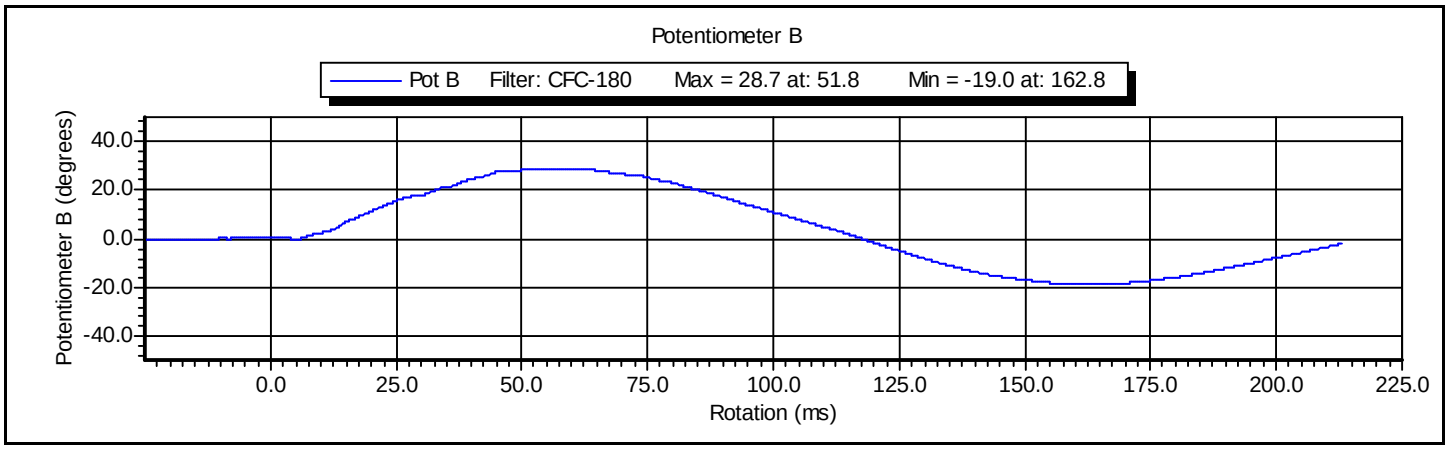
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

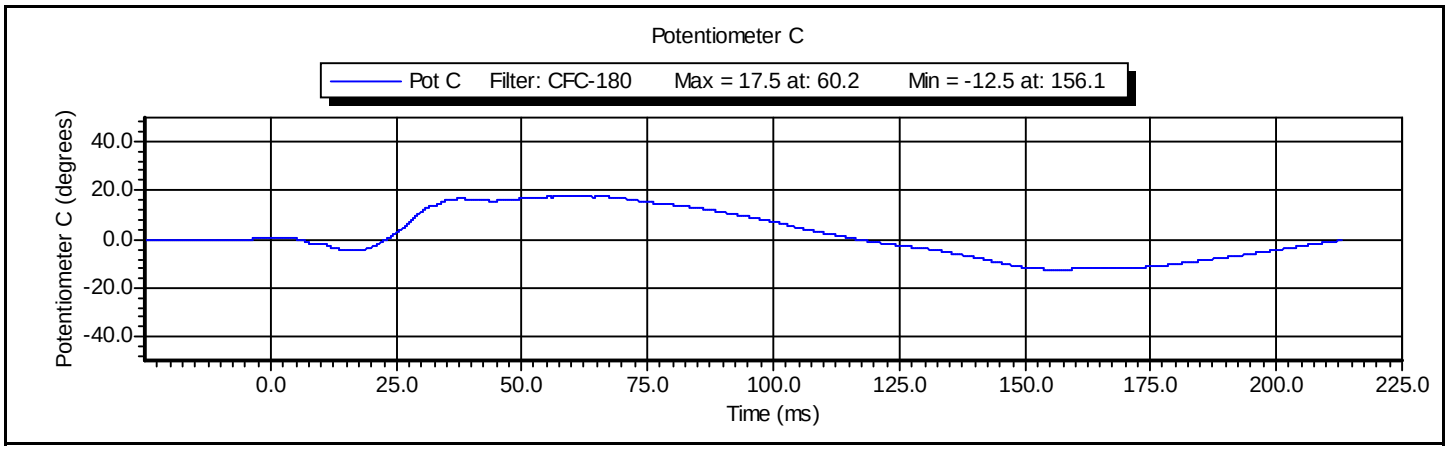
Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Neck Flextion**	Test Date:	**10/22/2010**
Test Number:	**2**	Test Time:	**12:01:05 PM**











Test ID: **Neck Flextion** Test Time: **12:01:05 PM** Test Date: **10/22/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/26/2010**
Test Number:	**1**	Test Time:	**9:37:51 AM**

Component Part Number	Component Serial Number
960715-313	

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.6**	deg C	P
Humidity	10.0	--	70.0	**59.0**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Pendulum Acceleration	-10.50	--	-7.50	**-9.61**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

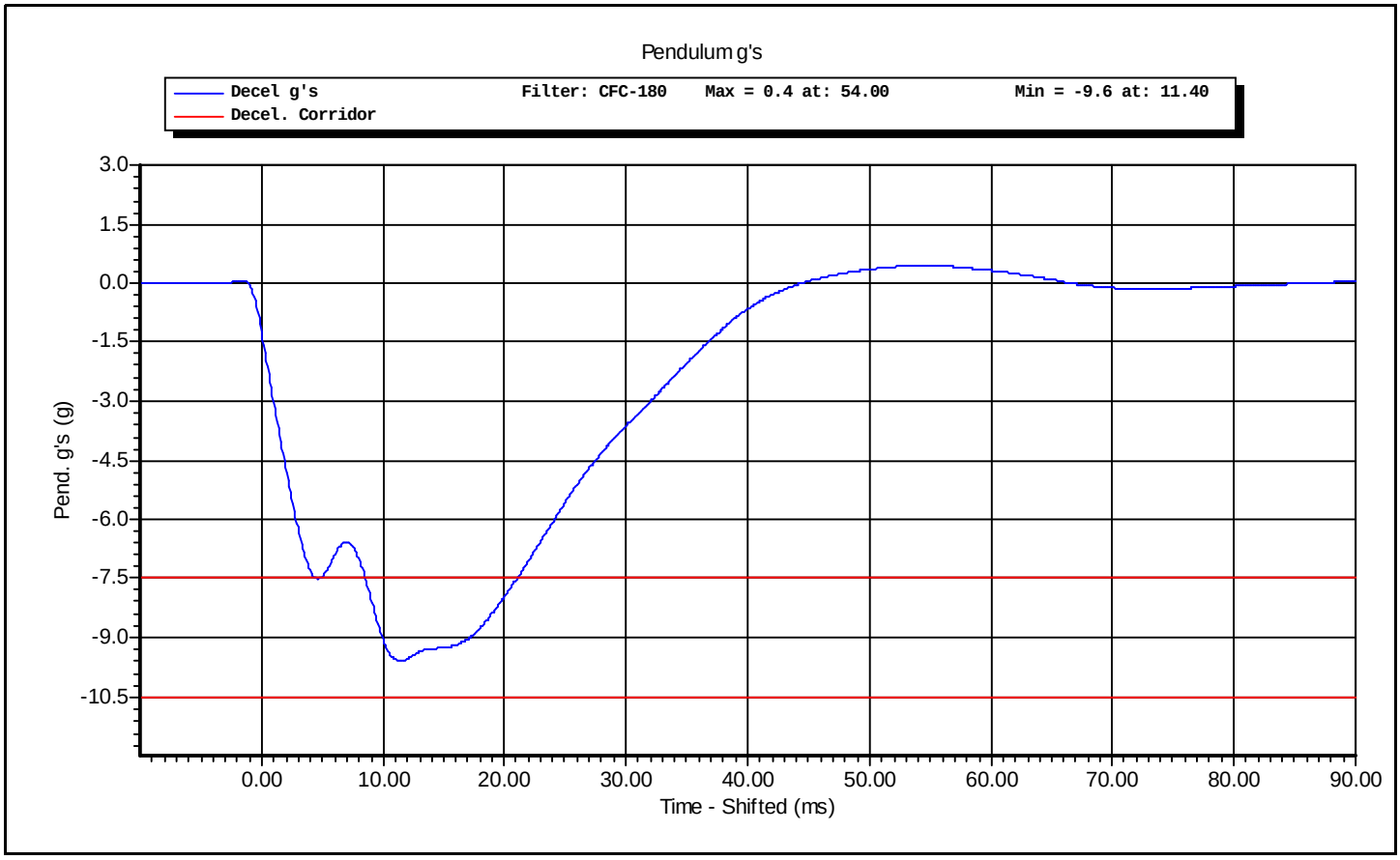
REFERENCE EQUIPMENT

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: **9:37:51 AM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/26/2010**
Test Number:	**1**	Test Time:	**9:37:51 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/26/2010**
Test Number:	**1**	Test Time:	**9:48:42 AM**

Component Part Number	Component Serial Number
Upper Rib - 175-4002	**UPPER**
Middle Rib - 175-4002	**MIDDLE**
Lower Rib - 175-4002	**LOWER**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.8**	deg C	P
Humidity	10.0	--	70.0	**59.0**	%RH	P
Velocity	5.40	--	5.60	**5.49**	m/s	P
Upper Rib Displacement	34.0	--	41.0	**37.5**	mm	P
Middle Rib Displacement	37.0	--	45.0	**41.2**	mm	P
Lower Rib Displacement	37.0	--	44.0	**41.0**	mm	P
Impactor Force	5100	--	6200	**5287**	N	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

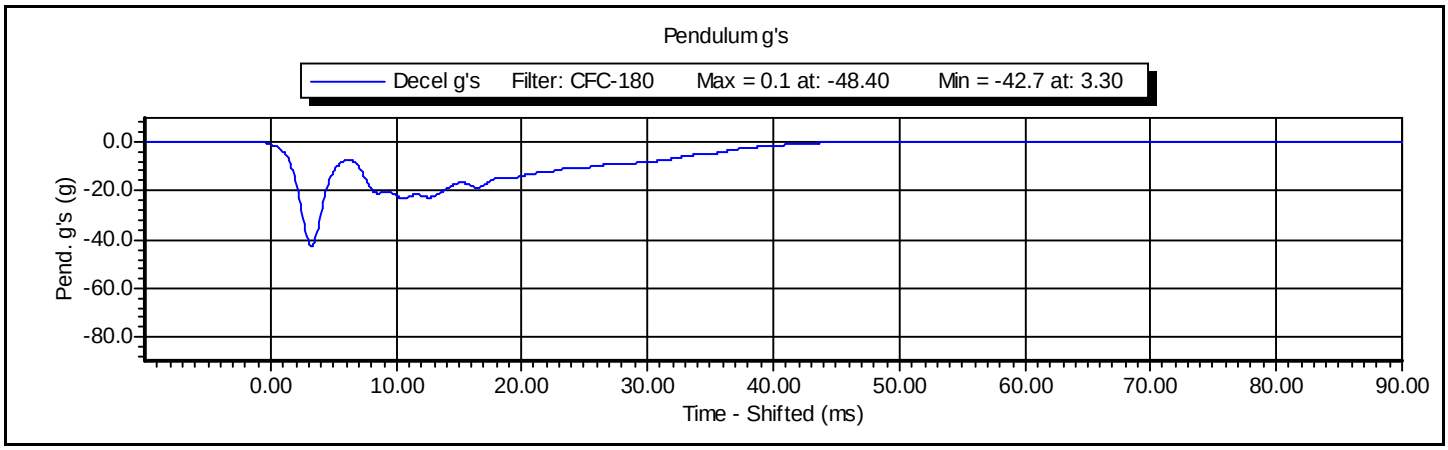
REFERENCE EQUIPMENT

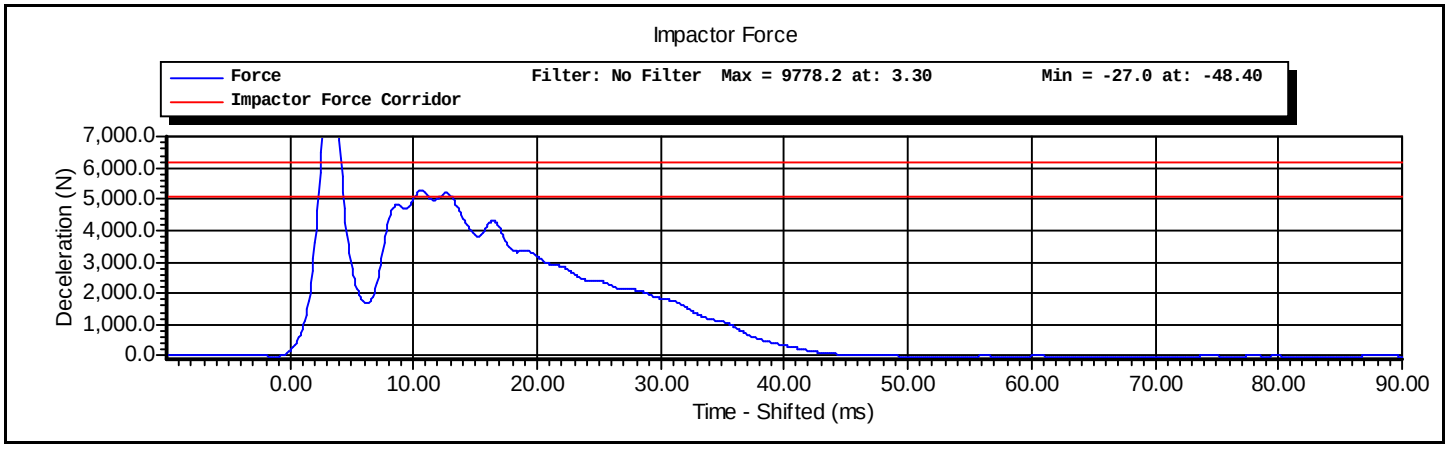
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**

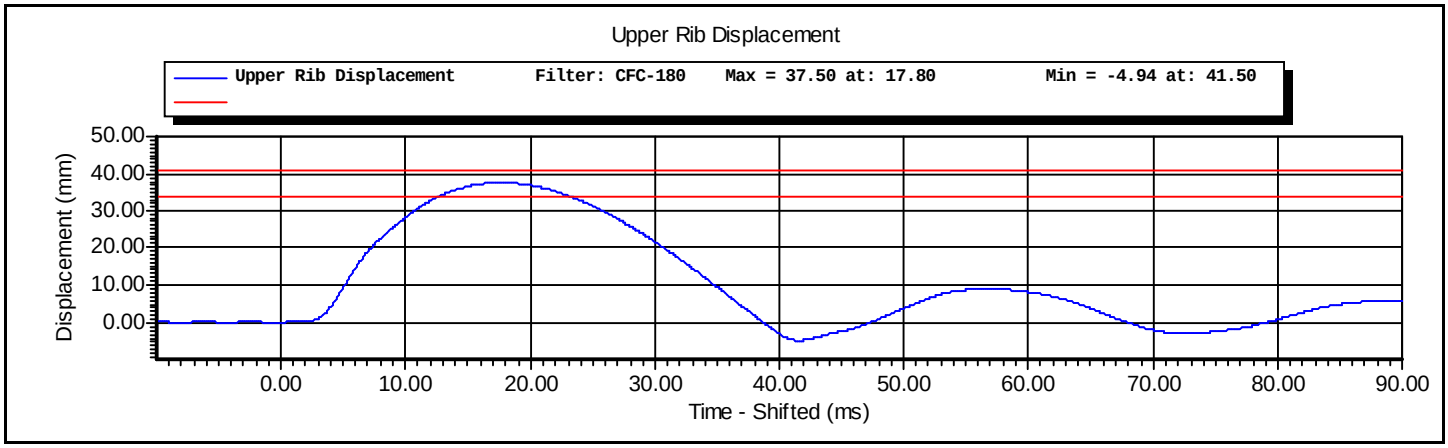
Test ID: **Thorax** Test Time: **9:48:42 AM** Test Date: **10/26/2010**

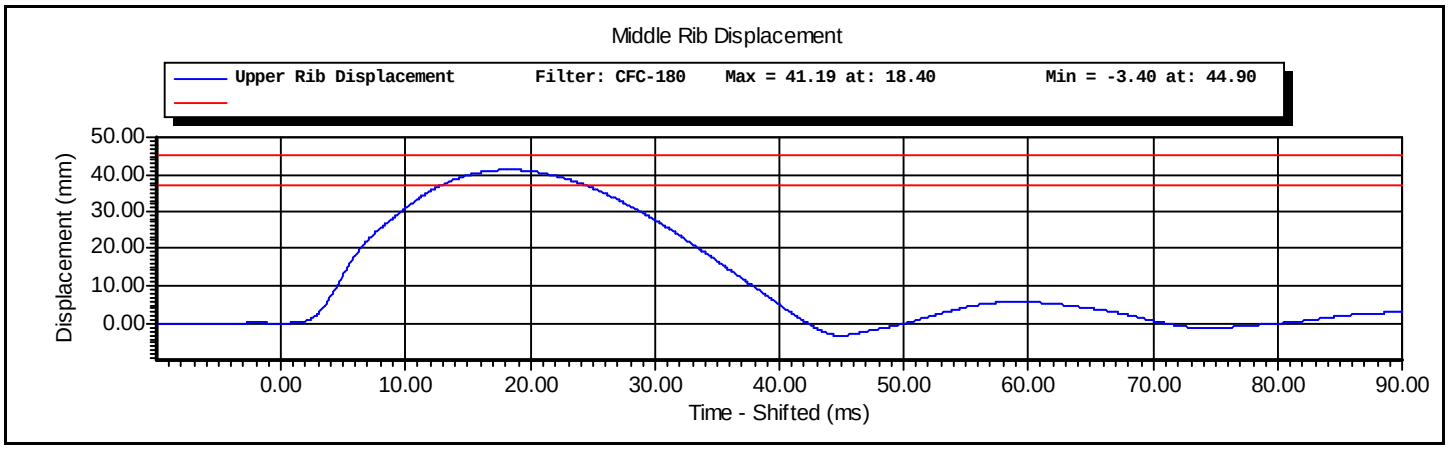
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

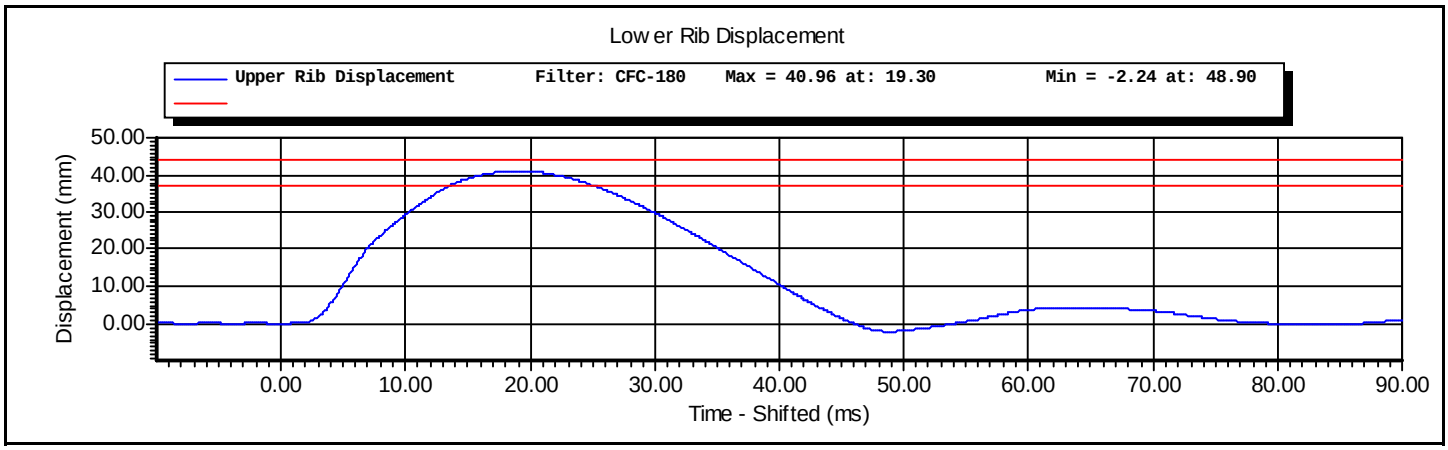
Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**9:48:42 AM**











Test ID: **Thorax** Test Time: **9:48:42 AM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**1:52:01 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	**48.0**	%RH	P
Velocity	3.90	--	4.10	**3.98**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.48**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

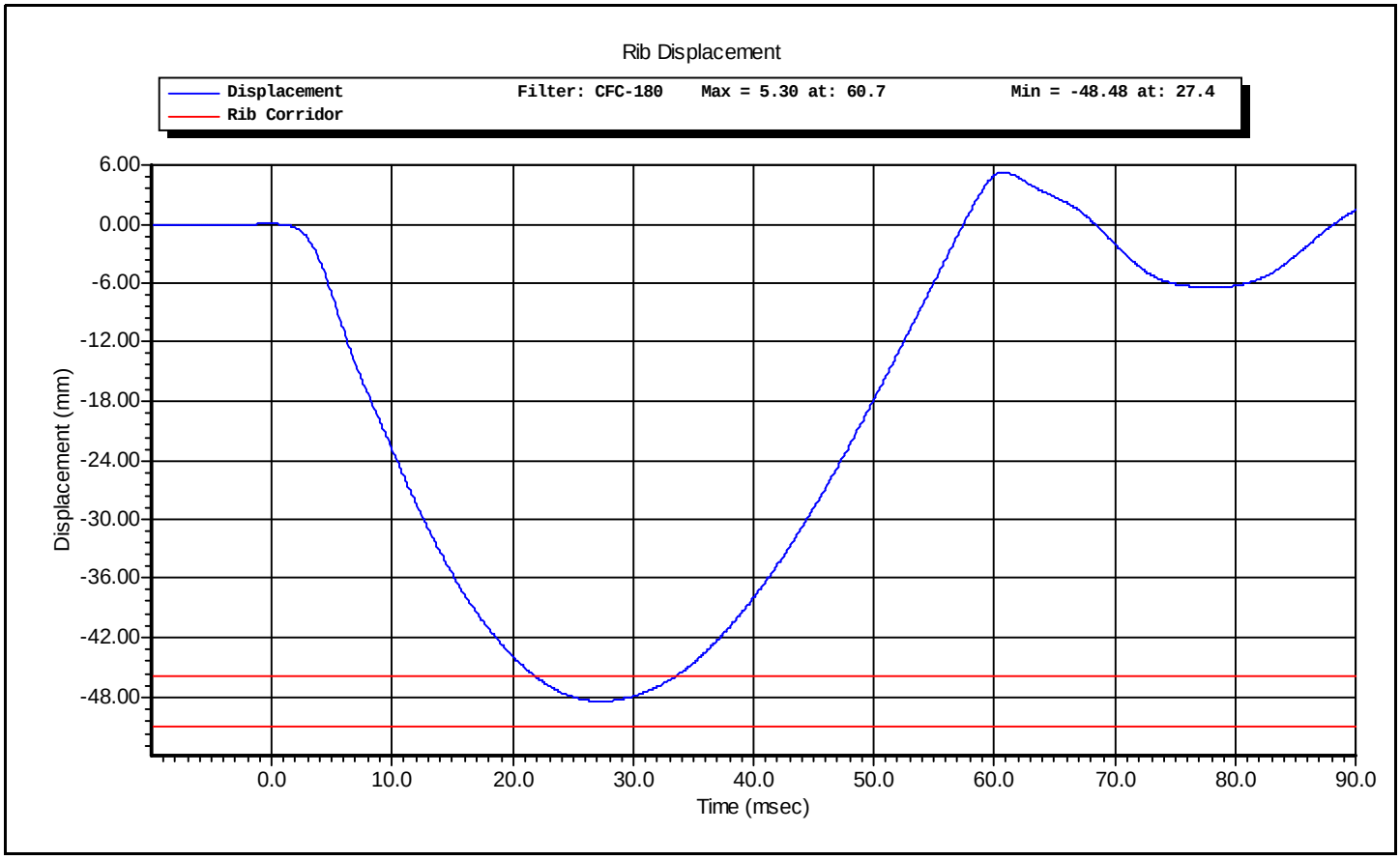
REFERENCE EQUIPMENT

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 4.0 m/s** Test Time: **1:52:01 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Full Rib Module Impact**	Revision:	**12/14/2006**
Sub Test Name:	**4.0 Meters/Second**	Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Upper Rib 4.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**1:52:01 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:01:46 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	**48.0**	%RH	P
Velocity	2.90	--	3.10	**2.96**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.66**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

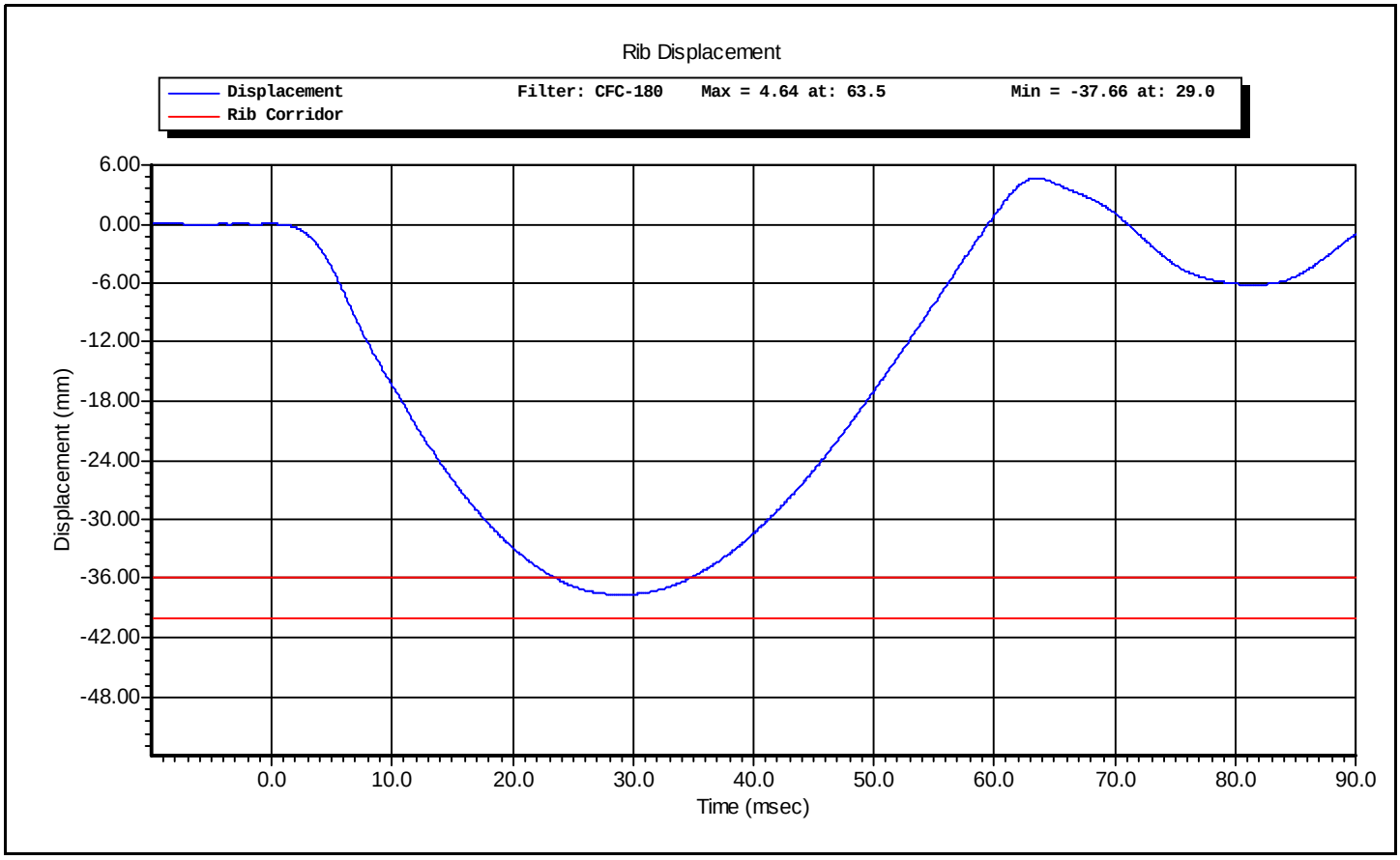
REFERENCE EQUIPMENT

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: **2:01:46 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:01:46 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 4.0m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:12:53 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	**49.0**	%RH	P
Velocity	3.90	--	4.10	**3.97**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-47.43**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

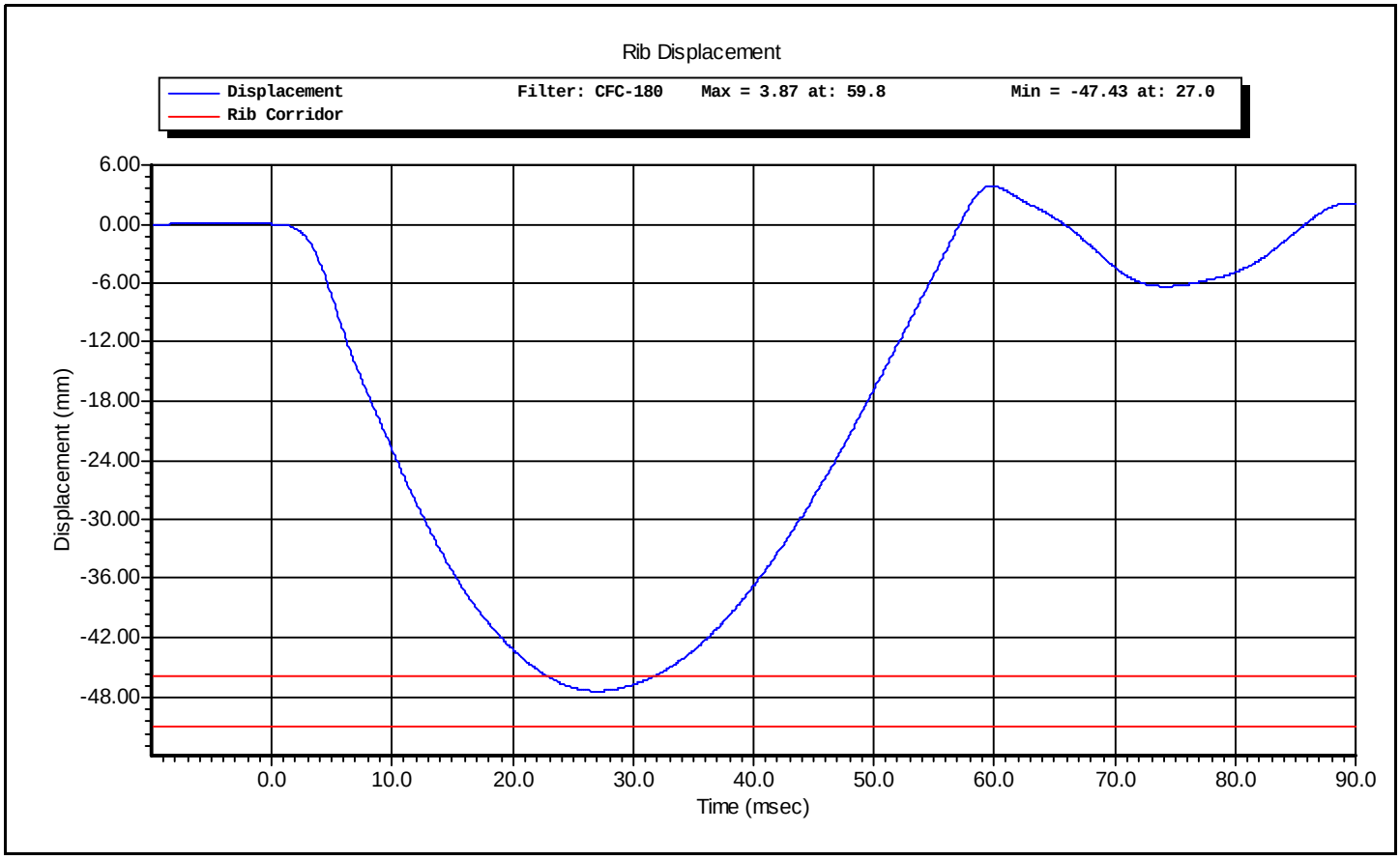
REFERENCE EQUIPMENT

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: **Upper Rib 4.0m/s** Test Time: **2:12:53 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 4.0m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:12:53 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 3.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:23:55 PM**

Component Part Number	Component Serial Number
455-3100	

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**49.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.02**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

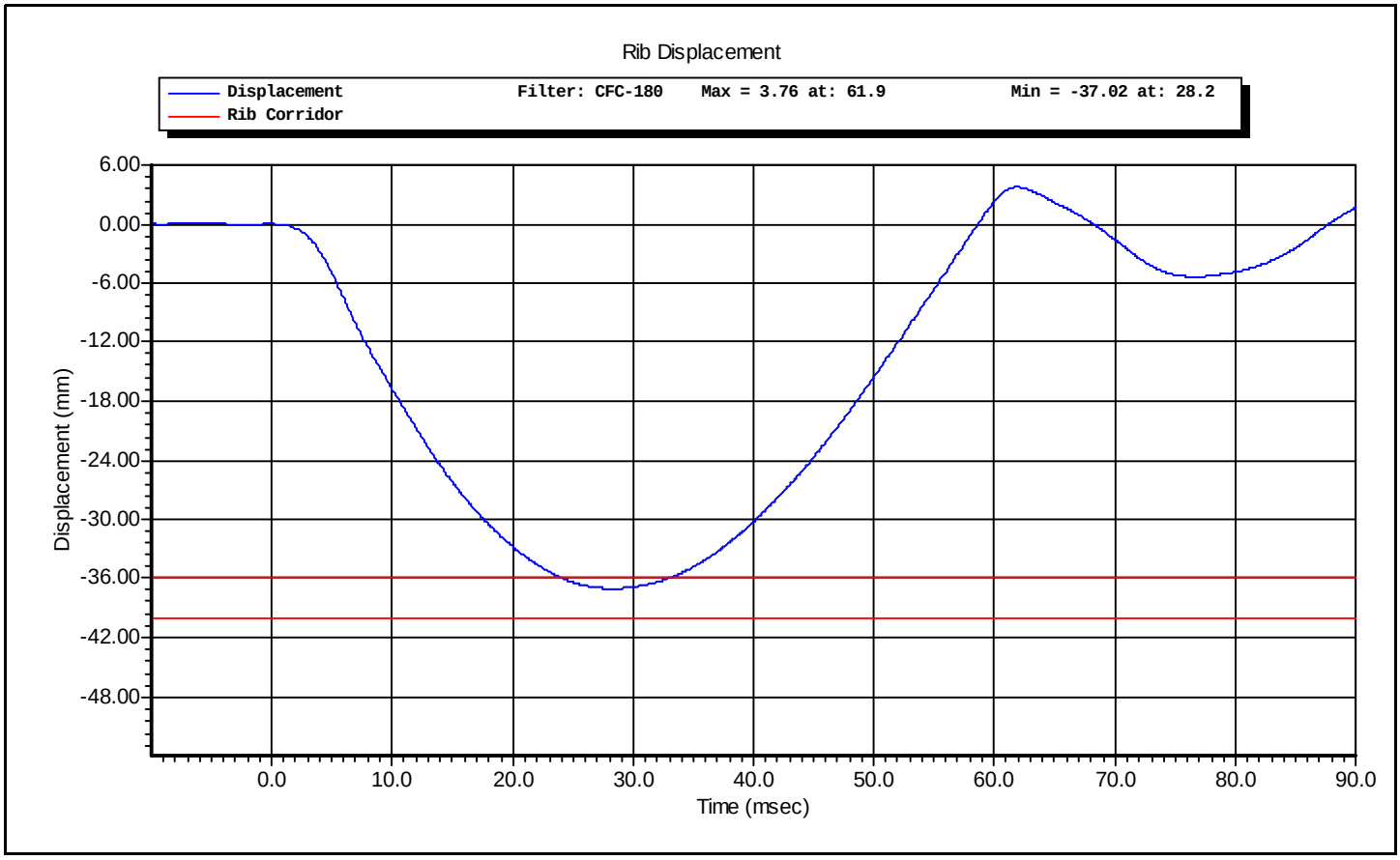
REFERENCE EQUIPMENT

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 3.0 m/s** Test Time: **2:23:55 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 3.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:23:55 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:30:21 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	**49.0**	%RH	P
Velocity	3.90	--	4.10	**3.98**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.03**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

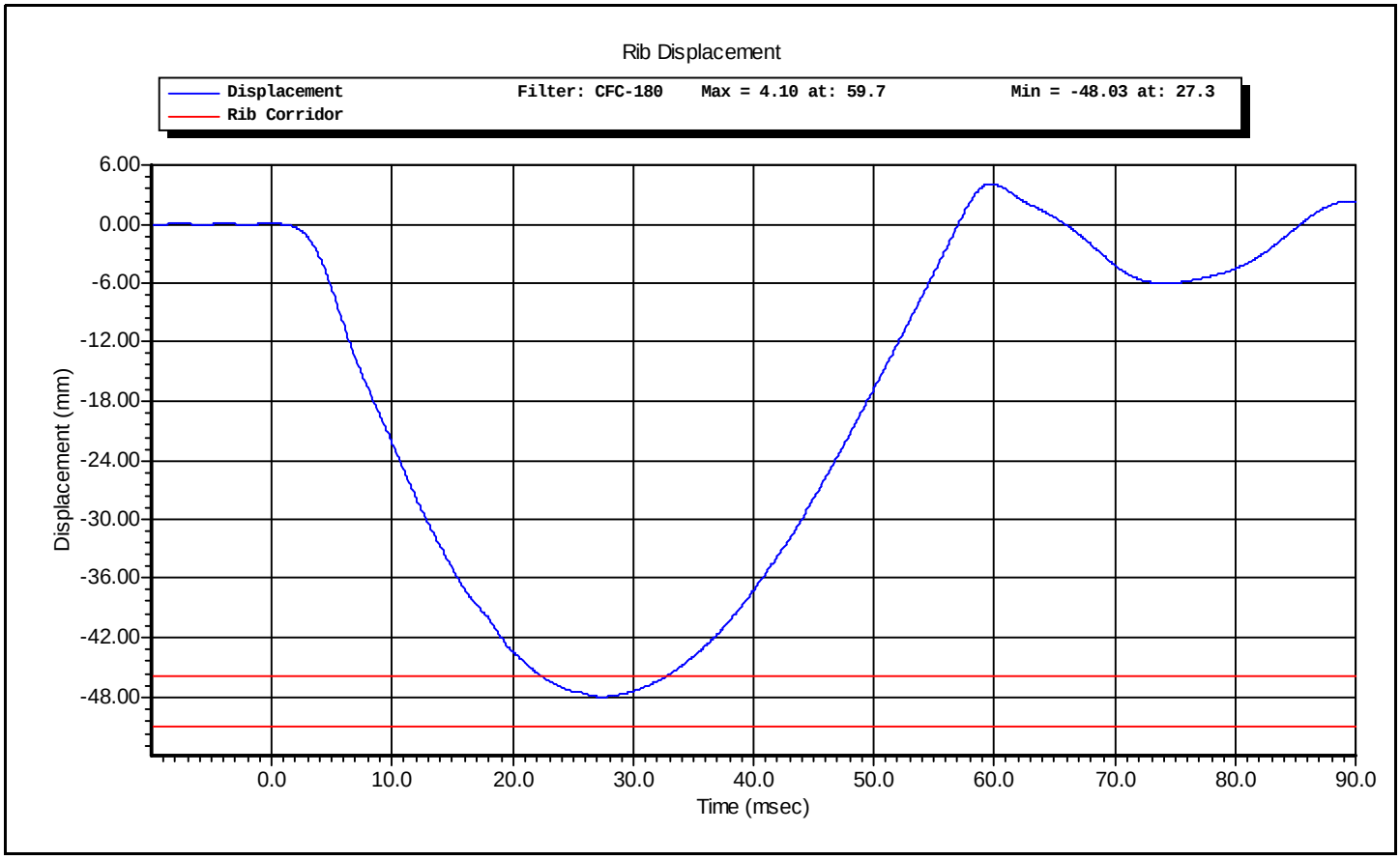
REFERENCE EQUIPMENT

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: **2:30:21 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:30:21 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 3.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:35:47 PM**

Component Part Number	Component Serial Number
455-3100	

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10.0	--	70.0	**49.0**	%RH	P
Velocity	2.90	--	3.10	**2.97**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-37.34**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

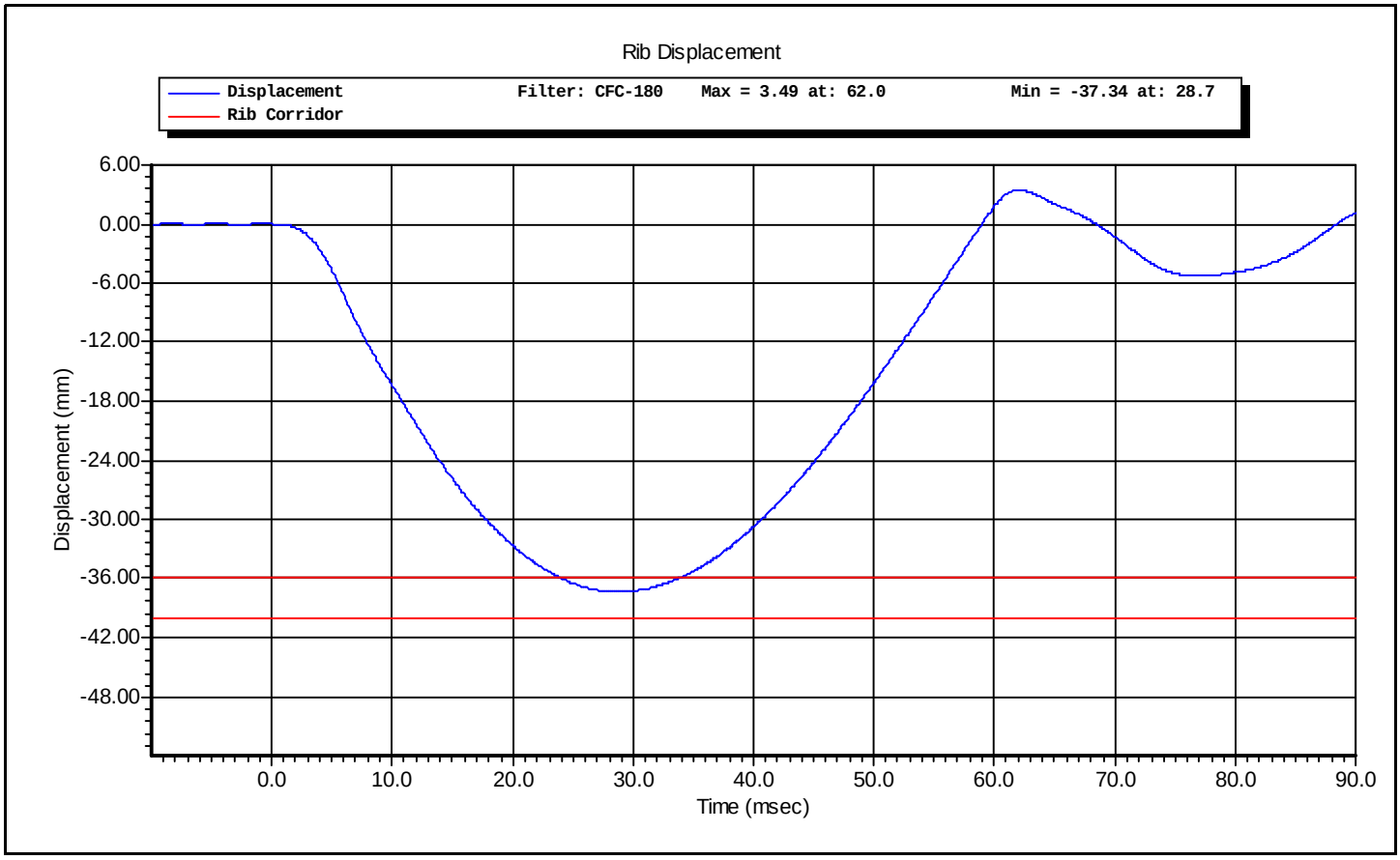
REFERENCE EQUIPMENT

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 3.0 m/s** Test Time: **2:35:47 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 3.0 m/s**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**2:35:47 PM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**1**	Test Time:	**4:02:48 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	**52**	%RH	P
Velocity	3.90	--	4.10	**4.04**	m/s	P
Peak Abdominal Force	-2.70	--	-2.20	**-2.39**	kN	P
Time At Peak Abdominal Force	10.0	--	12.3	**11.2**	ms	P
Maximum Pendulum Force	-4.80	--	-4.00	**-4.47**	kN	P
Time at Peak Pendumlum Force	10.6	--	13.0	**12.0**	ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

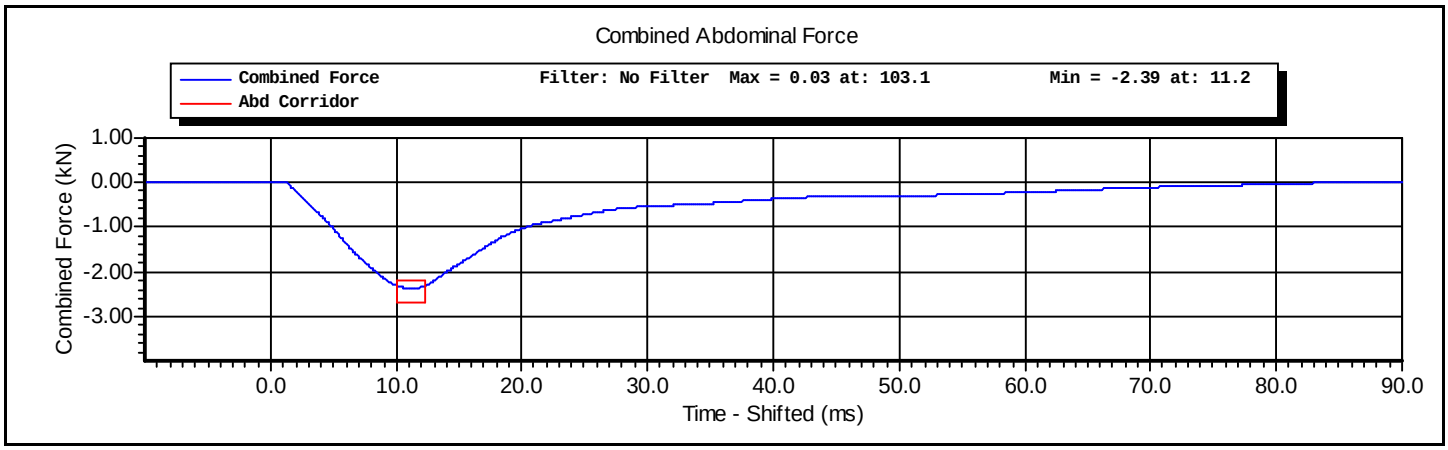
VERIFICATION REPORT

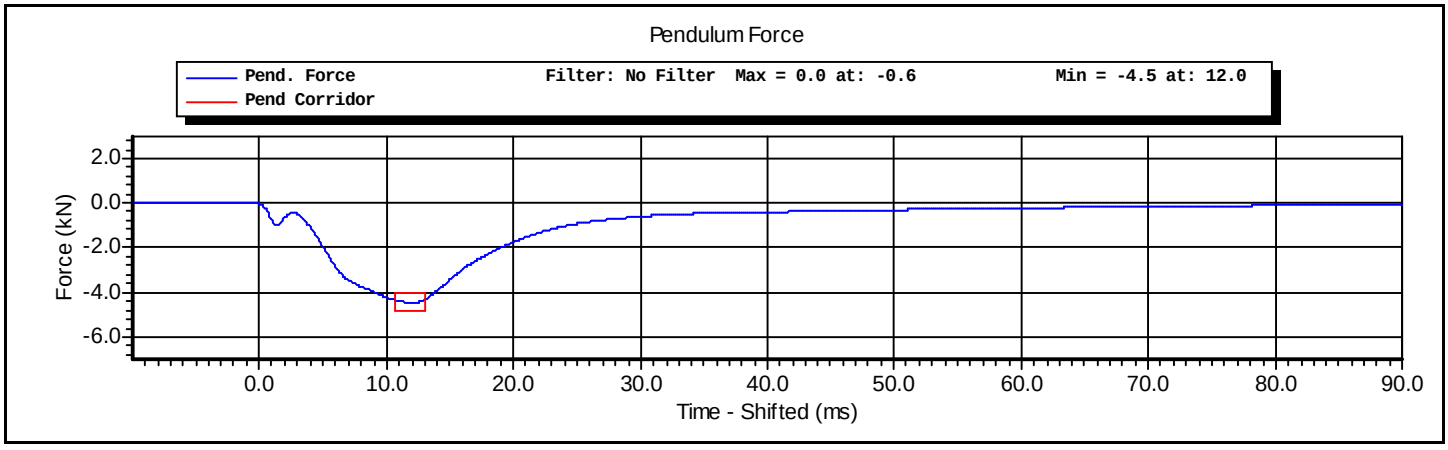
REFERENCE EQUIPMENT

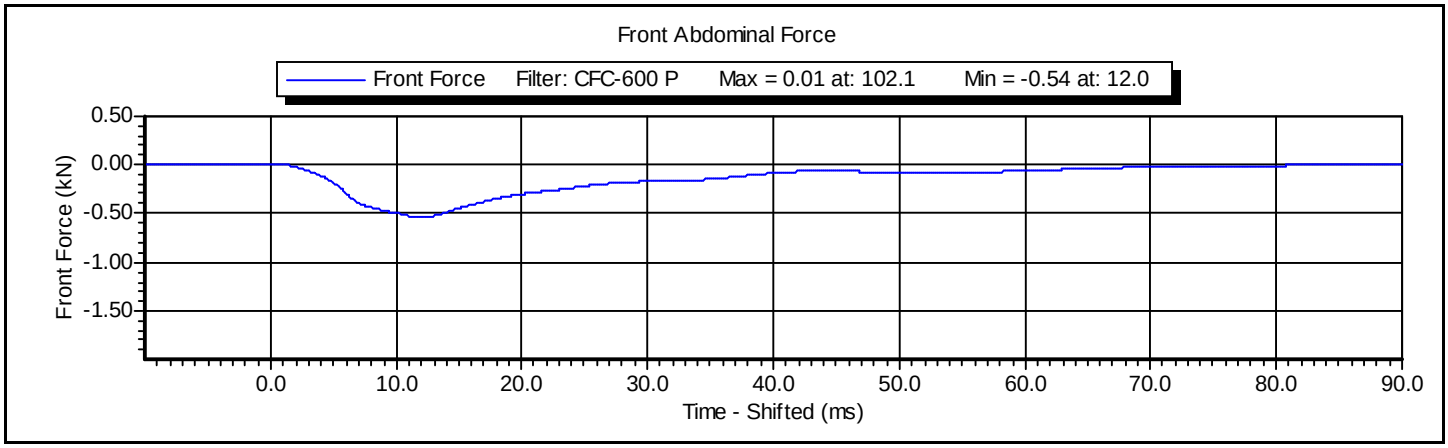
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**2631**	**LC-1524**	**4/22/2010**
Denton	**2631**	**LC-1523**	**4/22/2010**
Denton	**2631**	**LC-1530**	**4/22/2010**

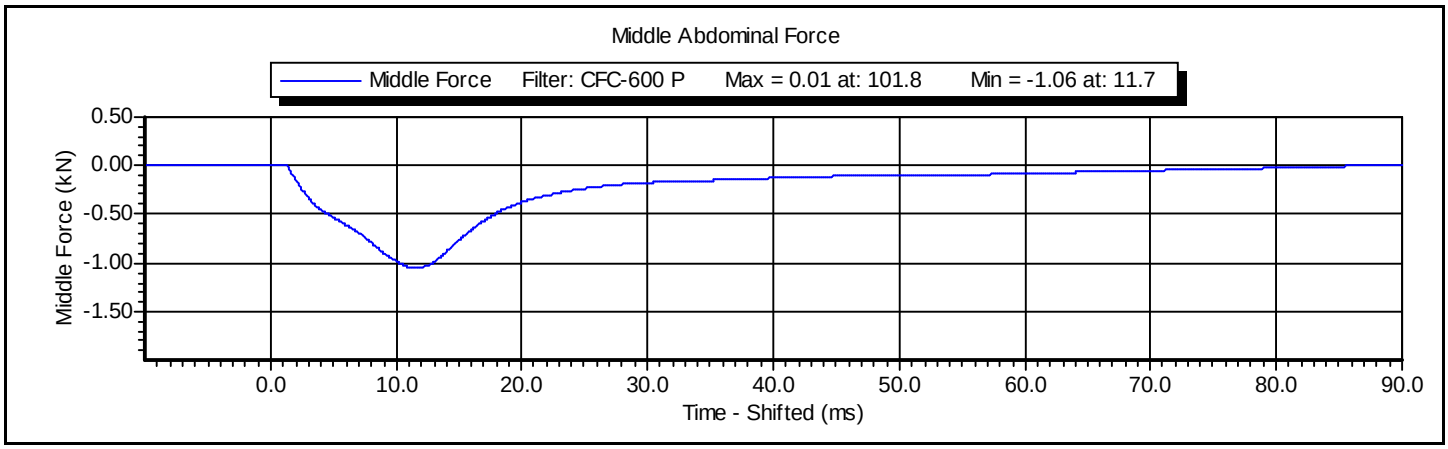
Test ID: **Abdomen** Test Time: **4:02:48 PM** Test Date: **10/25/2010**

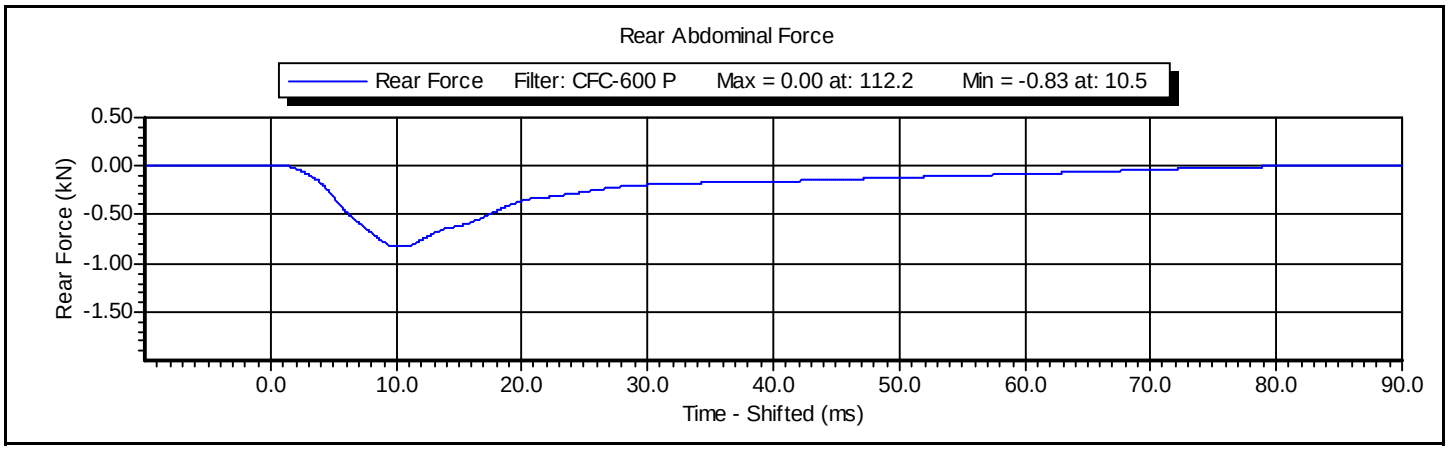
Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdomen**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**4:02:48 PM**











Test ID: **Abdomen** Test Time: **4:02:48 PM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**Lumbar Spine**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**11:33:27 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**48**	%RH	P
Velocity	5.95	--	6.15	**6.15**	m/s	P
Maximum Headform Flexion Angle	45.0	--	55.0	**48.9**	degrees	P
Time at Maximum Headform Flexion Angle	39.0	--	53.0	**45.0**	ms	P
Decay to Zero Degrees	37.0	--	57.0	**37.4**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

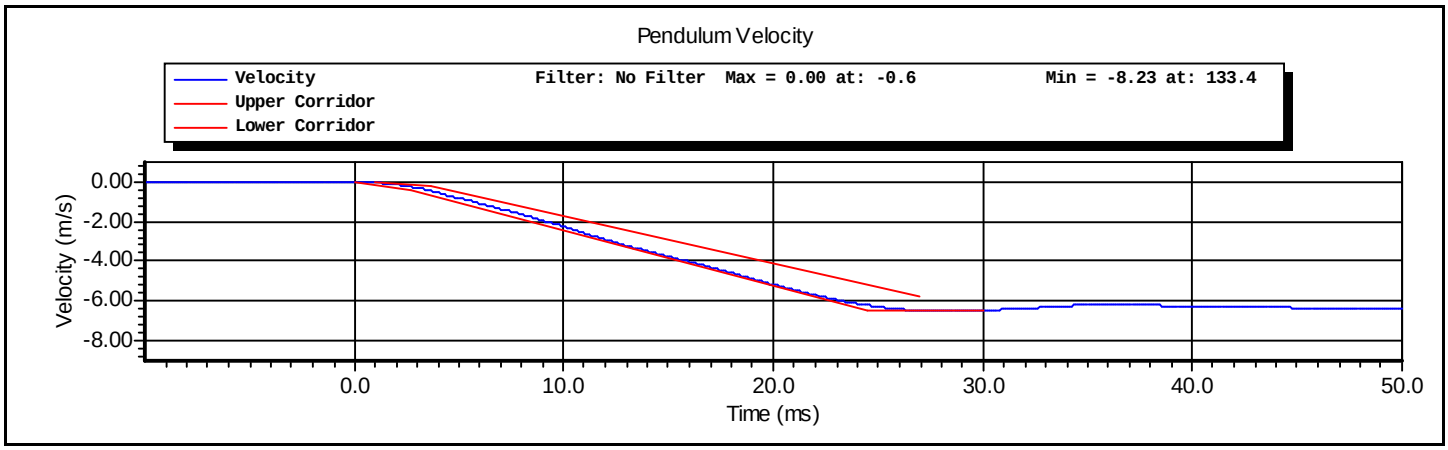
REFERENCE EQUIPMENT

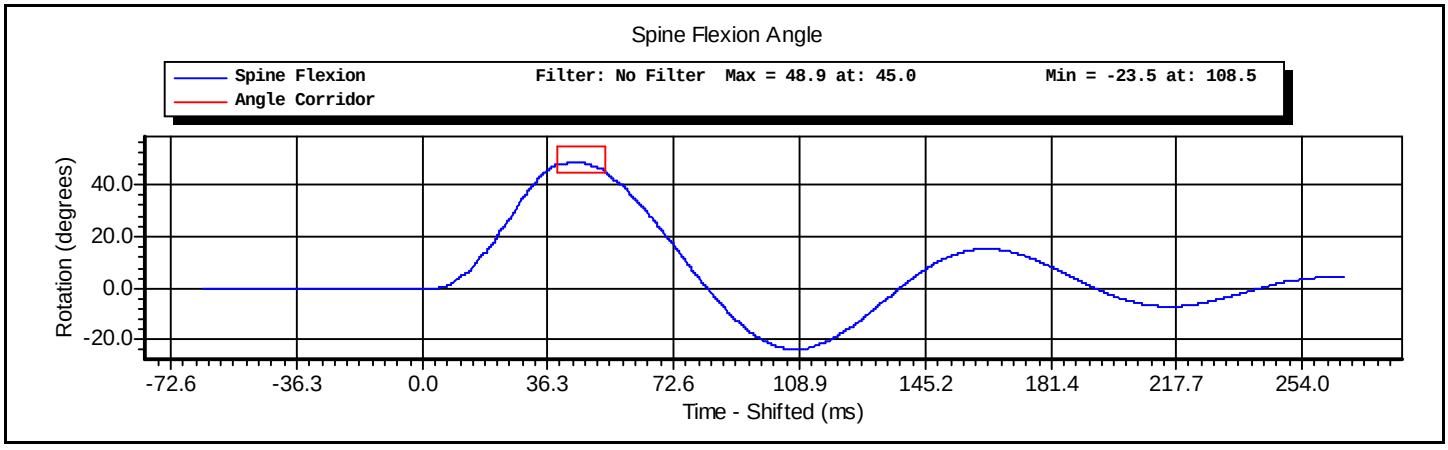
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

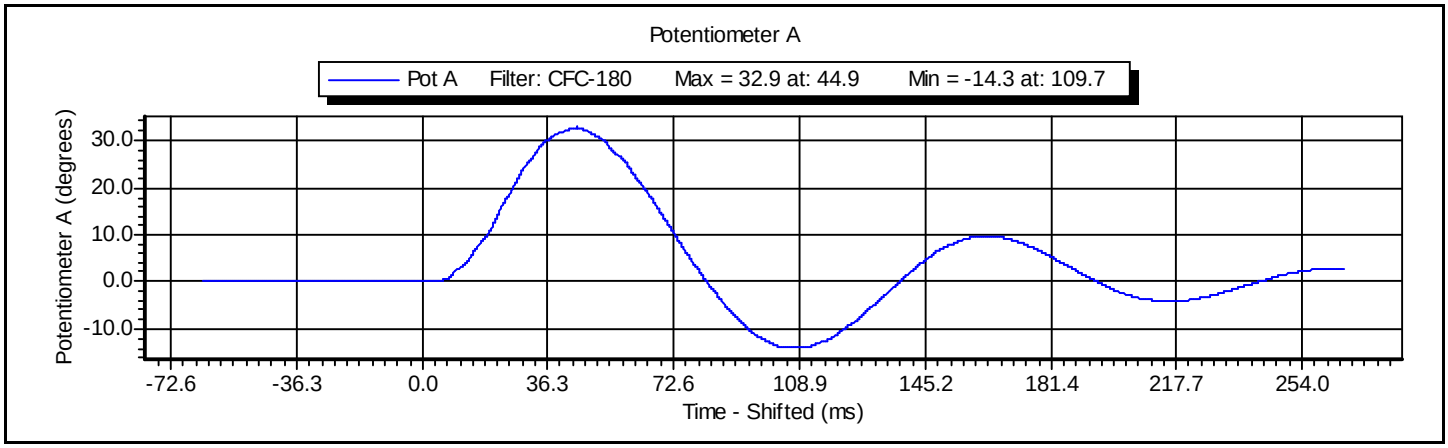
Test ID: **Lumbar Spine** Test Time: **11:33:27 AM** Test Date: **10/25/2010**

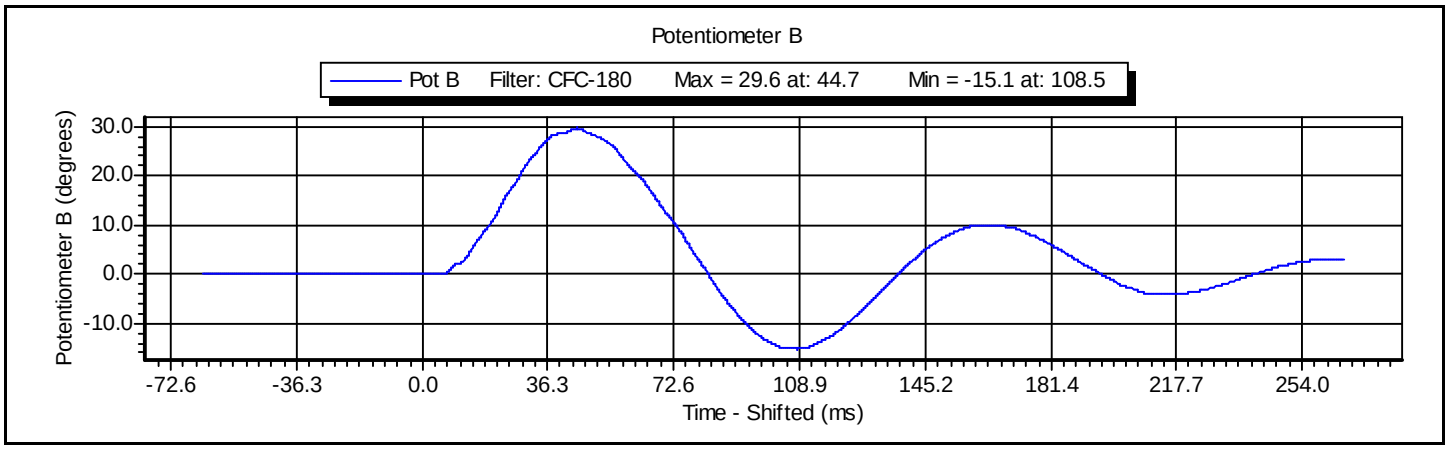
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

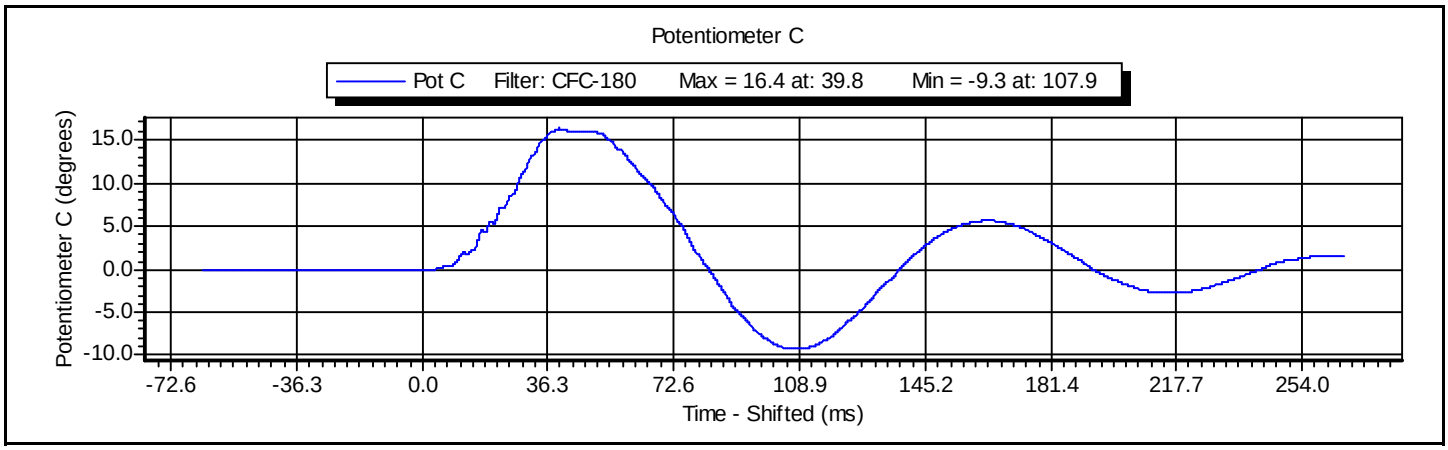
Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lumbar Spine**	Test Date:	**10/25/2010**
Test Number:	**1**	Test Time:	**11:33:27 AM**











Test ID: **Lumbar Spine** Test Time: **11:33:27 AM** Test Date: **10/25/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**10/25/2010**
Test Number:	**2**	Test Time:	**3:43:18 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**52**	%RH	P
Velocity	4.20	--	4.40	**4.34**	m/s	P
Peak Pendulum Force	-5.40	--	-4.70	**-5.12**	kN	P
Time at Peak Pendulum Force	11.80	--	16.10	**14.36**	ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	**-1.34**	kN	P
Time at Peak Pubic Symphysis Force	12.20	--	17.00	**15.36**	ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

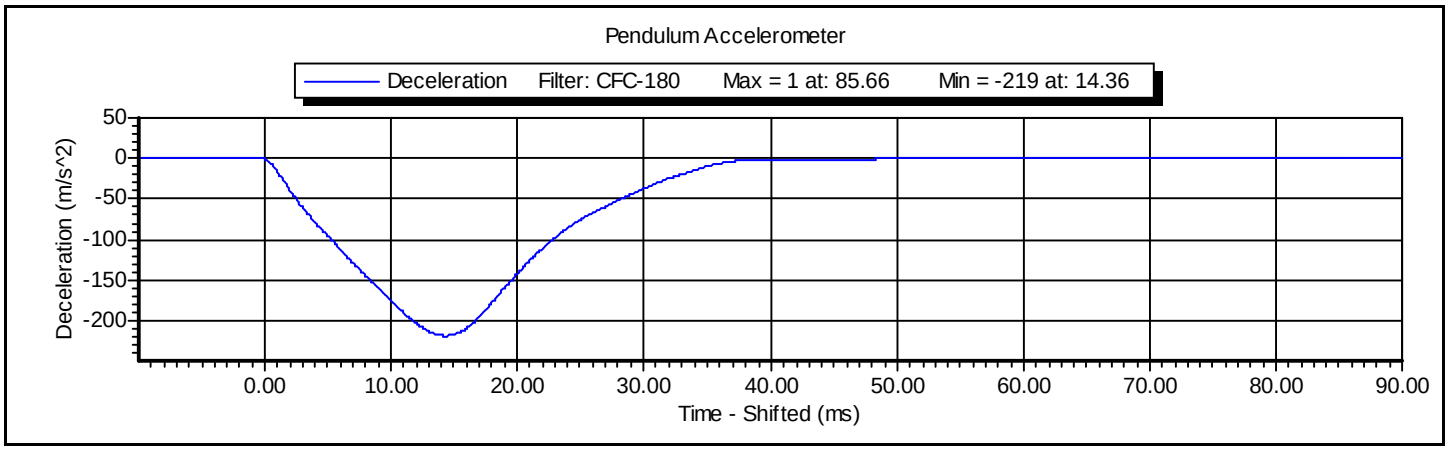
VERIFICATION REPORT

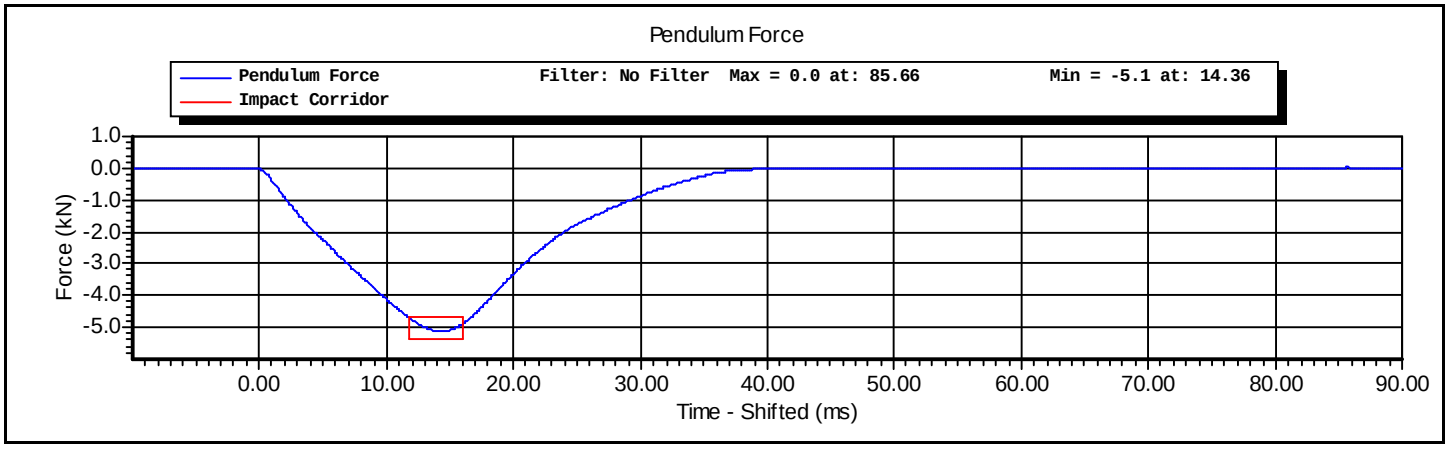
REFERENCE EQUIPMENT

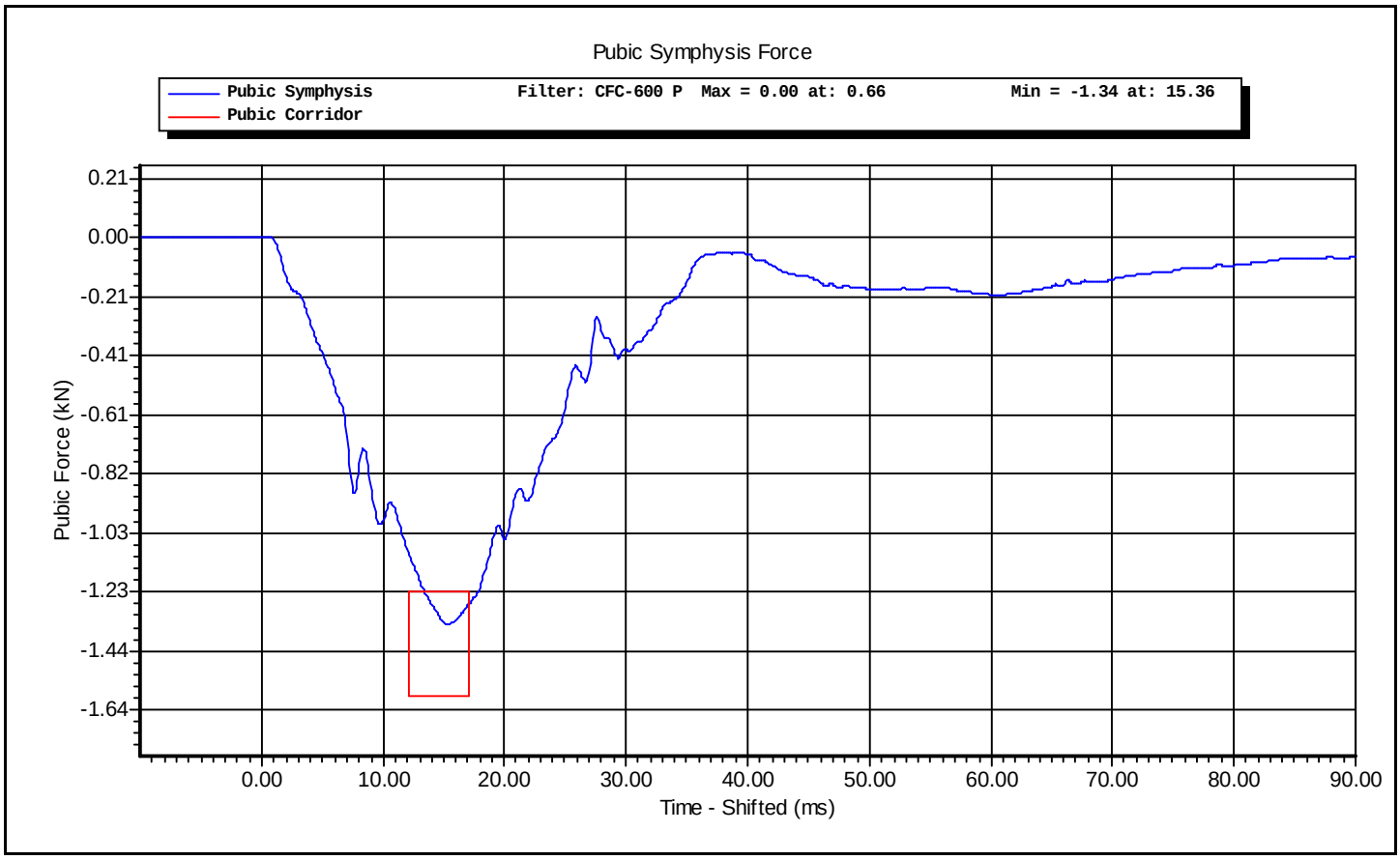
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**3096**	**LC-456Fy**	**4/22/2010**

Test ID: **Pelvis** Test Time: **3:43:18 PM** Test Date: **10/25/2010**

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:	**10/25/2010**
Test Number:	**2**	Test Time:	**3:43:18 PM**







Test ID: **Pelvis** Test Time: **3:43:18 PM** Test Date: **10/25/2010**

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIs No: 304

CONFIGURED FOR LEFT SIDE IMPACT

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

SID-IIsD External Measurements

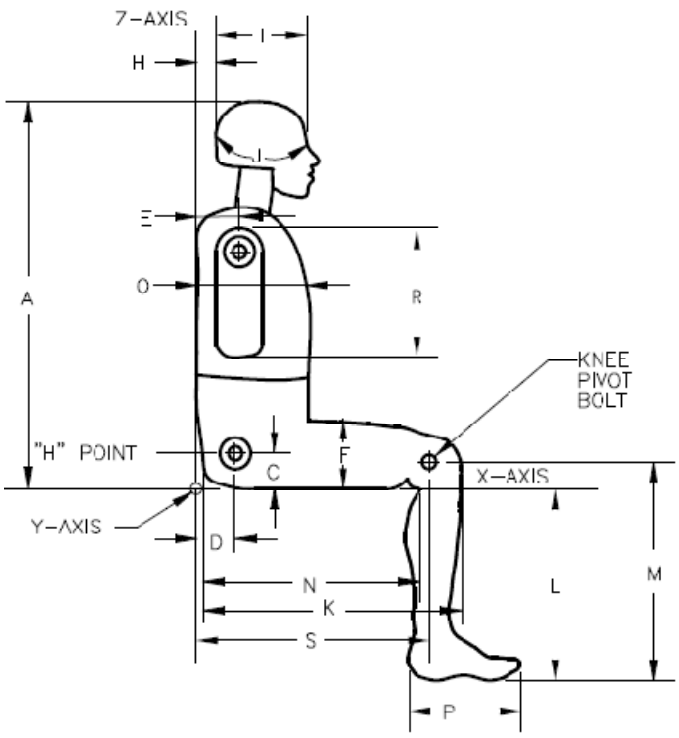
NHTSA ATD S/N 304

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	439	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	104	Yes
F	Thigh Clearance	119.0 - 135.0	126	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	546	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	398	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	318	Yes
R	Arm Length	249.0 - 259.0	251	Yes
S	Knee Joint to Seat back	478.0 - 493.0	485	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	Yes
W	Foot Width (right)	78.0 - 94.0	80	Yes
W	Foot Width (left)	78.0 - 94.0	80	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	782	Yes

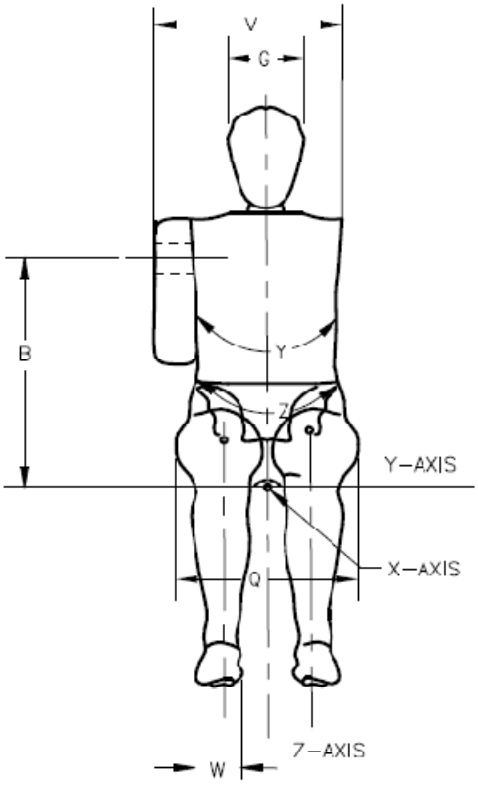
Technician: SZ

Date: 10/27/2010

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Head Drop**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**12:00:27 PM**

Component Part Number	Component Serial Number
Head Skin - 180-1002	**1371**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**55**	%RH	P
Resultant Acceleration	115.0	--	137.0	**122.4**	g	P
Oscillation	0.0	--	15.0	**3.4**	%	P
Fore-Aft Acceleration	-15.0	--	15.0	**-5.2**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

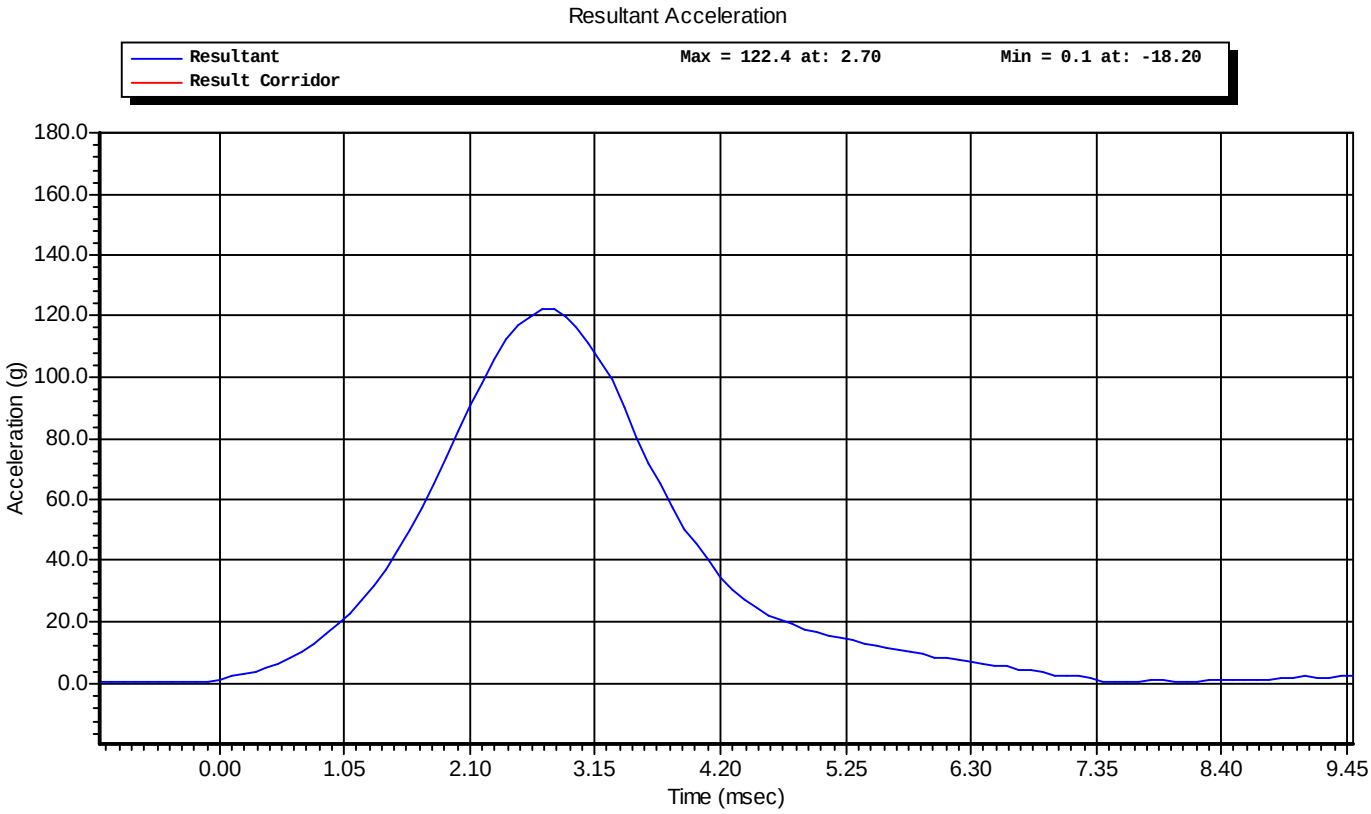
REFERENCE EQUIPMENT

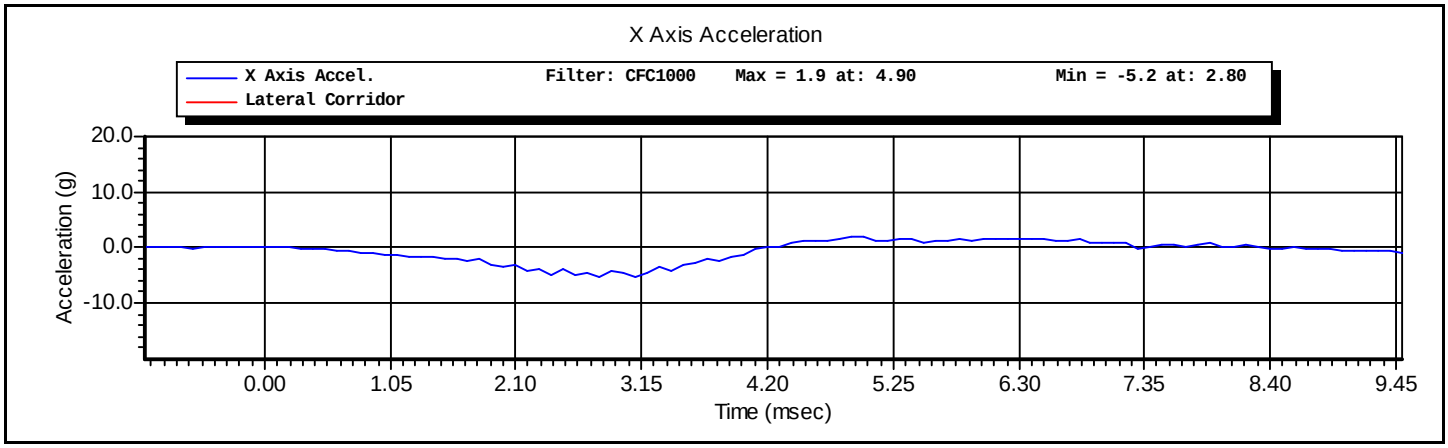
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P66943**	**10/25/2010**
Endevco	**7264-2000**	**P66931**	**10/25/2010**
Endevco	**7264-2000**	**P66926**	**10/25/2011**

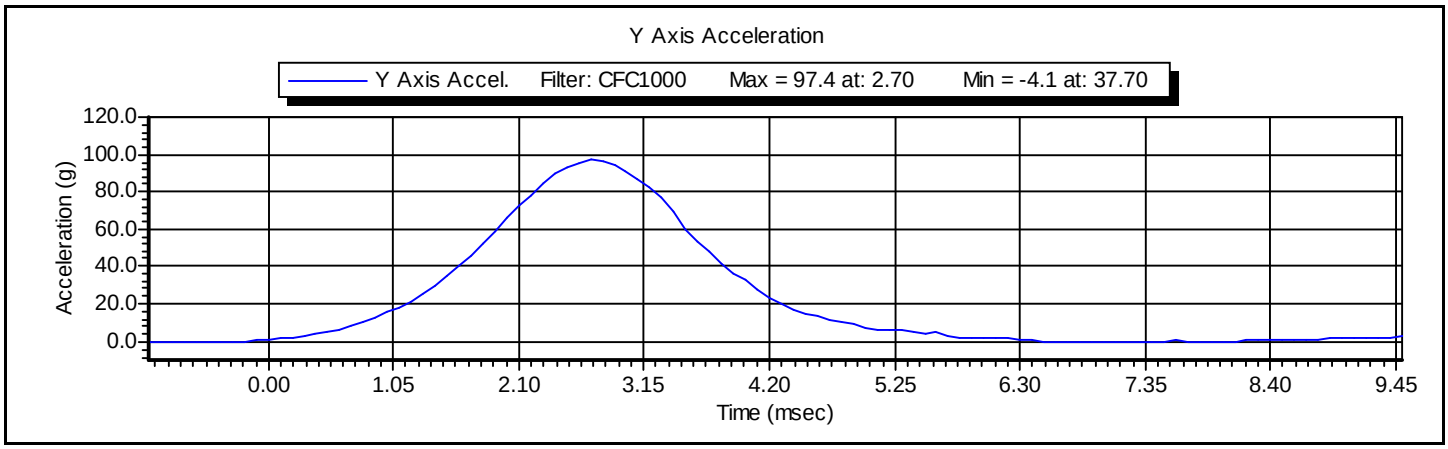
Test ID: **Head Drop** Test Time: **12:00:27 PM** Test Date: **10/26/2010**

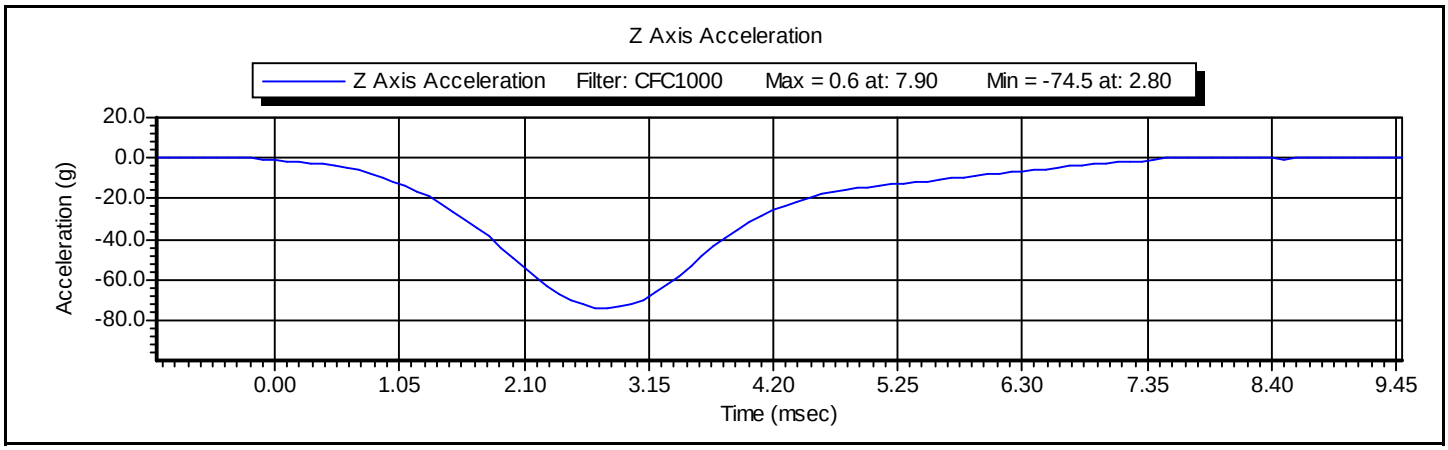
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Head Drop**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**12:00:27 PM**









Test ID: **Head Drop** Test Time: **12:00:27 PM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Neck Flexion**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**1:32:29 PM**

Component Part Number	Component Serial Number
Neck - 180-2000	**AB8239**

Test Parameters	Test Specifications	Test Results	
Temperature	20.6 -- 22.2	**22.2** deg C	P
Humidity	10 -- 70	**52** %RH	P
Velocity	5.51 -- 5.63	**5.56** m/s	P
Pendulum Impulse at 10 ms	2.20 -- 2.80	**2.45** m/s	P
Pendulum Impulse at 15 ms	3.30 -- 4.10	**3.61** m/s	P
Pendulum Impulse at 20 ms	4.40 -- 5.40	**4.89** m/s	P
Pendulum Impulse at 25 ms	5.40 -- 6.10	**5.77** m/s	P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	**5.88** m/s	P
Max D Plane Rotation	71.0 -- 81.0	**71.7** degrees	P
Time at Max Rotation	50.0 -- 70.0	**60.5** ms	P
Moment about OC	-44.0 -- -36.0	**-41.8** Nm	P
Moment Decay to Zero	102.0 -- 126.0	**114.3** ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

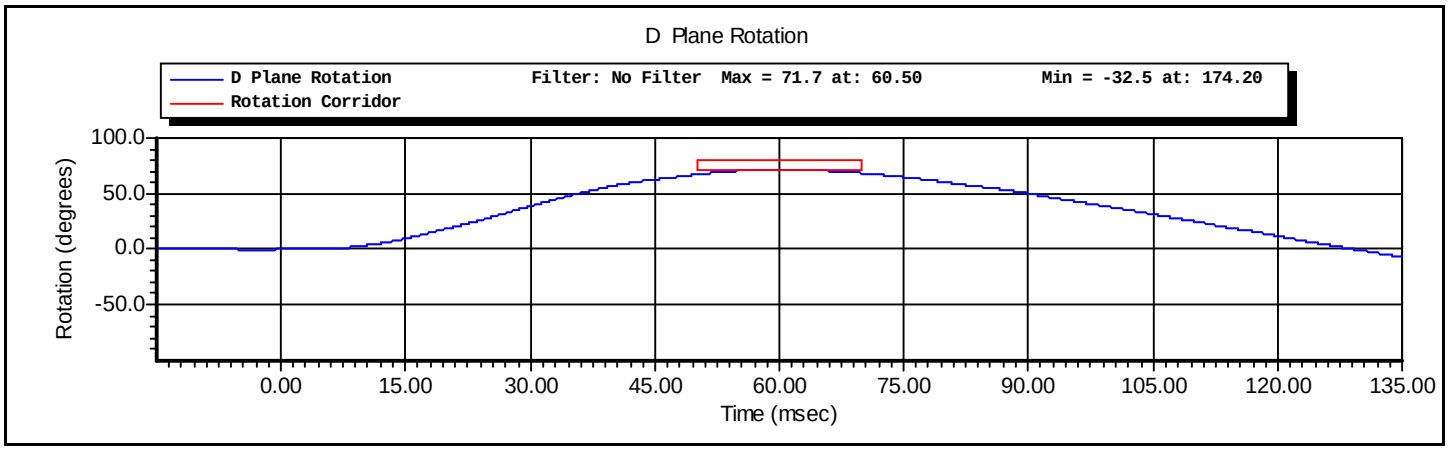
REFERENCE EQUIPMENT

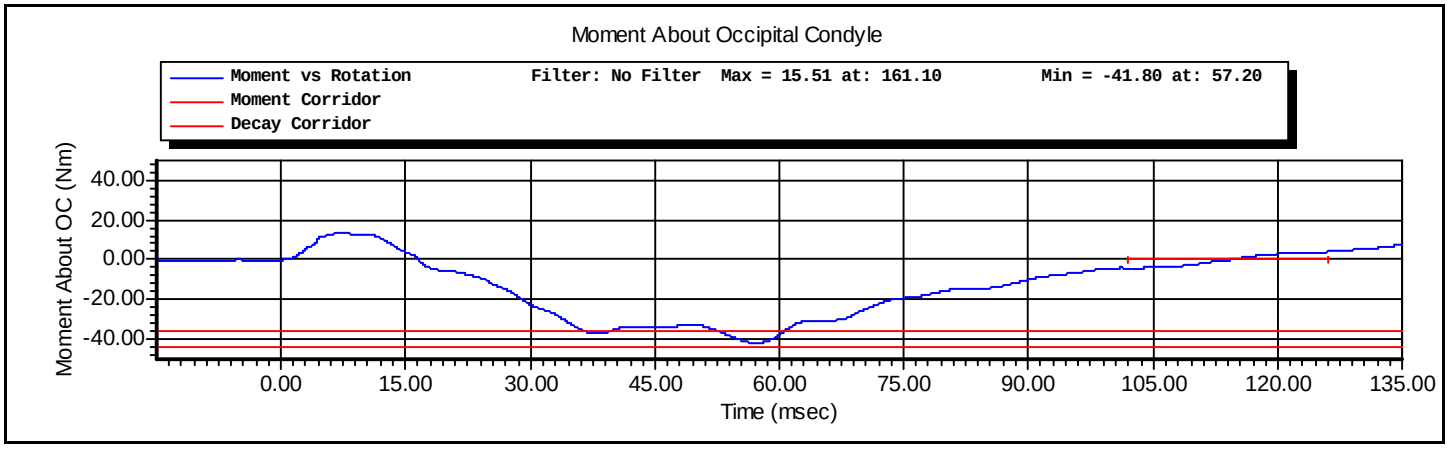
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
Denton	**1716A**	**LC-576 Fy**	**2/15/2010**
Denton	**1716A**	**LC-576 Mx**	**2/15/2010**
DentonATD	**78051-342**	**184**	**4/30/2010**
DentonATD	**78051-342**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

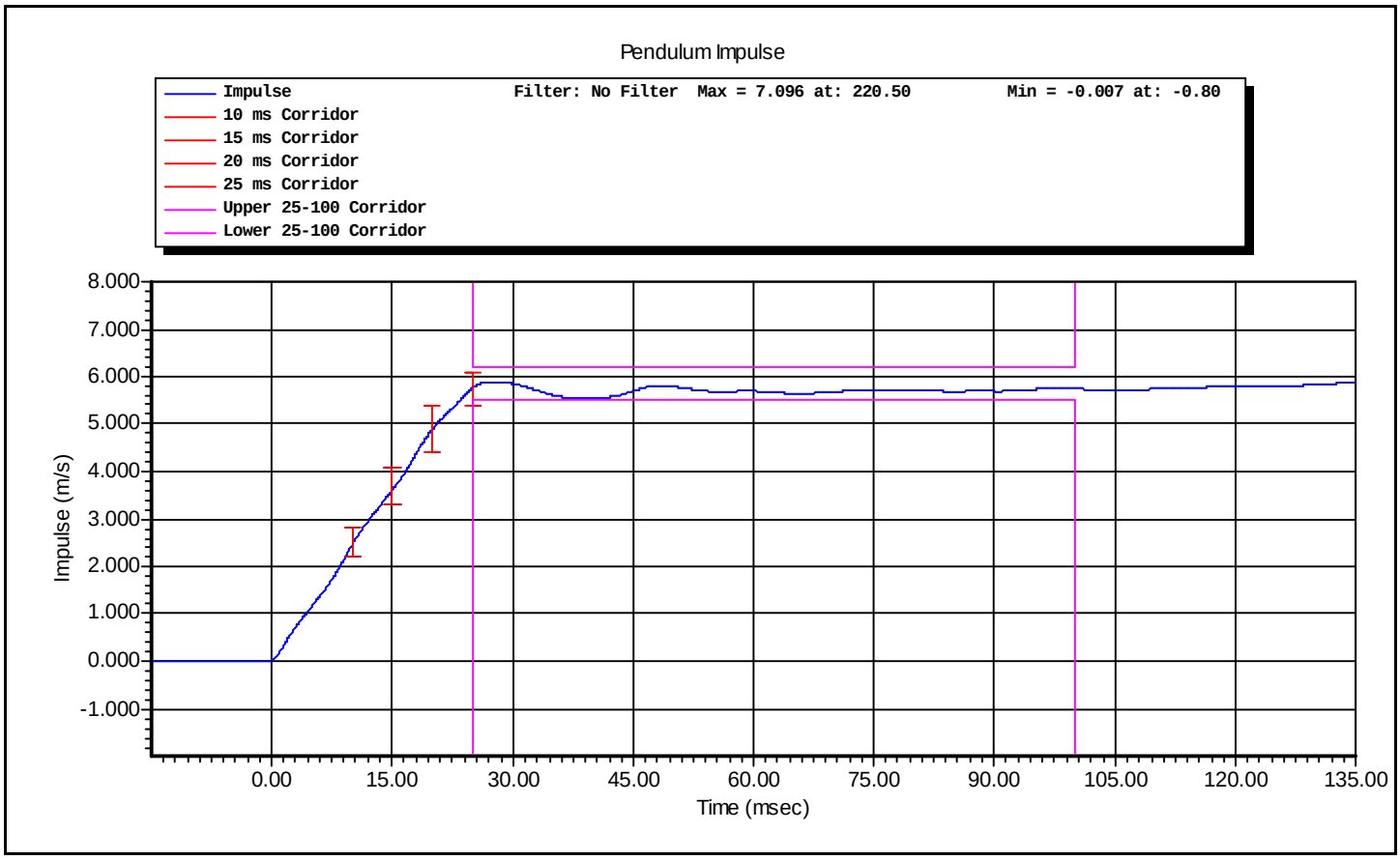
Test ID: **Neck Flexion** Test Time: **1:32:29 PM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Neck Flexion**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**1:32:29 PM**







Test ID: **Neck Flexion** Test Time: **1:32:29 PM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Shoulder**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**11:37:45 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.40**	deg C	P
Humidity	10.0	--	70.0	**47.0**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Probe Acceleration	13.0	--	18.0	**15.9**	g	P
Shoulder Deflection	28.0	--	37.0	**30.4**	mm	P
T1 Acceleration	17.0	--	22.0	**20.0**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

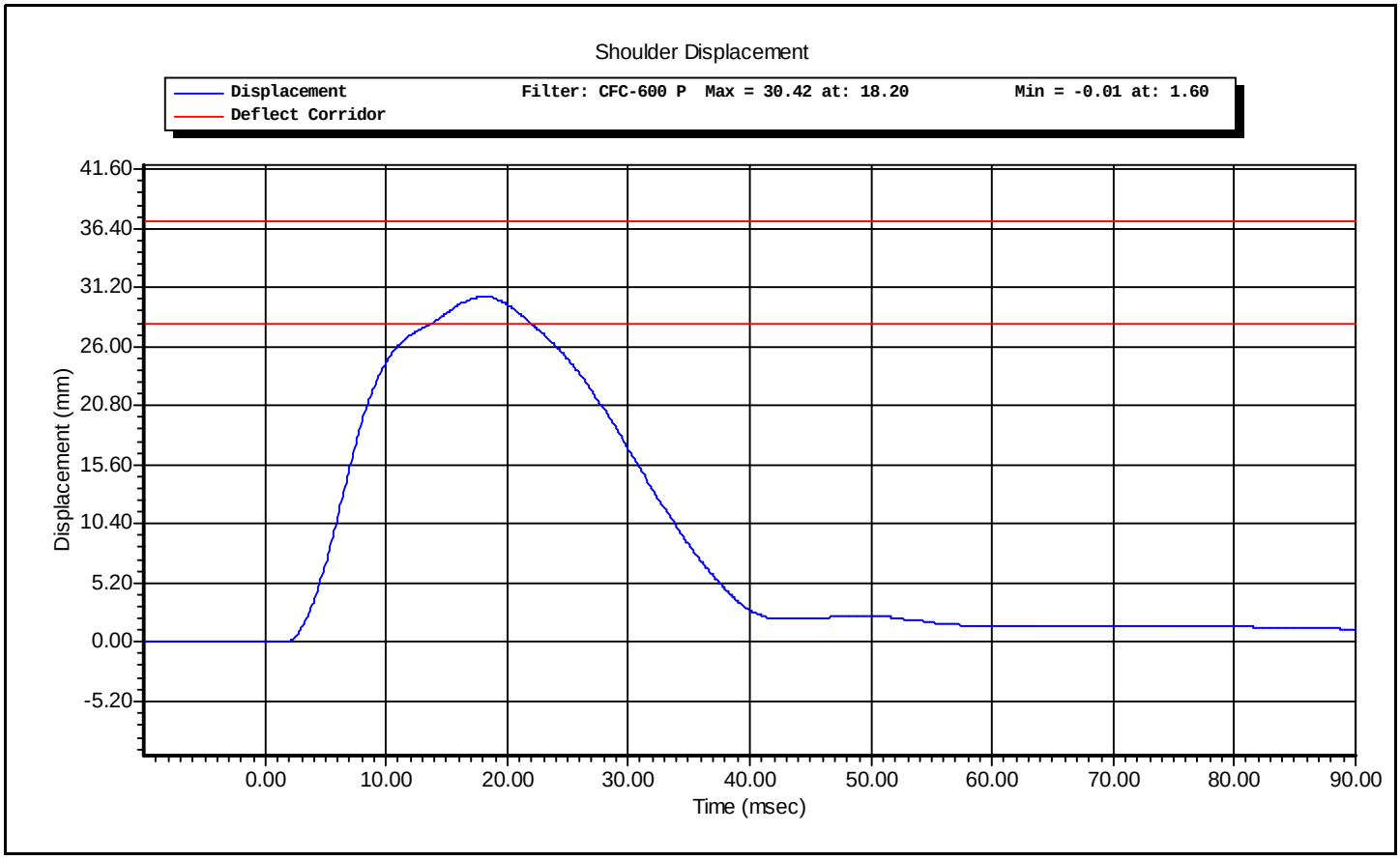
REFERENCE EQUIPMENT

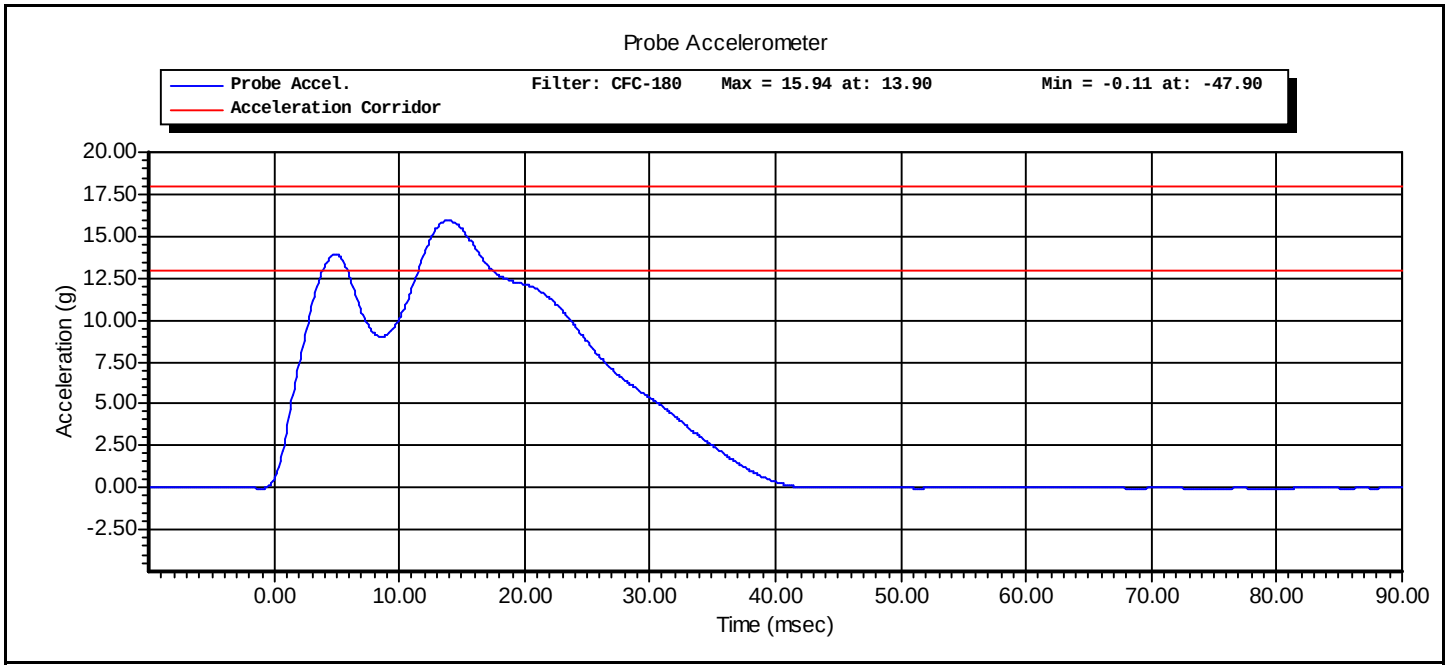
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1154**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**

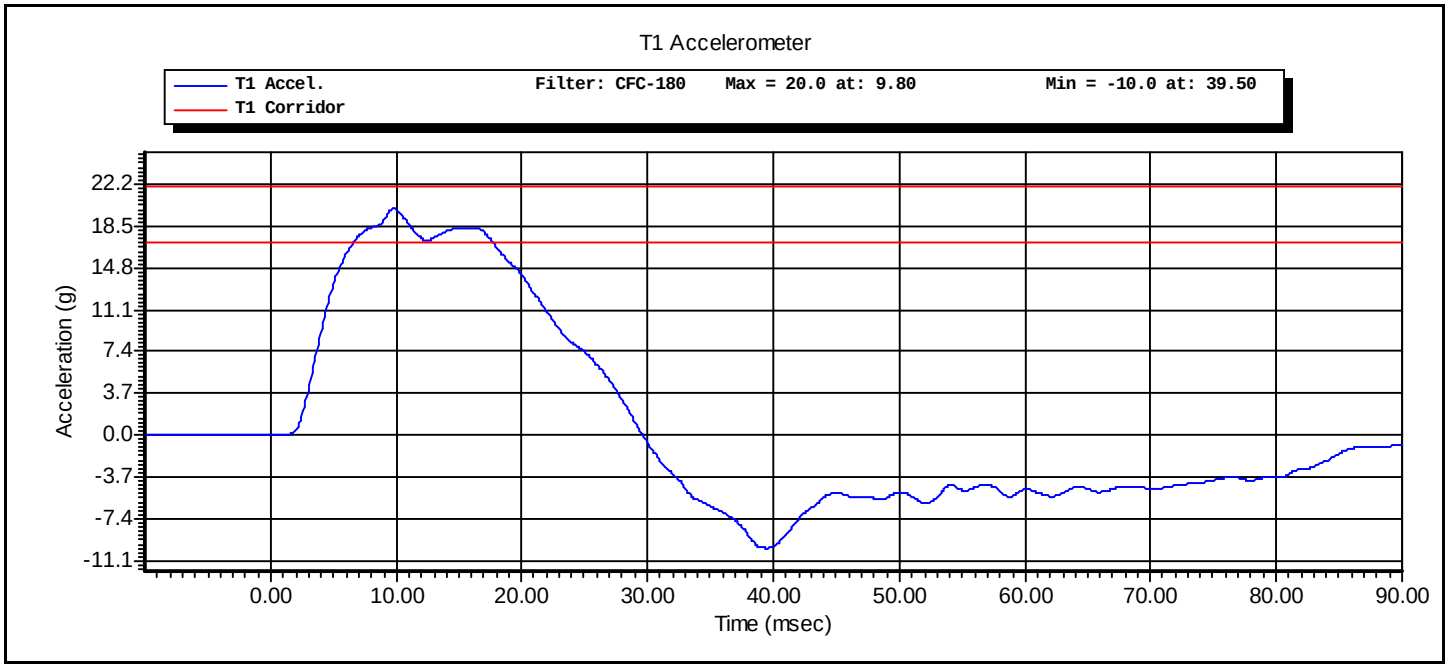
Test ID: **Shoulder** Test Time: **11:37:45 AM** Test Date: **10/27/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Shoulder**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**11:37:45 AM**







Test ID: **Shoulder** Test Time: **11:37:45 AM** Test Date: **10/27/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**10:38:22 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.4**	deg C	P
Humidity	10	--	70	**48**	%RH	P
Velocity	4.20	--	4.40	**4.30**	m/s	P
Probe Acceleration	14.0	--	18.0	**17.0**	g	P
Upper Thorax Rib Deflection	32.0	--	40.0	**35.5**	mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	**40.6**	mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	**37.8**	mm	P
Upper Spine Acceleration T1	13.0	--	17.0	**17.0**	g	P
Lower Spine Acceleration T12	7.0	--	11.0	**10.7**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

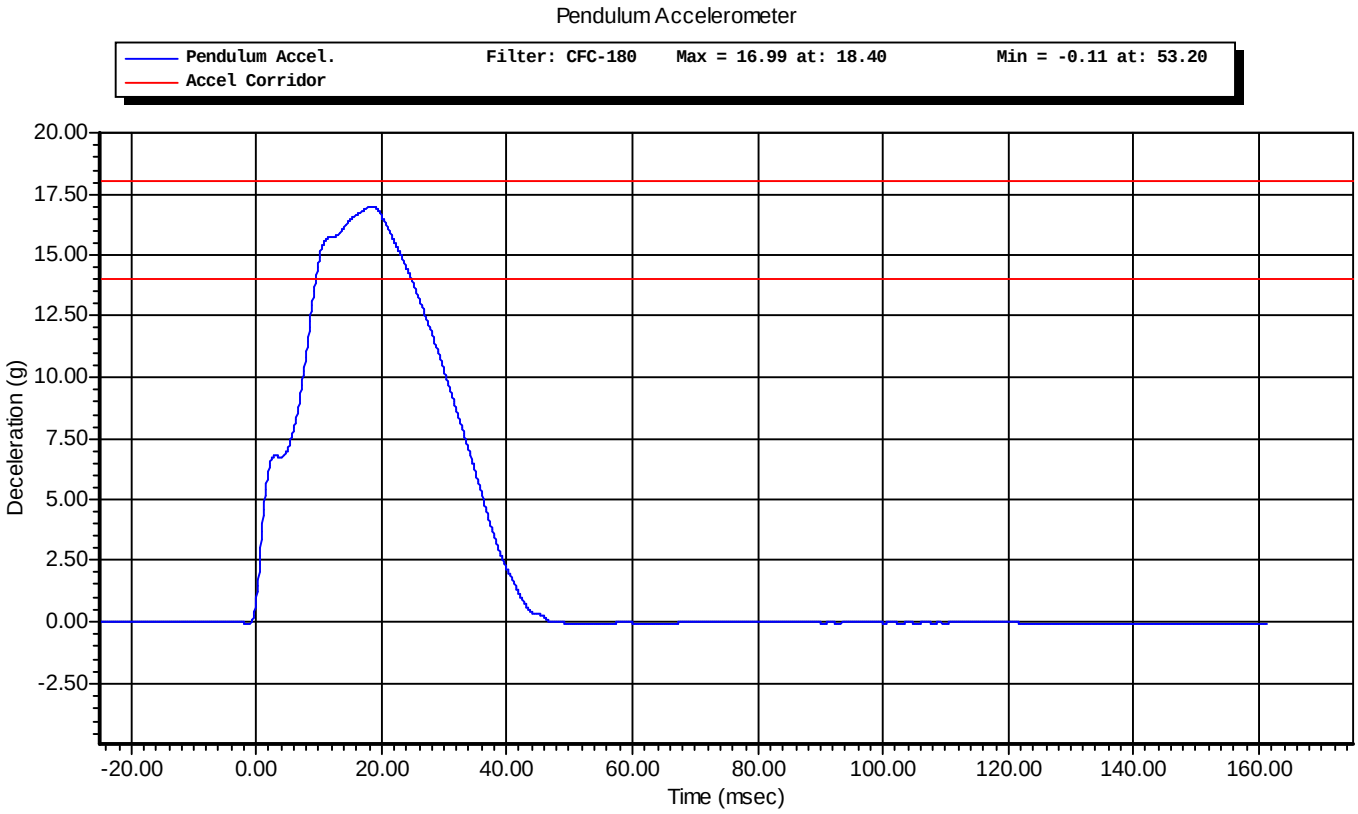
REFERENCE EQUIPMENT

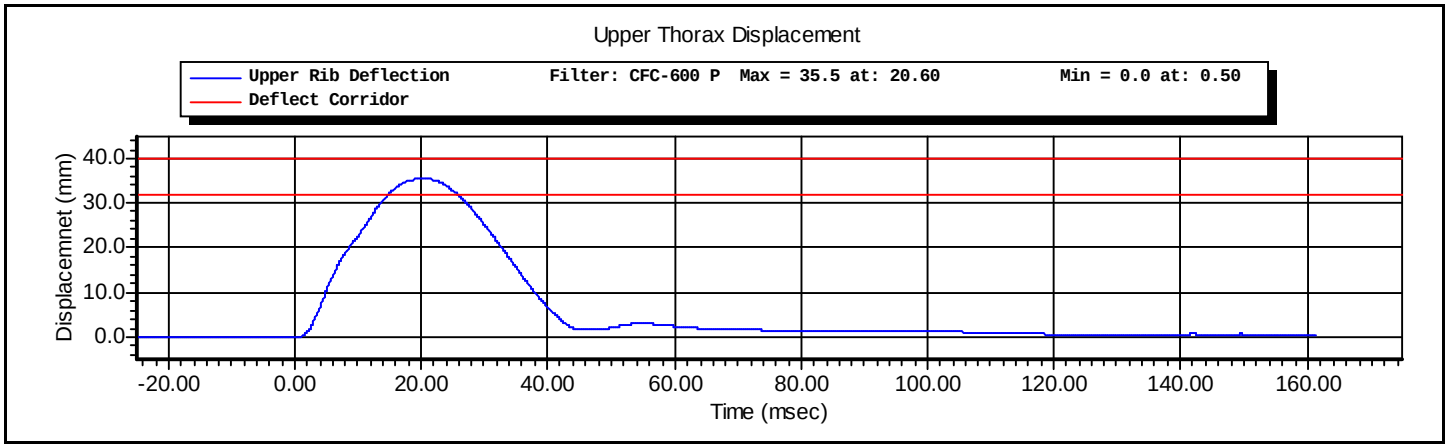
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1188**	**3/26/2010**
Servo	**180-3885**	**DS-1269**	**3/26/2010**
Servo	**180-3885**	**DS-1260**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**

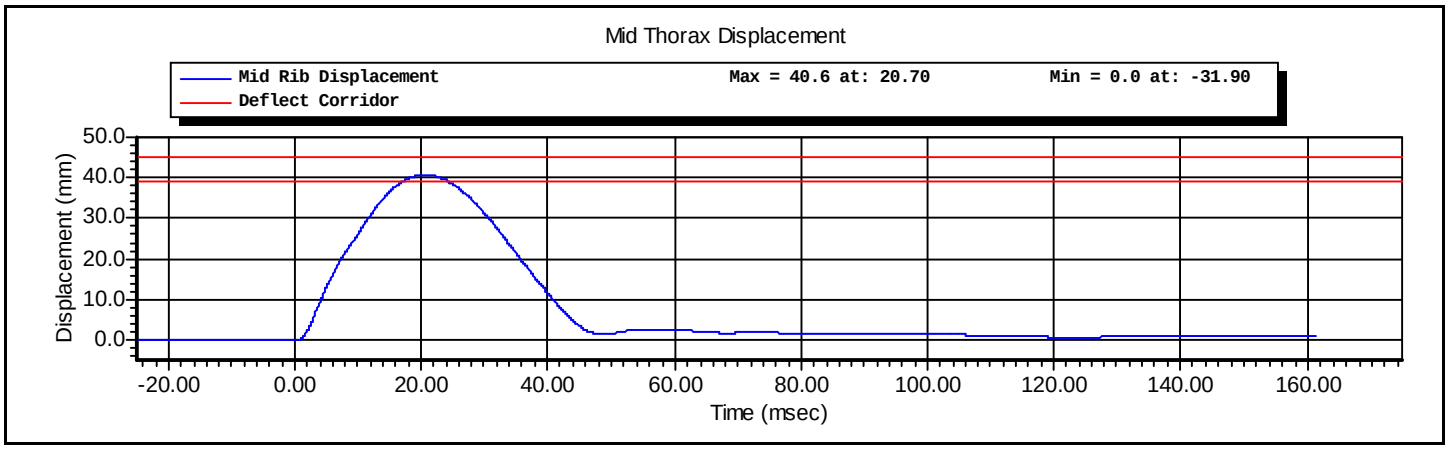
Test ID: **Thorax Without Arm** Test Time: **10:38:22 AM** Test Date: **10/27/2010**

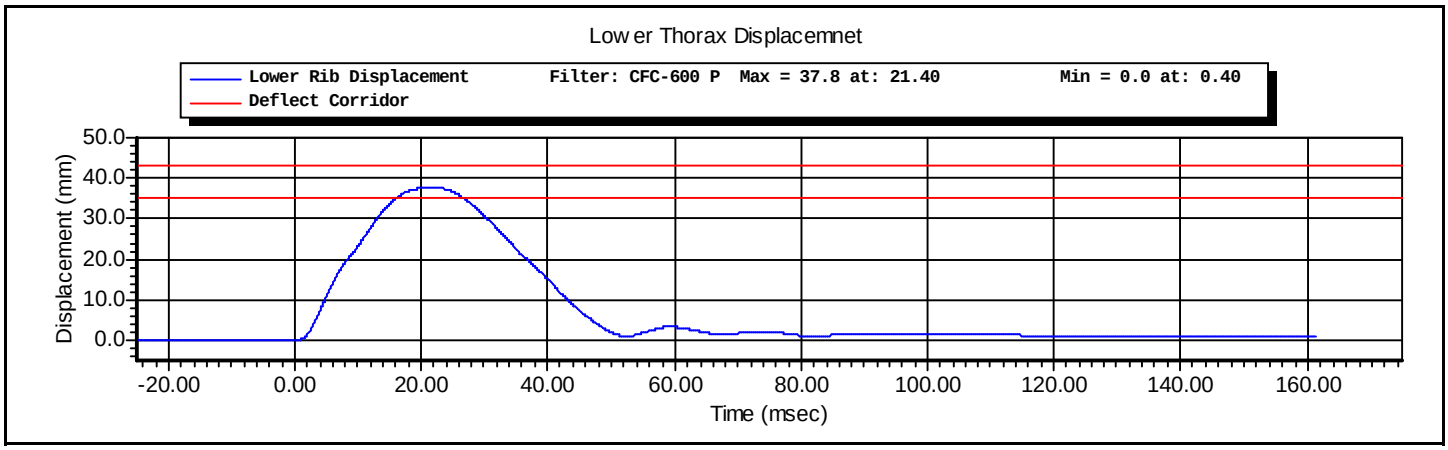
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Thorax Without Arm**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**10:38:22 AM**

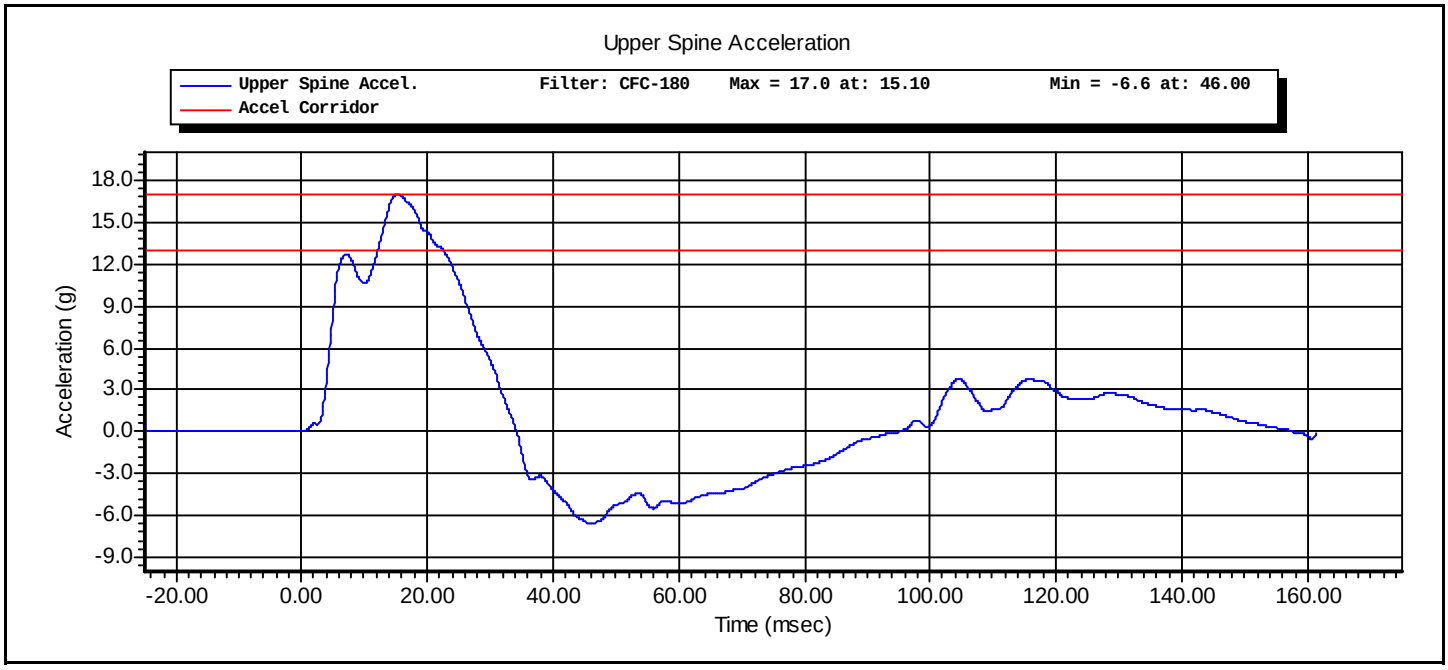


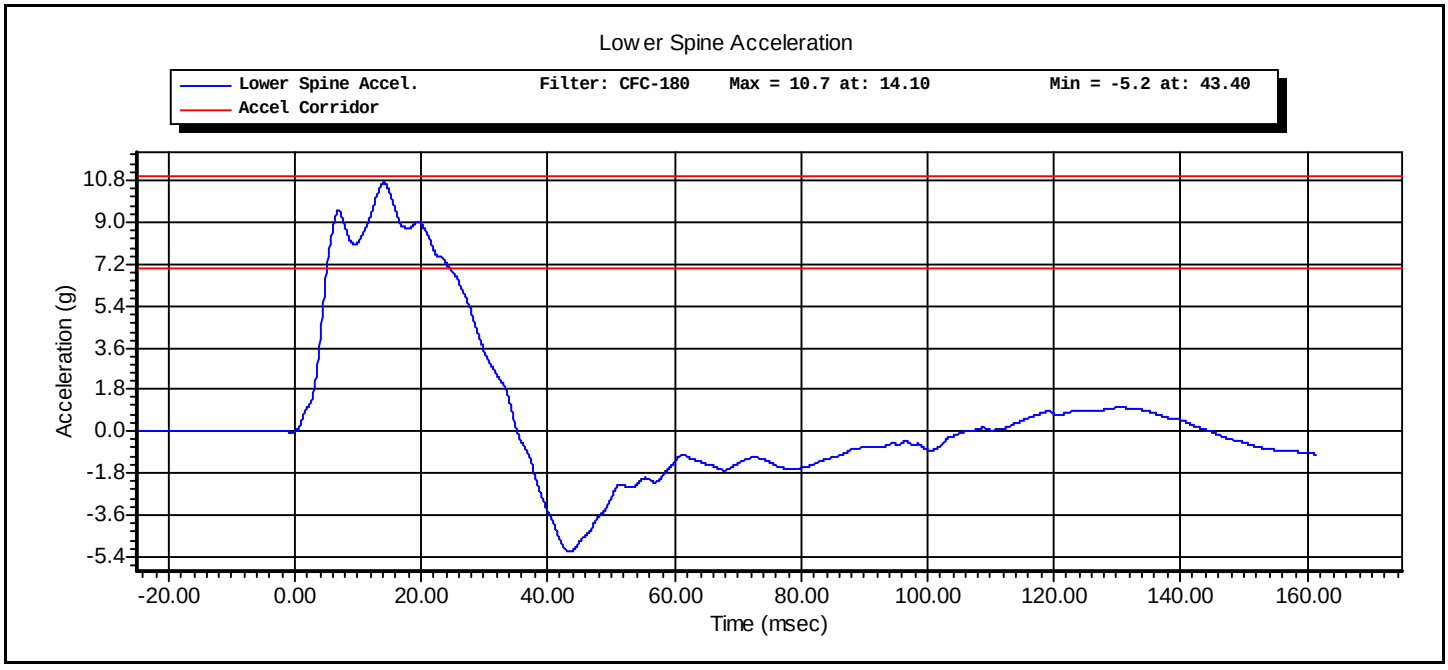






Test ID: **Thorax Without Arm** Test Time: **10:38:22 AM** Test Date: **10/27/2010**





Test ID: **Thorax Without Arm** Test Time: **10:38:22 AM** Test Date: **10/27/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Thorax With Arm**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**11:09:54 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.5**	deg C	P
Humidity	10	--	70	**47**	%RH	P
Velocity	6.60	--	6.80	**6.69**	m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	**34.6**	g	P
Upper Thorax Rib Deflection	25.0	--	32.0	**27.6**	mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	**30.8**	mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	**32.5**	mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	**42.0**	g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	**35.7**	g	P
Shoulder Deflection	31.0	--	40.0	**35.8**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

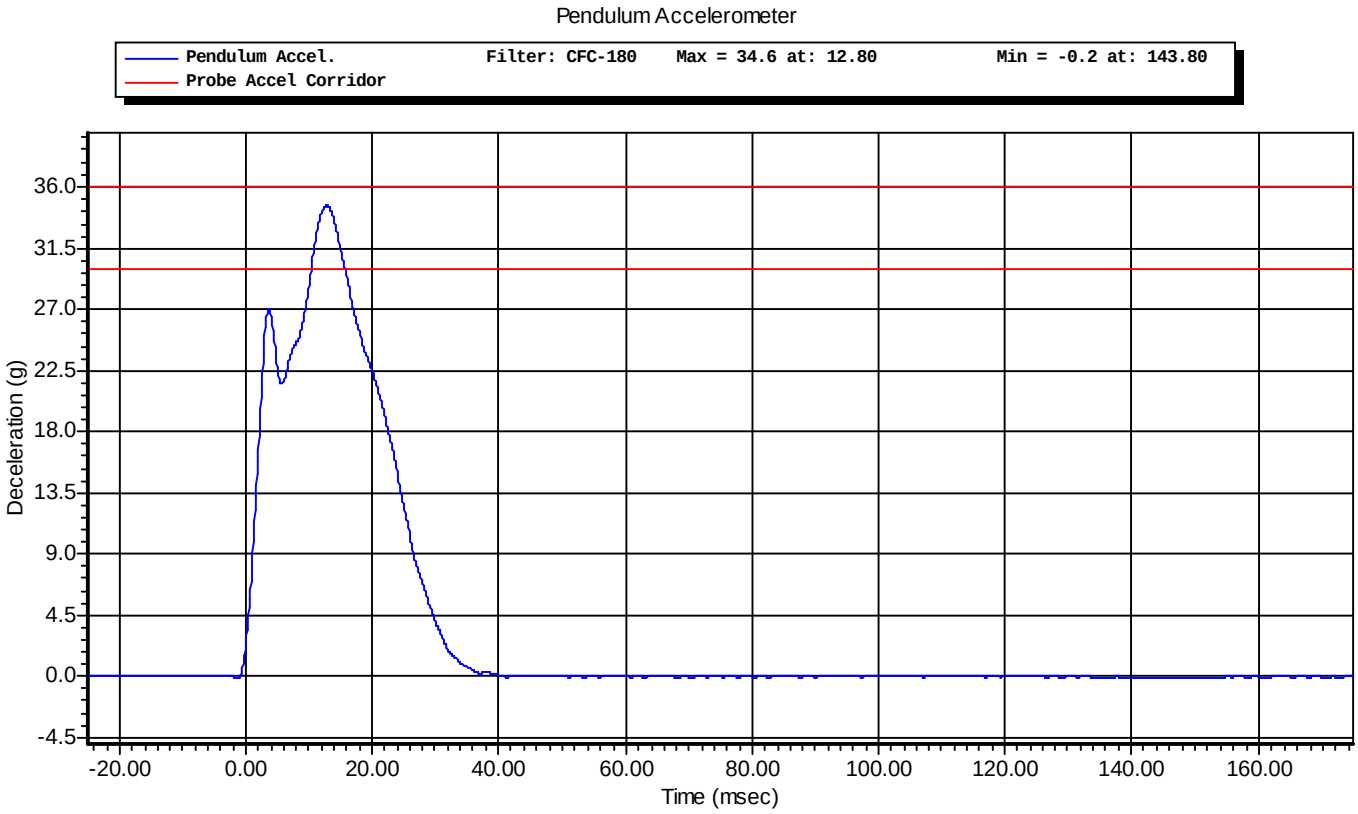
REFERENCE EQUIPMENT

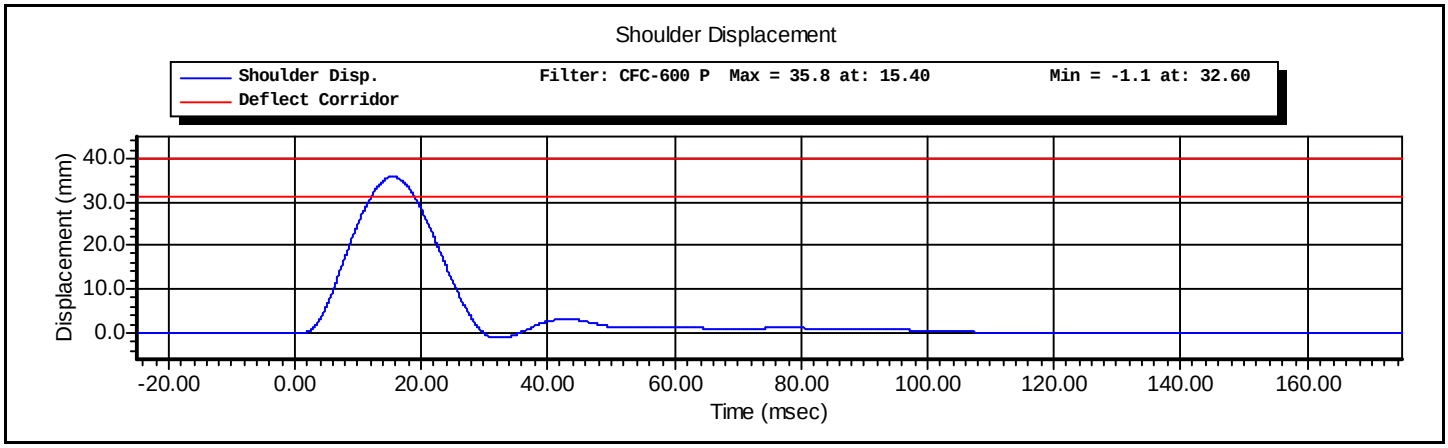
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1188**	**3/26/2010**
Servo	**180-3885**	**DS-1269**	**3/26/2010**
Servo	**180-3885**	**DS-1260**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**
Servo	**180-3885**	**DS-1154**	**3/26/2010**

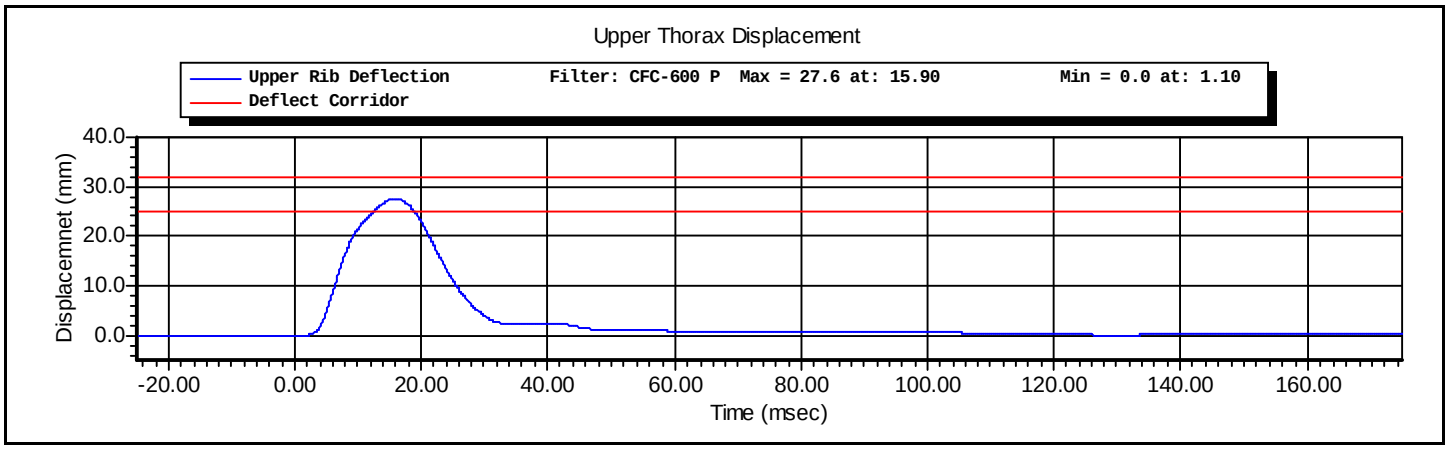
Test ID: **Thorax With Arm** Test Time: **11:09:54 AM** Test Date: **10/27/2010**

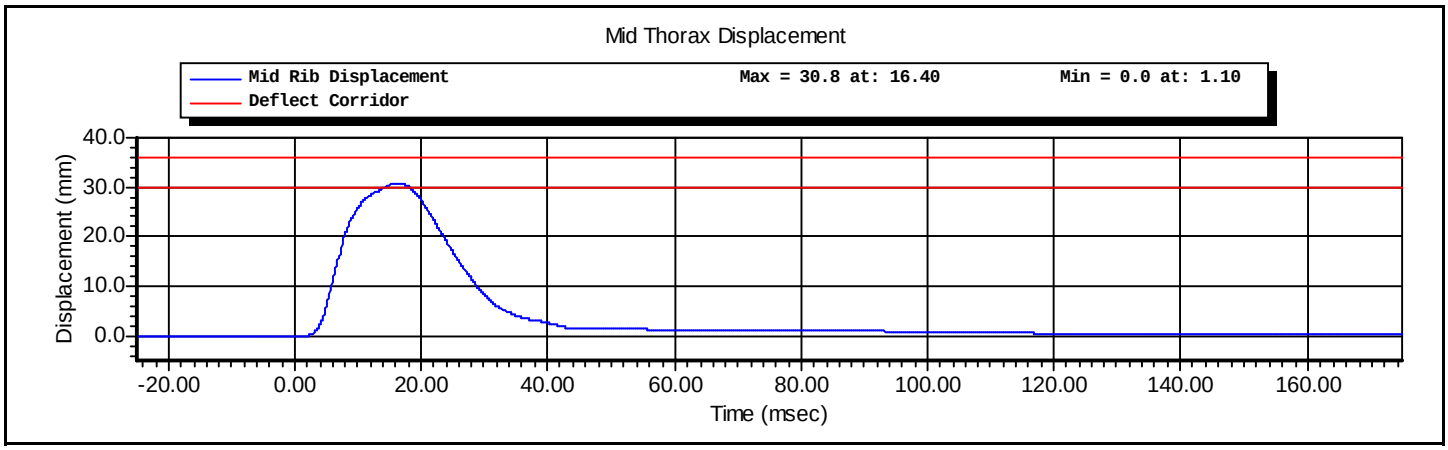
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Thorax With Arm**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**11:09:54 AM**

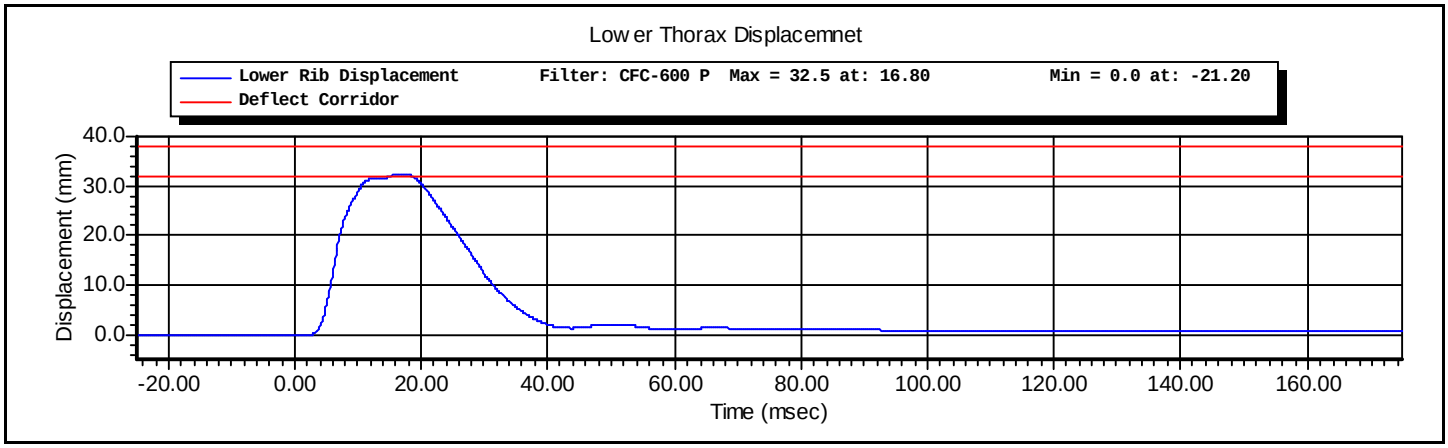


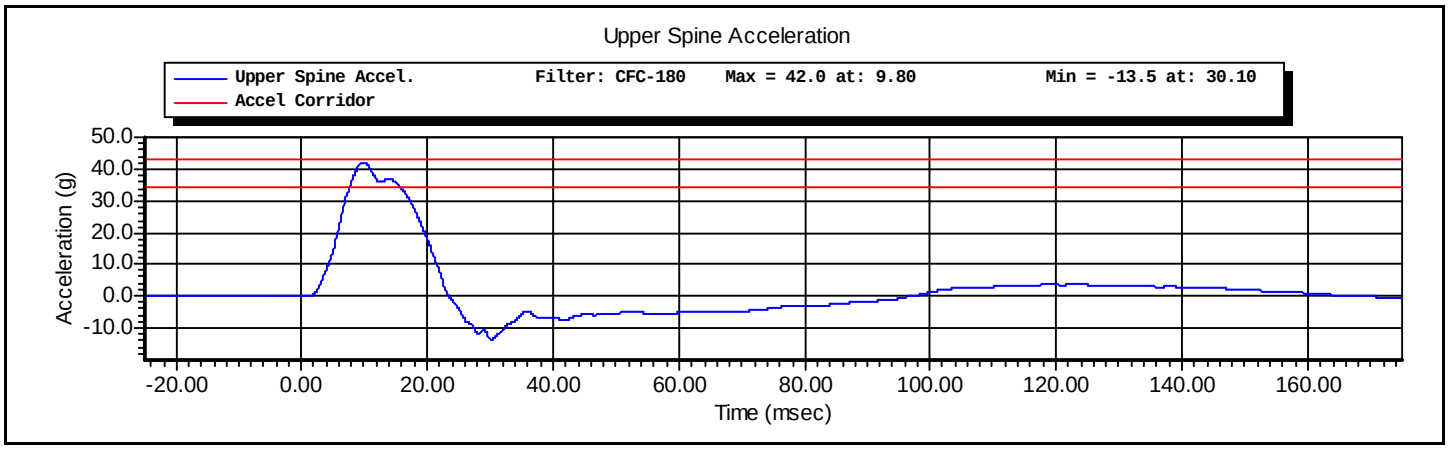


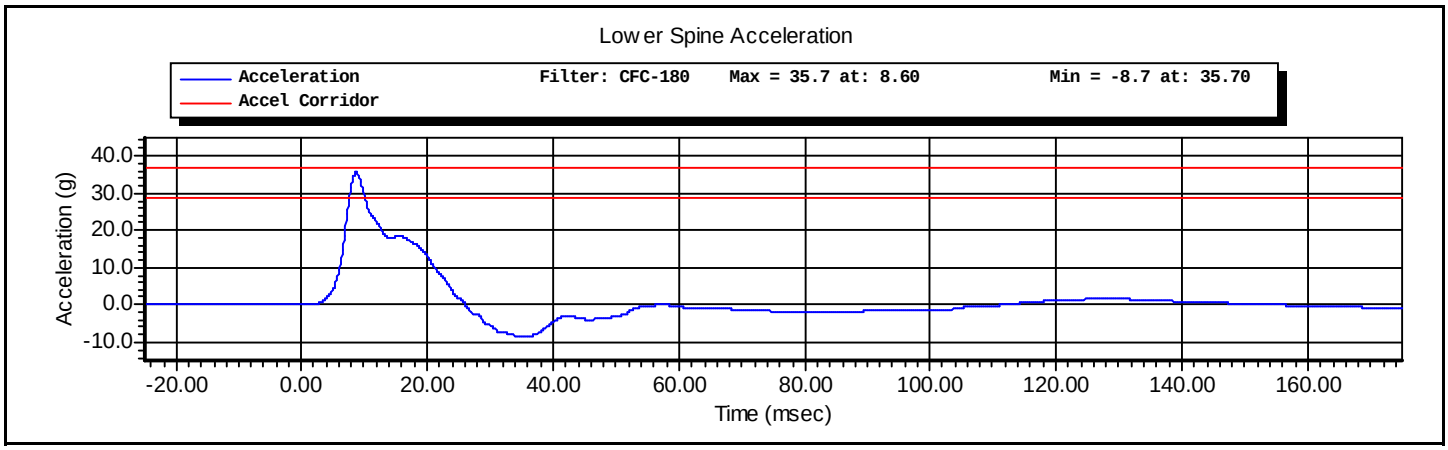




Test ID: **Thorax With Arm** Test Time: **11:09:54 AM** Test Date: **10/27/2010**







Test ID: **Thorax With Arm** Test Time: **11:09:54 AM** Test Date: **10/27/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Abdomen**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**10:19:15 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.2**	deg C	P
Humidity	10	--	70	**47**	%RH	P
Velocity	4.20	--	4.40	**4.32**	m/s	P
Probe Acceleration	12.0	--	16.0	**16.0**	g	P
Upper Abdominal Rib Deflection	36.0	--	47.0	**38.9**	mm	P
Lower Abdominal Rib Deflection	33.0	--	44.0	**37.8**	mm	P
Lower Spine Acceleration - T12	9.0	--	14.0	**11.9**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

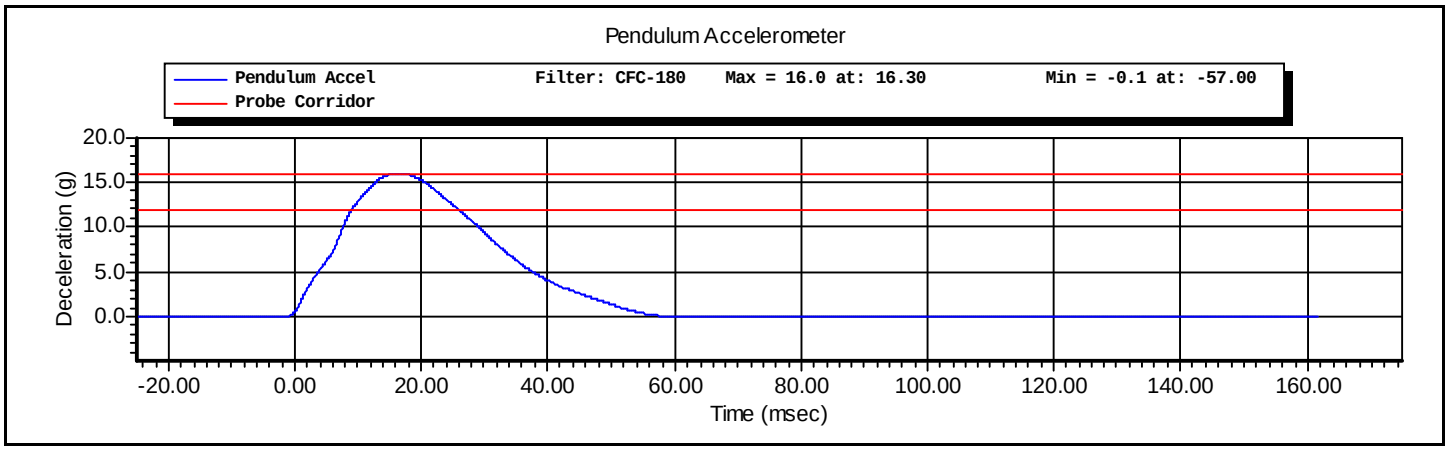
REFERENCE EQUIPMENT

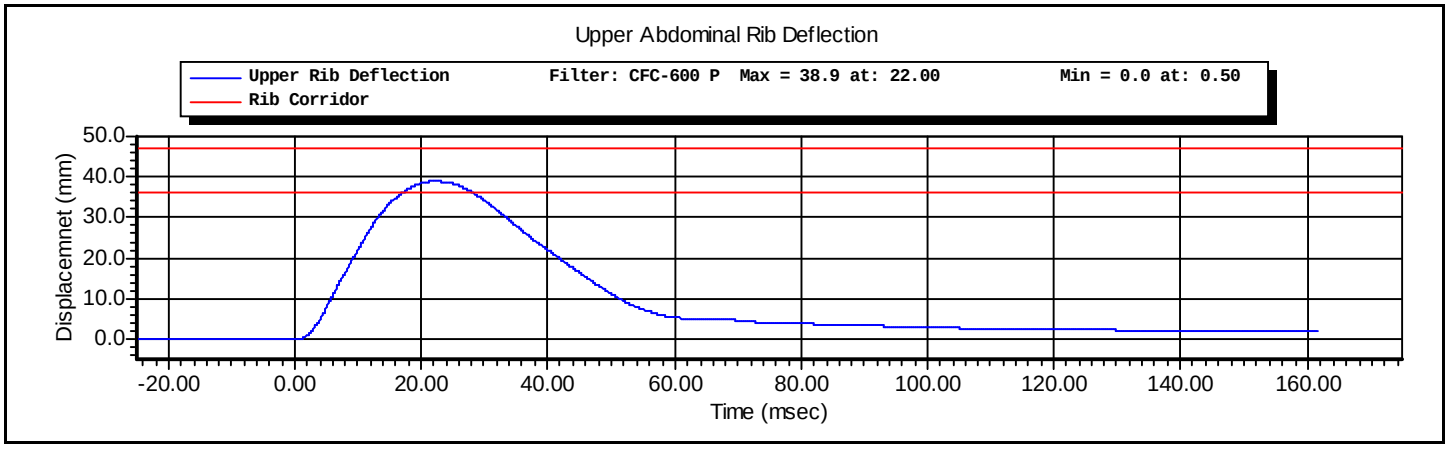
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1207**	**3/26/2010**
Servo	**180-3885**	**DS-1204**	**3/26/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**

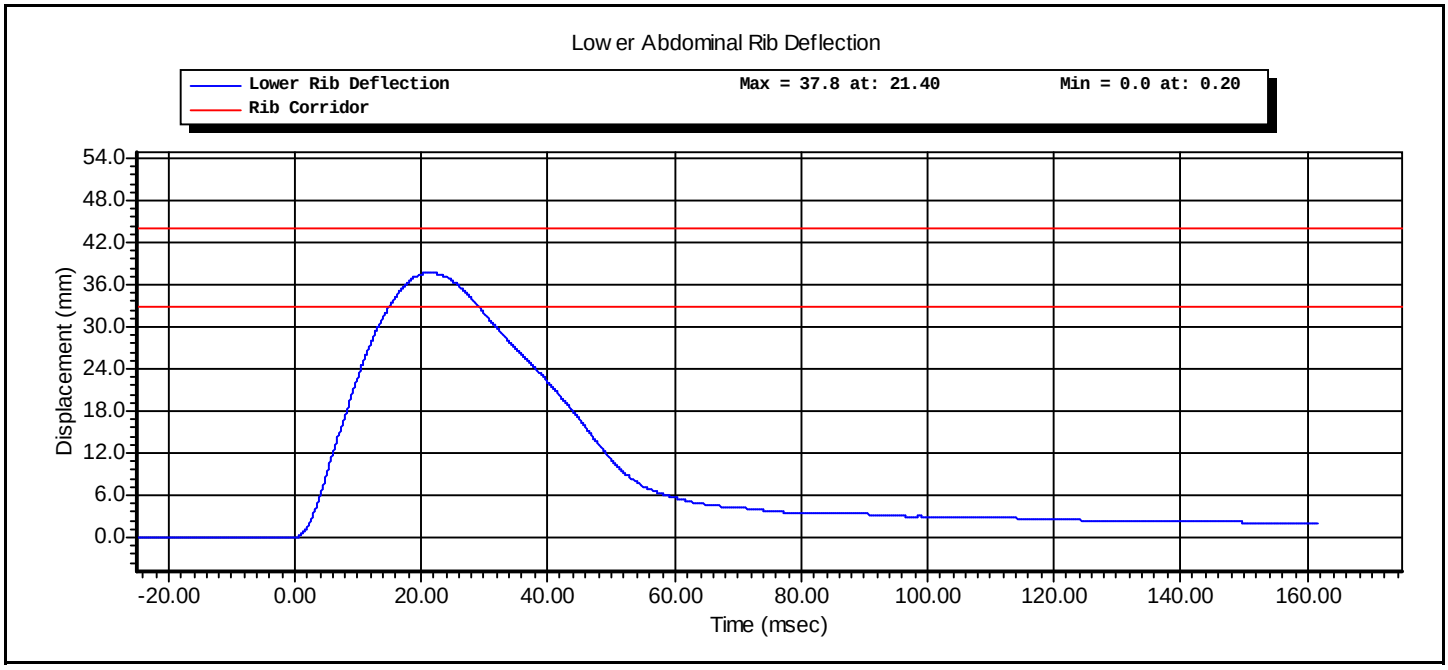
Test ID: **Abdomen** Test Time: **10:19:15 AM** Test Date: **10/27/2010**

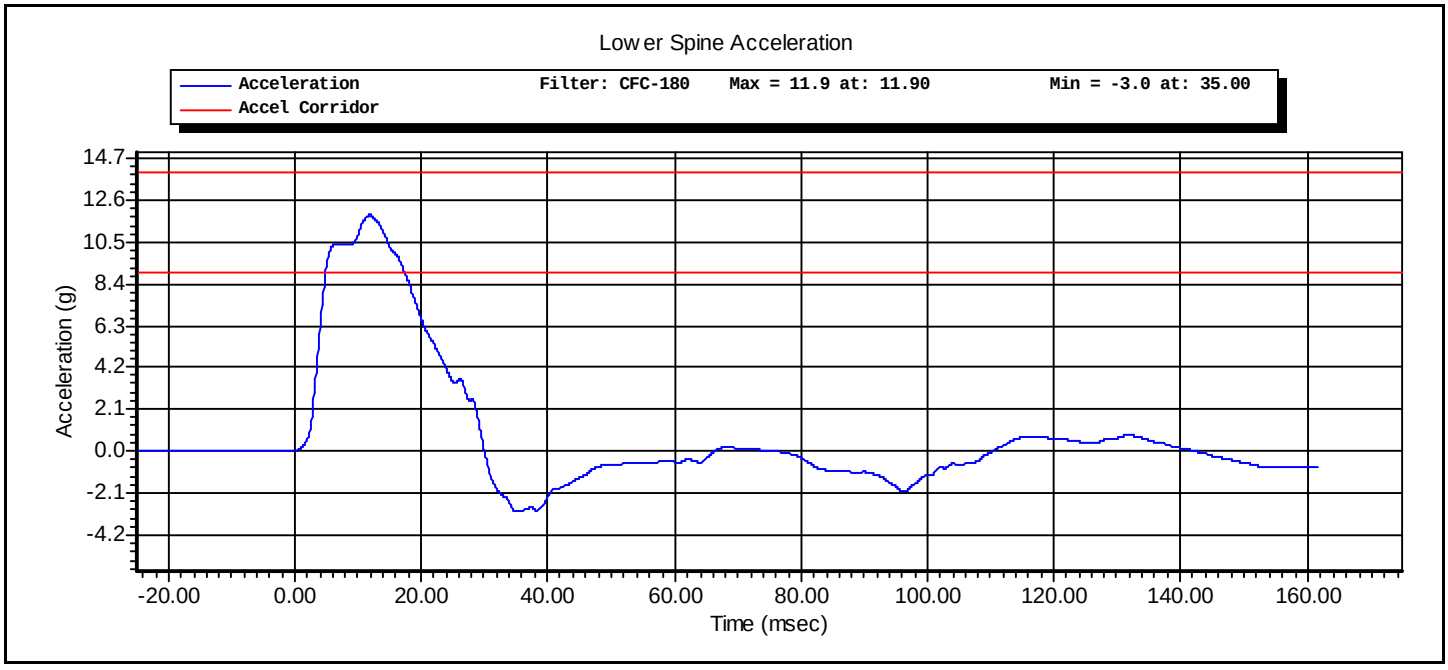
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Abdomen**	Test Date:	**10/27/2010**
Test Number:	**1**	Test Time:	**10:19:15 AM**









Test ID: **Abdomen** Test Time: **10:19:15 AM** Test Date: **10/27/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Pelvis Acetabulum**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**3:16:54 PM**

Comments:

Pelvis Plug Used for Certification:
FTSS S/N 12820
Force @ 3mm = 1500N

Pelvis Plug Used for Full Scale Test:
FTSS S/N 12597
Force @ 3mm = 1505N

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**49**	%RH	P
Velocity	6.60	--	6.80	**6.63**	m/s	P
Peak Probe Acceleration	38.0	--	47.0	**43.1**	g	P
Peak Pelvis Acceleration	34.0	--	42.0	**36.1**	g	P
Peak Acetabulum Force	3.60	--	4.30	**3.90**	kN	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

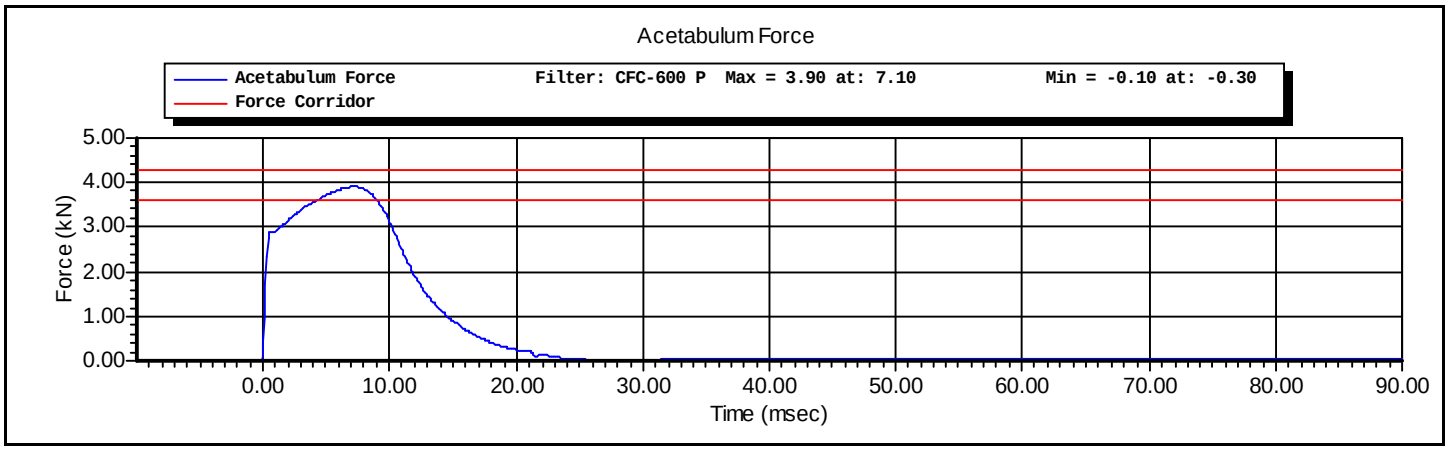
VERIFICATION REPORT

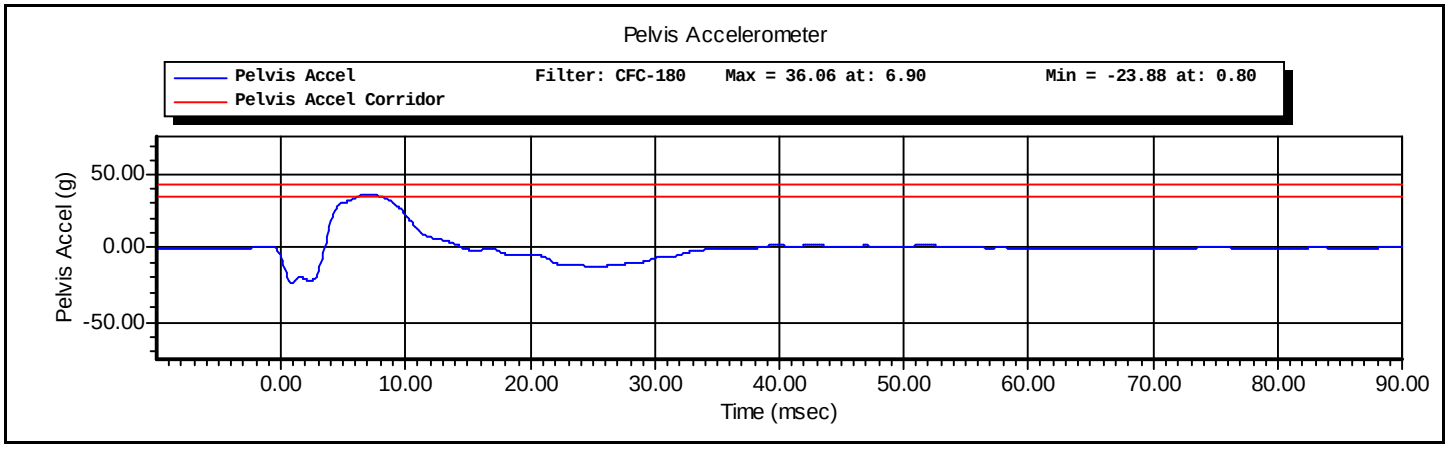
REFERENCE EQUIPMENT

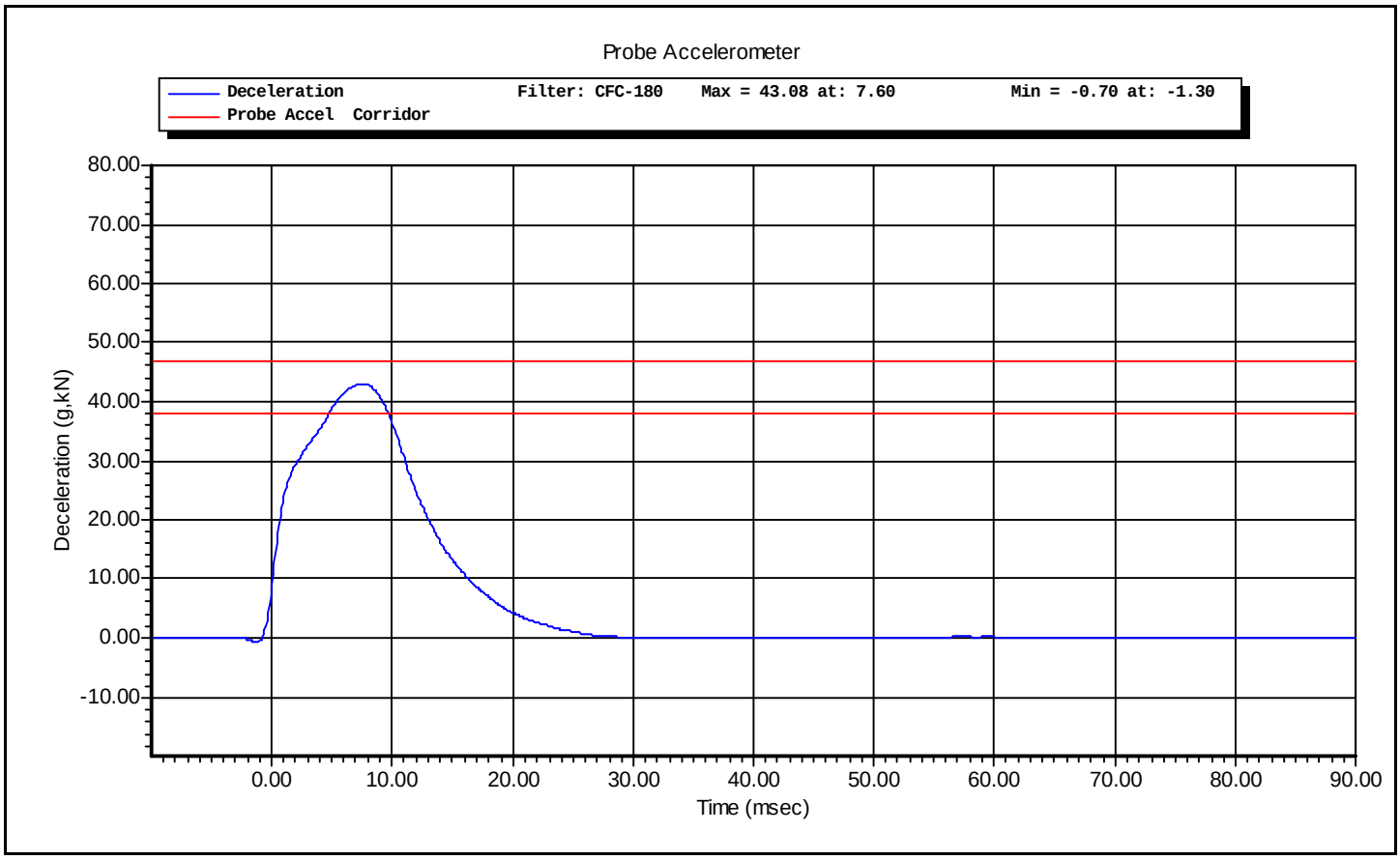
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P49217**	**10/12/2010**
DentonATD	**3249J**	**LC-267Fy**	**4/9/2010**

Test ID: **Pelvis Acetabulum** Test Time: **3:16:54 PM** Test Date: **10/26/2010**

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Pelvis Acetabulum**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**3:16:54 PM**







Test ID: **Pelvis Acetabulum** Test Time: **3:16:54 PM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Iliac Pelvis**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**2:27:34 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**53**	%RH	P
Velocity	4.20	--	4.40	**4.31**	m/s	P
Peak Probe Acceleration	36.0	--	45.0	**42.5**	g	P
Peak Pelvis Acceleration	28.0	--	39.0	**36.1**	g	P
Peak Iliac Force	4.10	--	5.10	**4.98**	kN	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

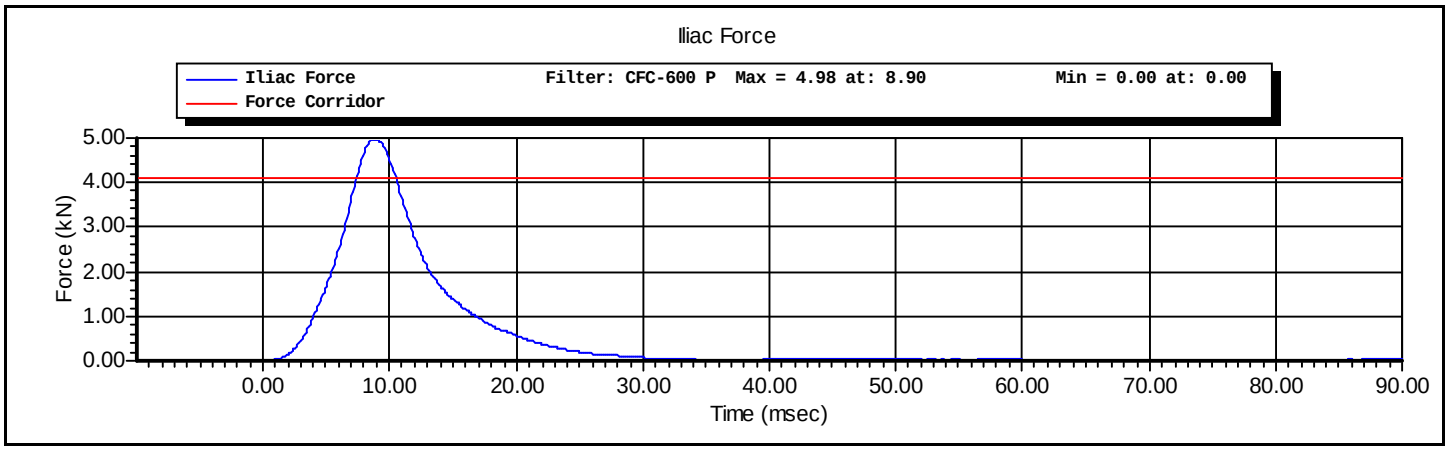
REFERENCE EQUIPMENT

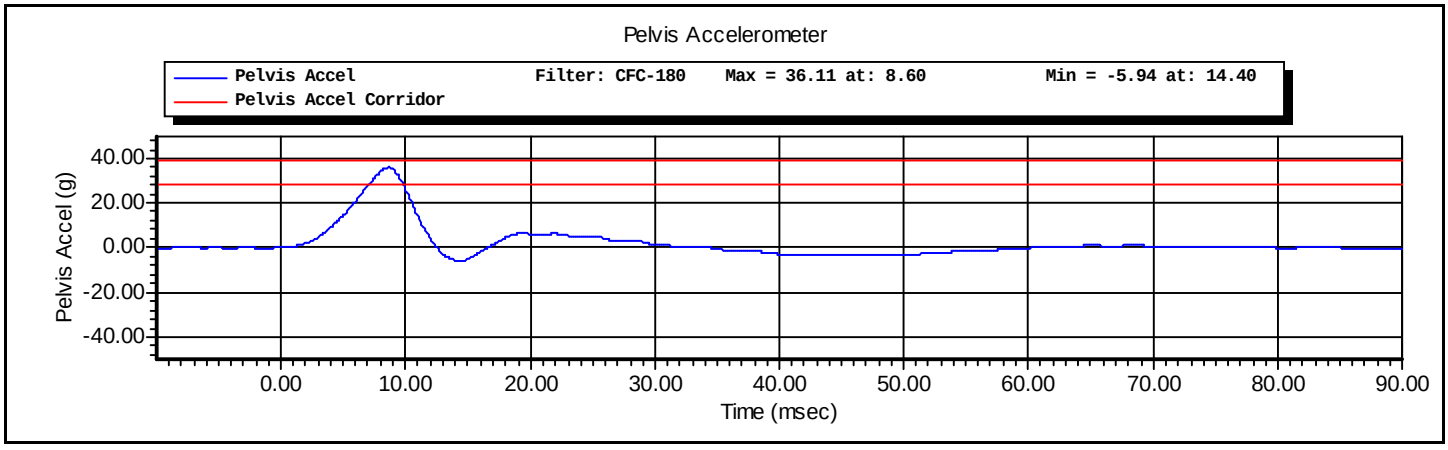
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P49217**	**10/12/2010**
DentonATD	**3228J**	**LC-281 Fy**	**4/9/2010**

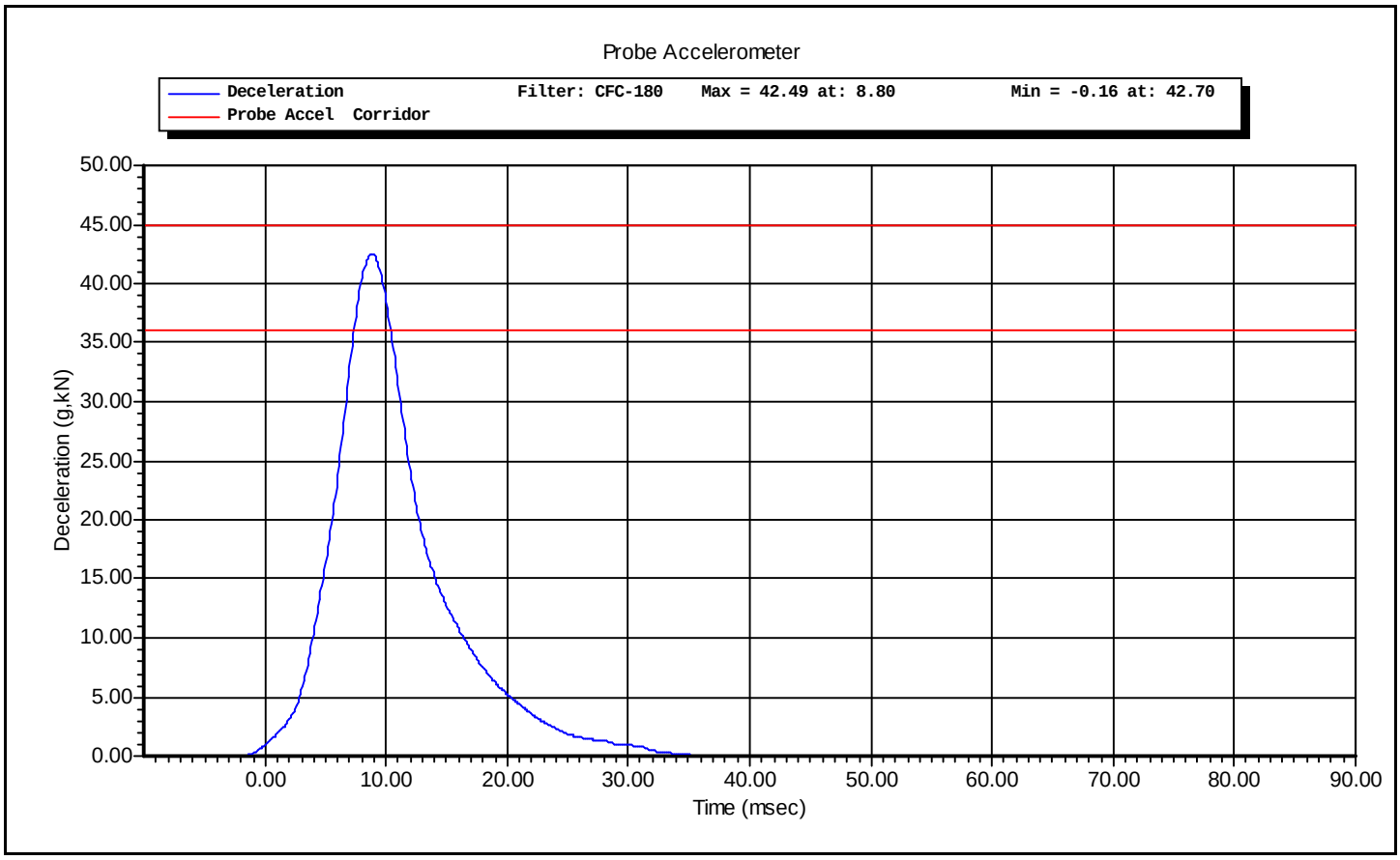
Test ID: **Iliac Pelvis** Test Time: **2:27:34 PM** Test Date: **10/26/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Iliac Pelvis**	Test Date:	**10/26/2010**
Test Number:	**1**	Test Time:	**2:27:34 PM**

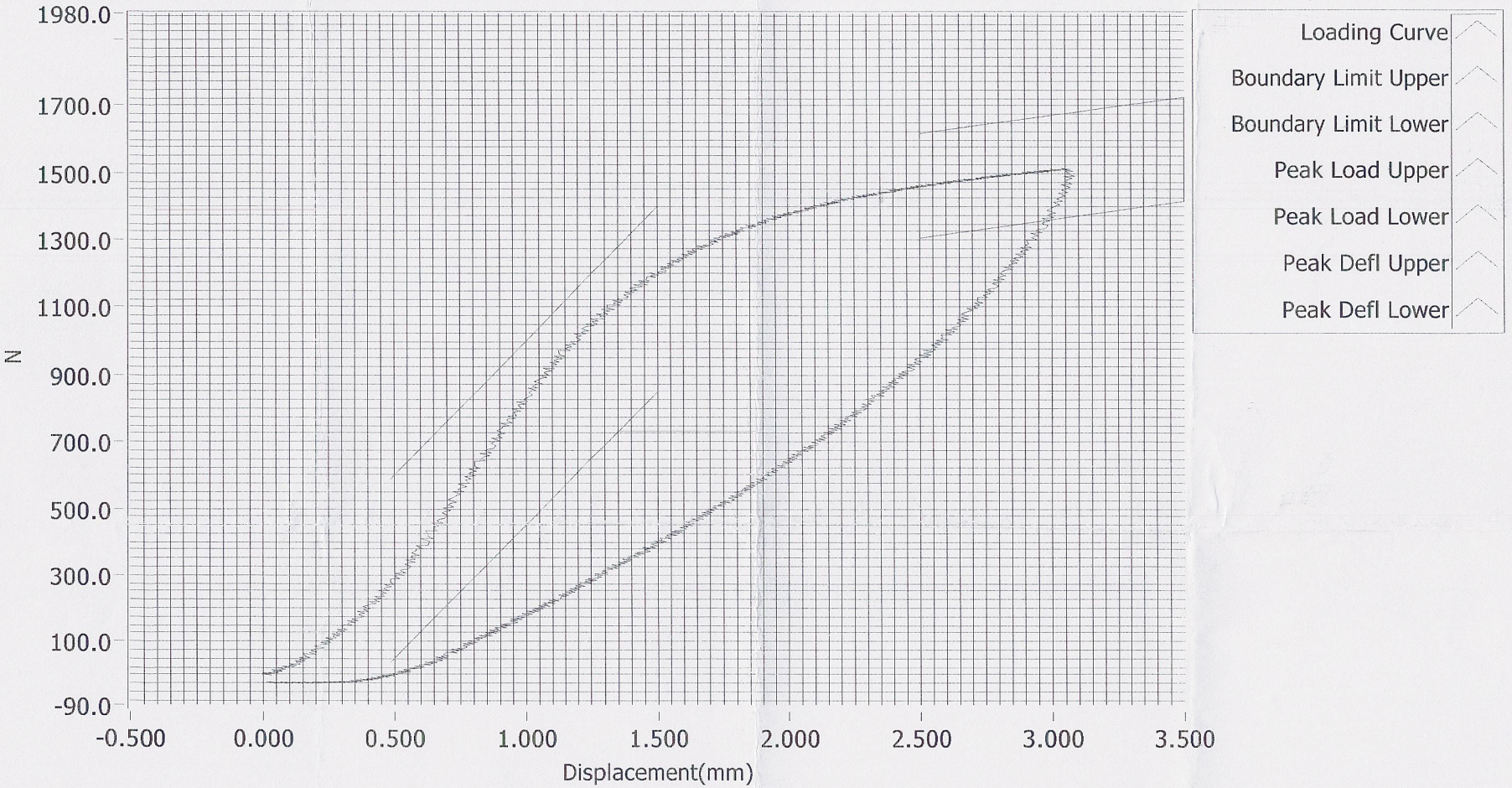






Test ID: **Iliac Pelvis** Test Time: **2:27:34 PM** Test Date: **10/26/2010**

Resultant Data - SIDIIs Plug Compression



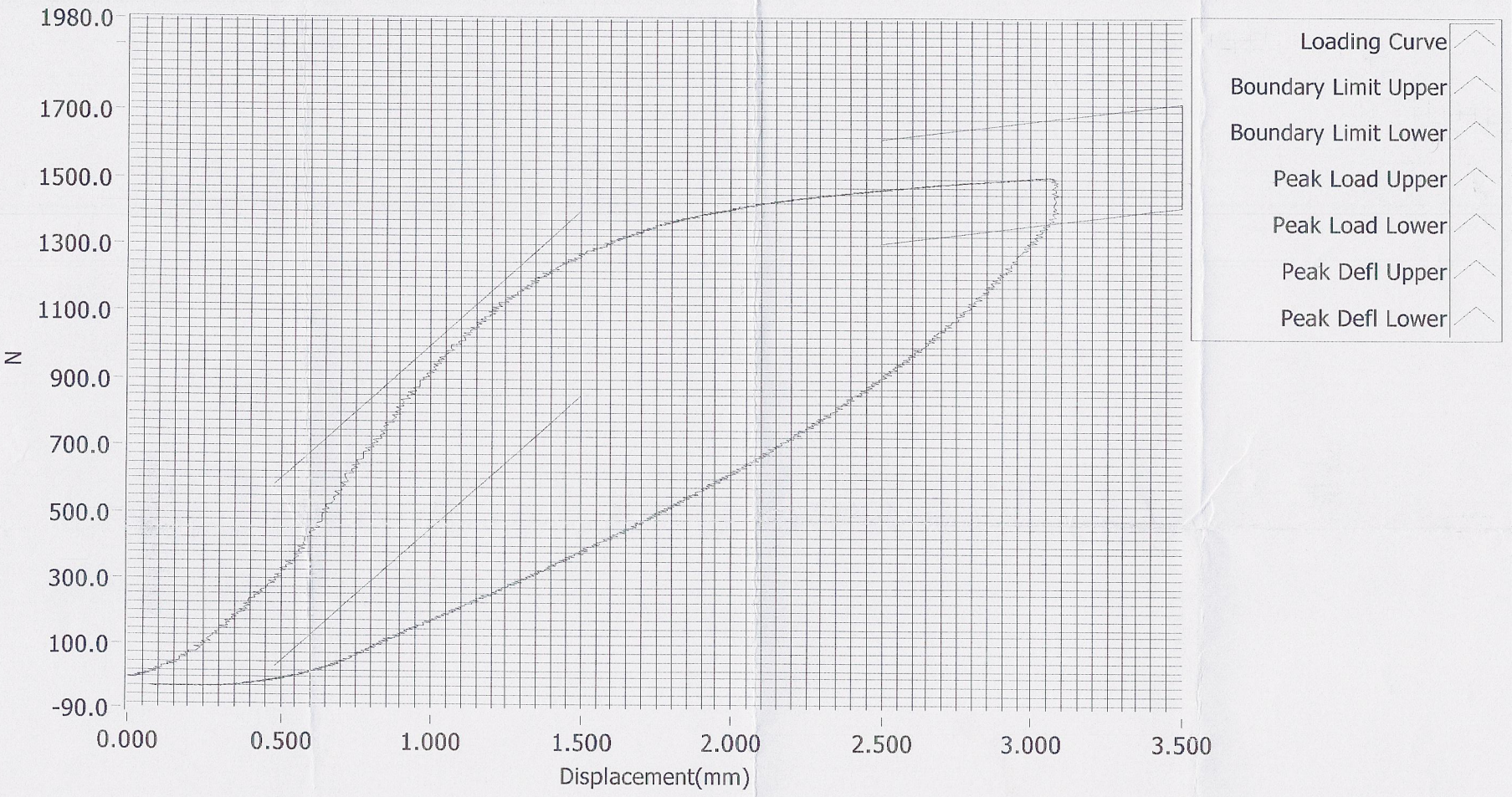
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		7/10/2007	3:40 PM

Cert ID	ATD Serial Number	ATD Type
	12597	SIDIIs

Current Date : 7/10/2007 Current Time : 15:41:12

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		7/17/2007	11:43 AM
Cert ID	ATD Serial Number	ATD Type	
	12820	SIDIIs	

Current Date : 7/17/2007 Current Time : 11:44:29

CALIBRATION TEST RESULTS

POST-TEST

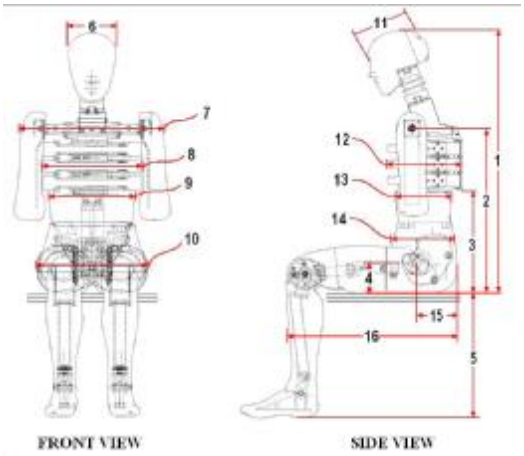
ES2-re No: 033

CONFIGURED FOR LEFT SIDE IMPACT

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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: 11/2/2010

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/1/2010**
Test Number:	**1**	Test Time:	**2:39:57 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	**23**	%RH	P
Resultant Acceleration	125	--	155	**146**	g	P
Oscillation	0.0	--	15.0	**8.3**	%	P
Fore-Aft Acceleration	-15.00	--	15.00	**5.72**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

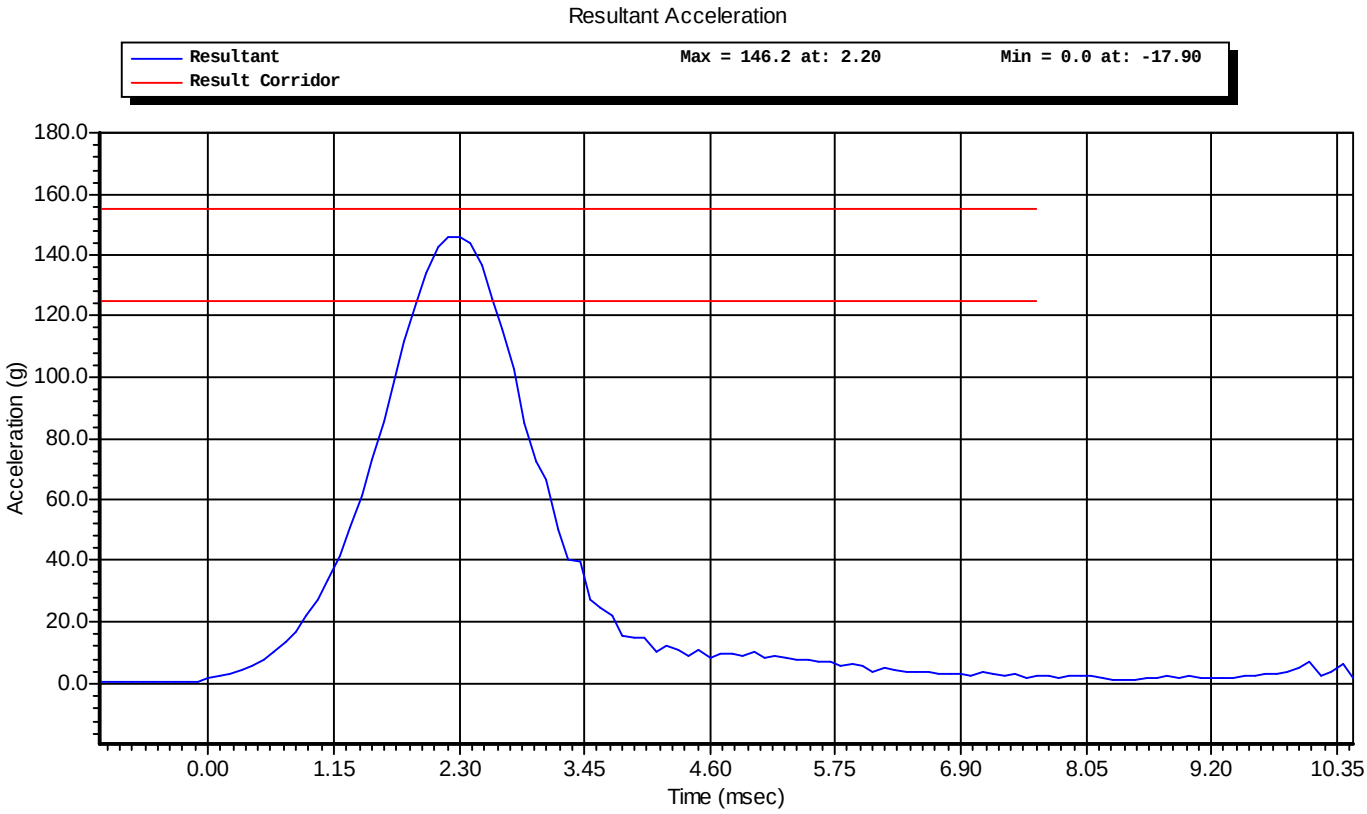
REFERENCE EQUIPMENT

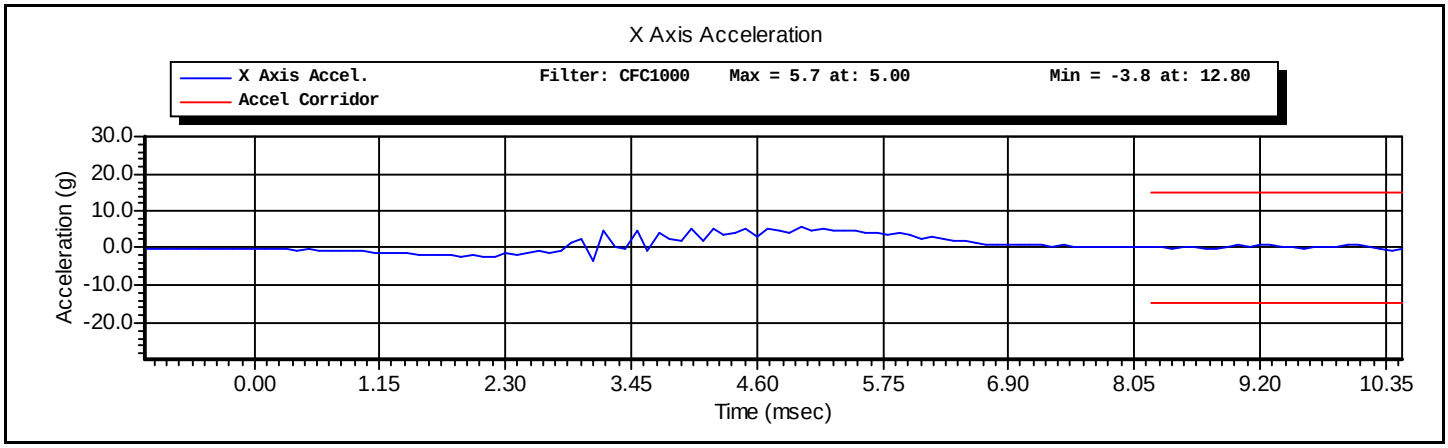
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P51681**	**9/20/2010**
Endevco	**7264-2000**	**P51949**	**5/26/2010**
Endevco	**7264-2000**	**P51695**	**9/20/2010**

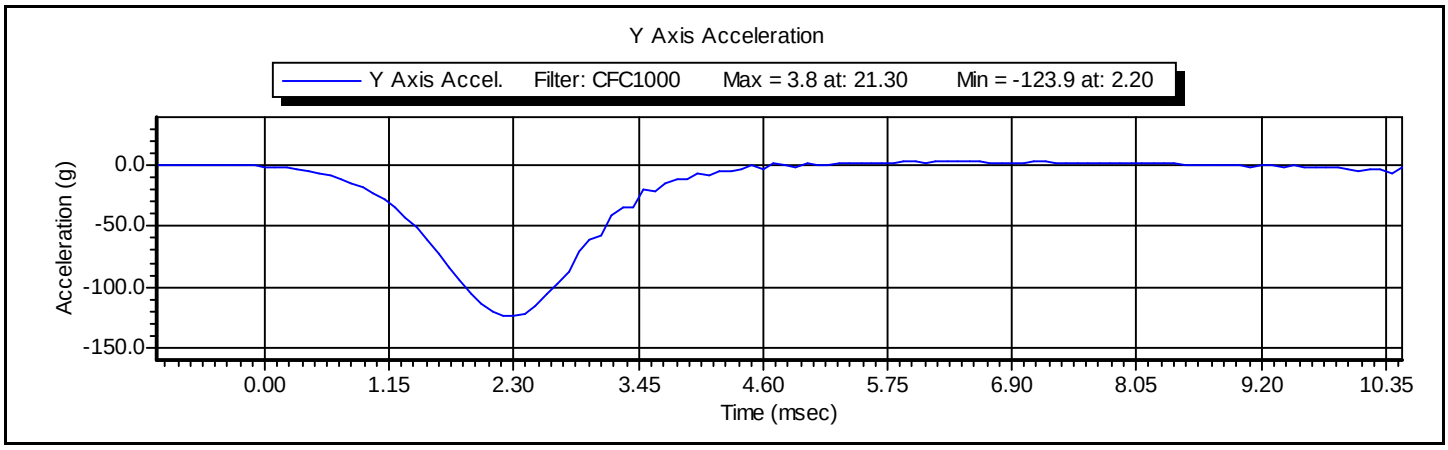
Test ID: **Head Drop** Test Time: **2:39:57 PM** Test Date: **11/1/2010**

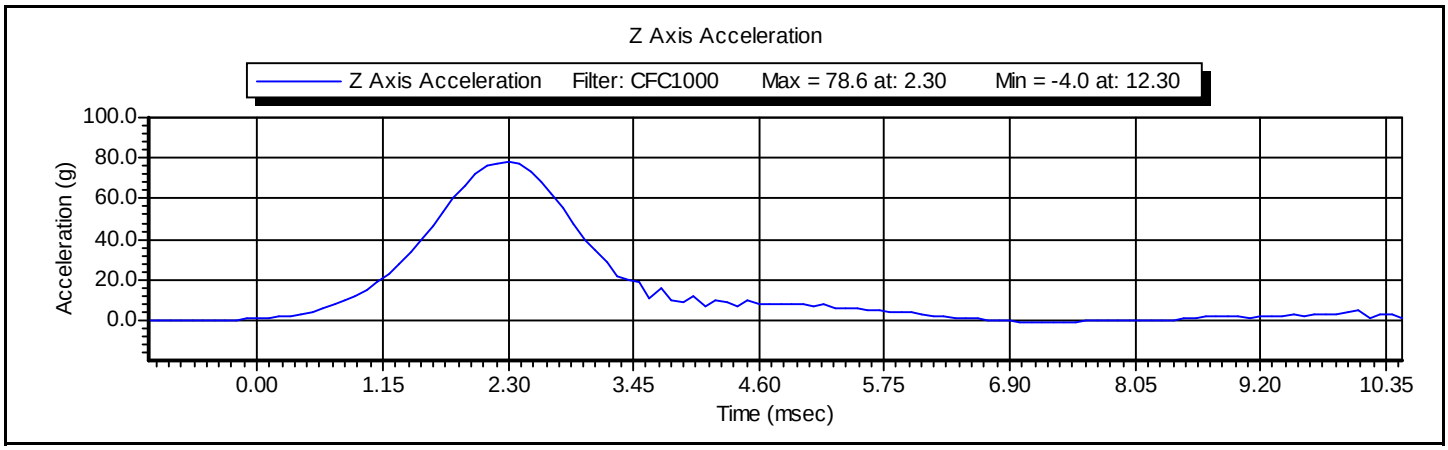
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/1/2010**
Test Number:	**1**	Test Time:	**2:39:57 PM**









Test ID: **Head Drop** Test Time: **2:39:57 PM** Test Date: **11/1/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**Fo33**		
Test ID:	**Neck Flexion**	Test Date:	**11/1/2010**
Test Number:	**1**	Test Time:	**3:22:38 PM**

Component Part Number	Component Serial Number
455-2002	**07085**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**23**	%RH	P
Velocity	3.30	--	3.50	**3.43**	m/s	P
Maximum Neck Flexion Angle	49.0	--	59.0	**51.2**	degrees	P
Time At Maximum Neck Flexion	54.0	--	66.0	**55.6**	ms	P
Decay to Zero Degrees	53.0	--	88.0	**61.6**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

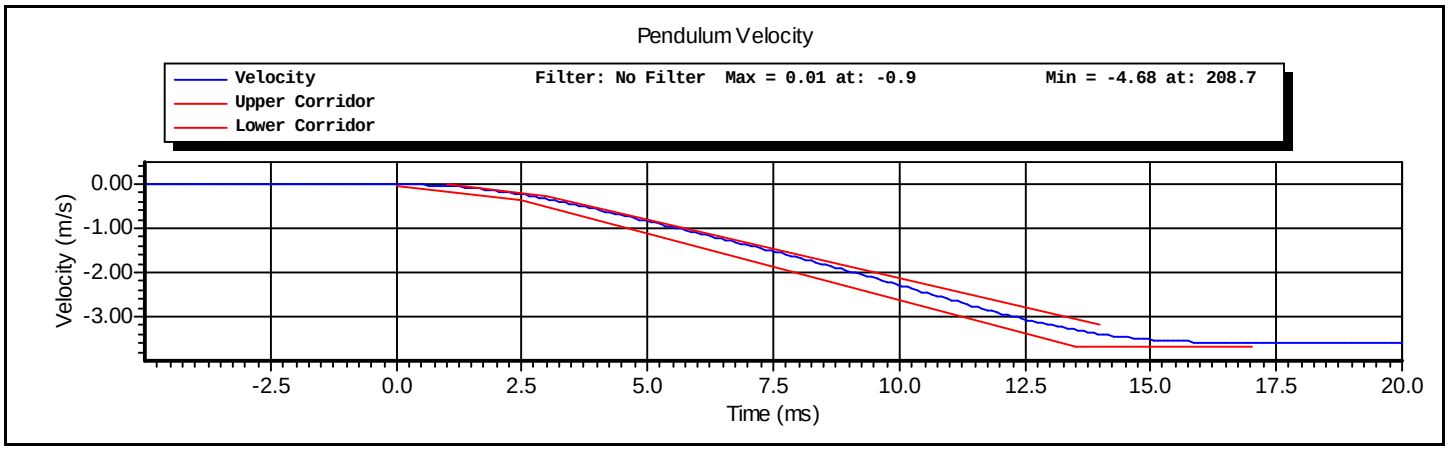
REFERENCE EQUIPMENT

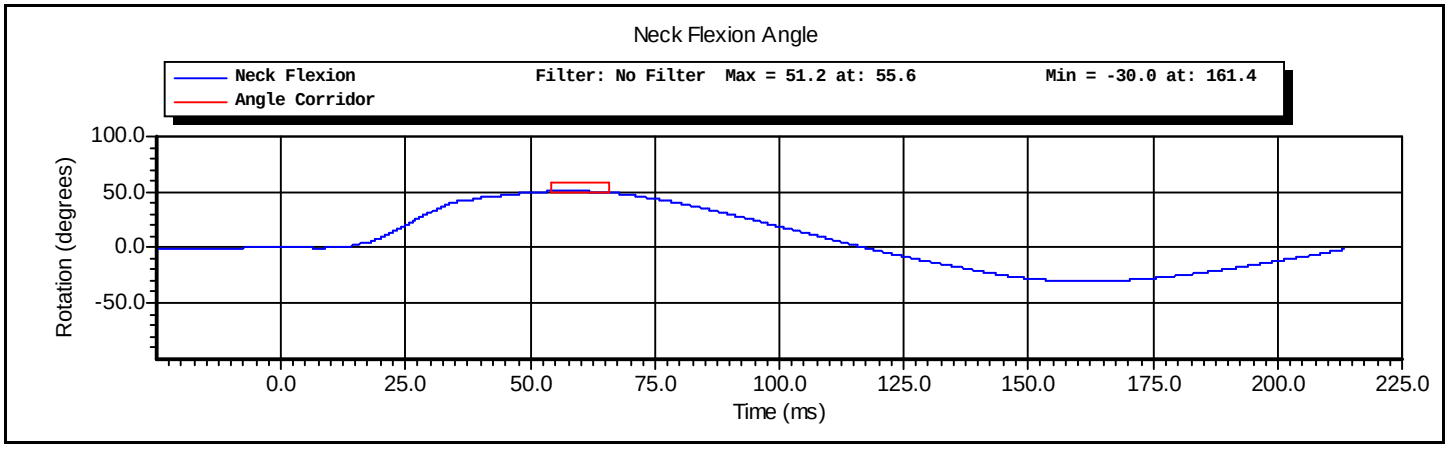
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

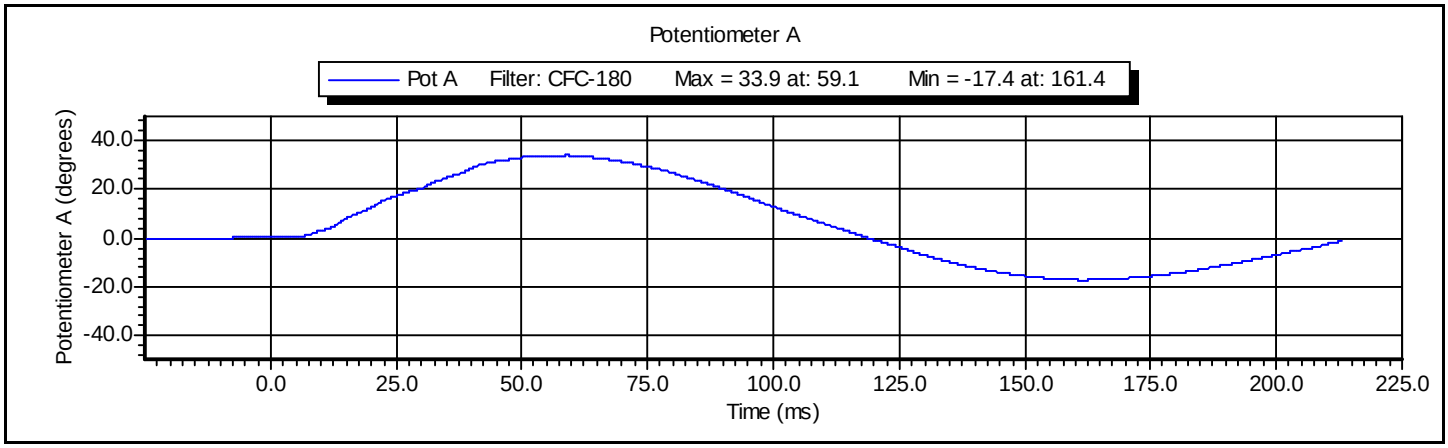
Test ID: **Neck Flexion** Test Time: **3:22:38 PM** Test Date: **11/1/2010**

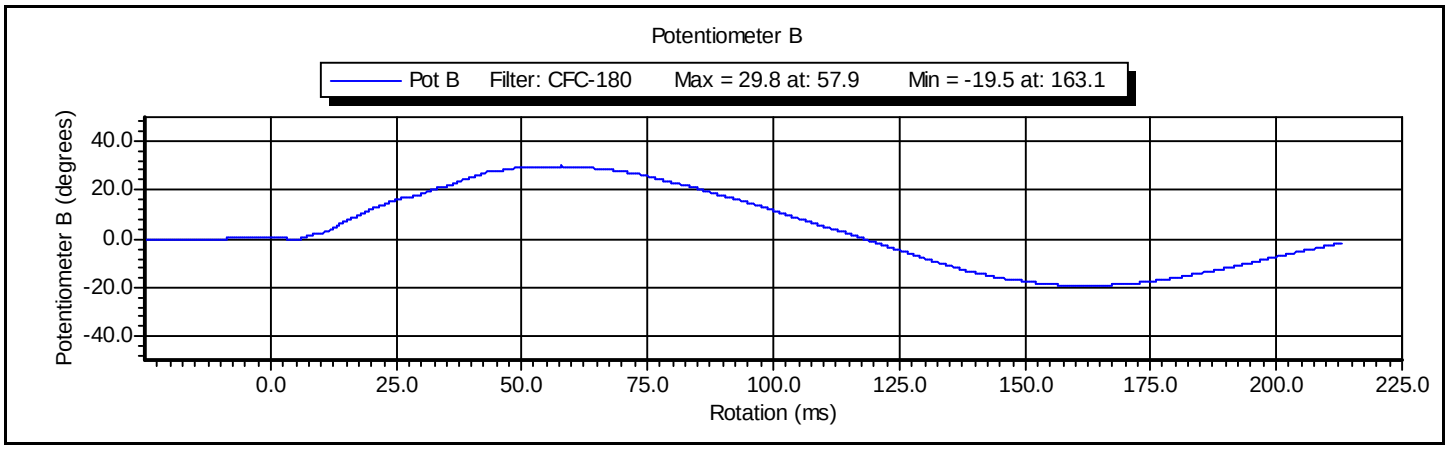
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

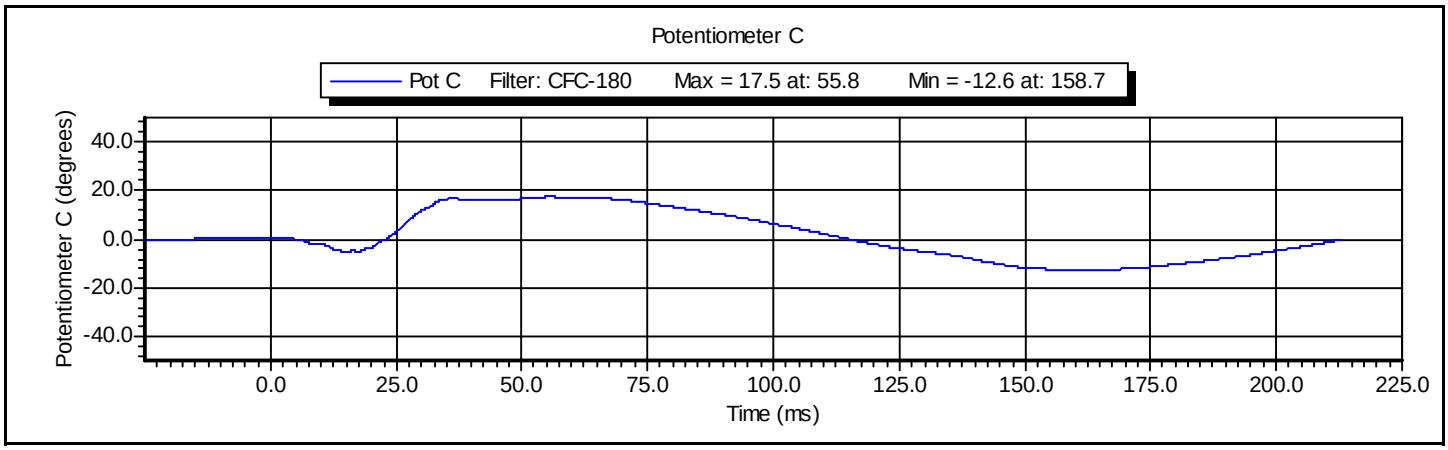
Test Name:	**Neck Flexion**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**Fo33**		
Test ID:	**Neck Flexion**	Test Date:	**11/1/2010**
Test Number:	**1**	Test Time:	**3:22:38 PM**











Test ID: **Neck Flexion** Test Time: **3:22:38 PM** Test Date: **11/1/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**11:49:13 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.0**	deg C	P
Humidity	10.0	--	70.0	**25.7**	%RH	P
Velocity	4.20	--	4.40	**4.33**	m/s	P
Pendulum Acceleration	-10.50	--	-7.50	**-10.07**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

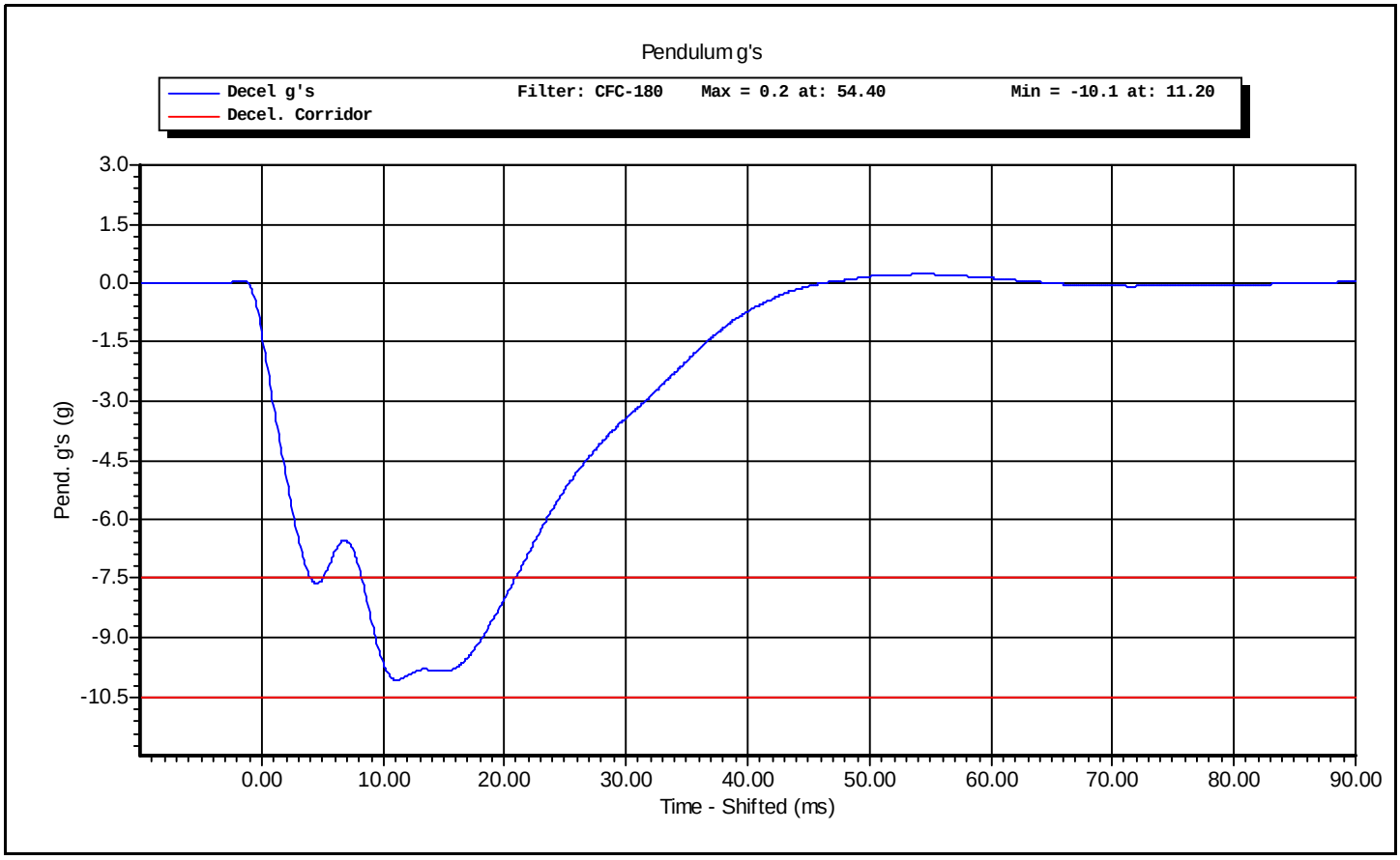
REFERENCE EQUIPMENT

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

Test ID: **Shoulder** Test Time: **11:49:13 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**11:49:13 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:32:34 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.1**	deg C	P
Humidity	10.0	--	70.0	**23.0**	%RH	P
Velocity	3.90	--	4.10	**3.99**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-48.10**	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: _____

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

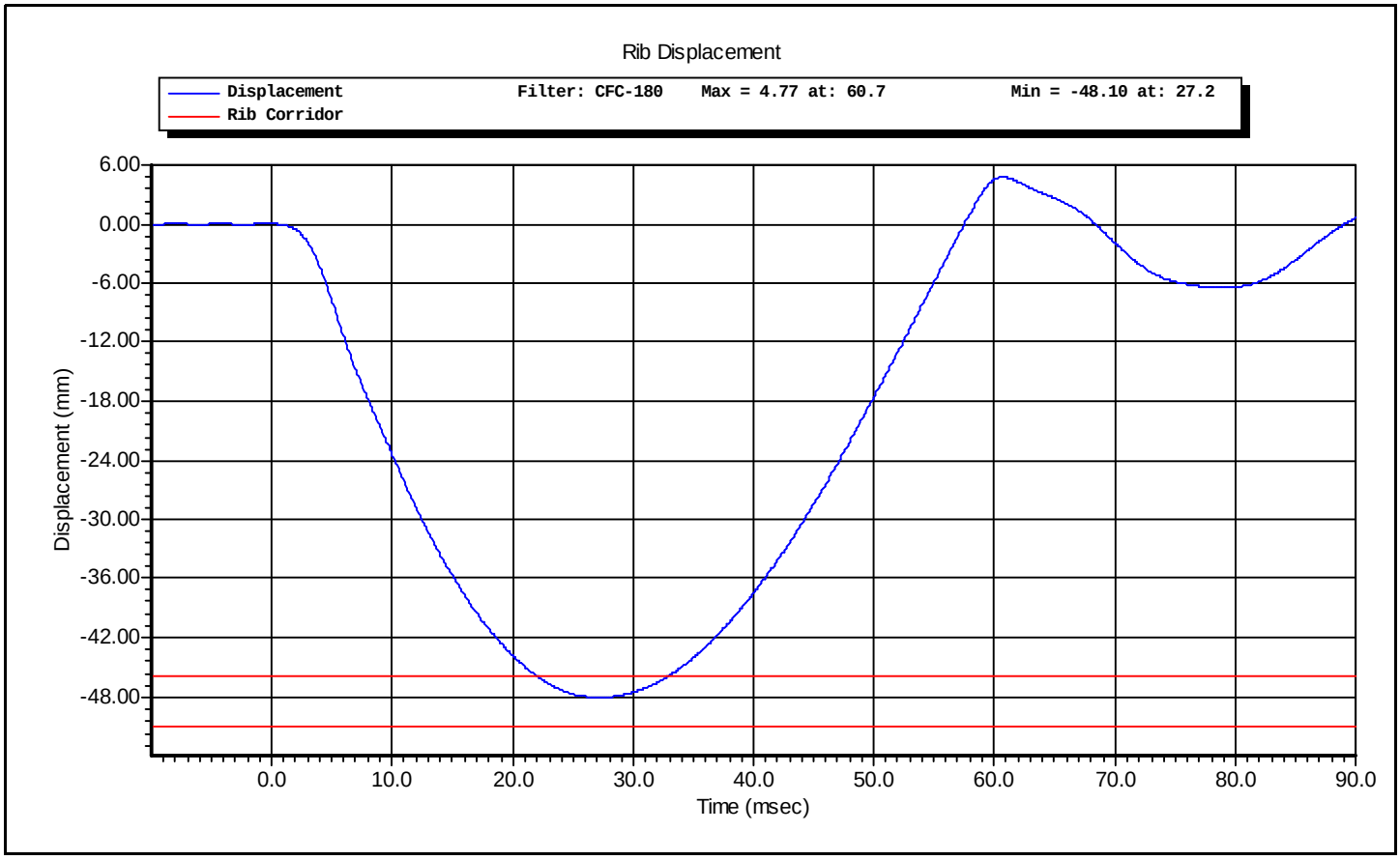
REFERENCE EQUIPMENT

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: **8:32:34 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:32:34 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:39:25 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.1**	deg C	P
Humidity	10.0	--	70.0	**23.0**	%RH	P
Velocity	2.90	--	3.10	**2.97**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-36.98**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

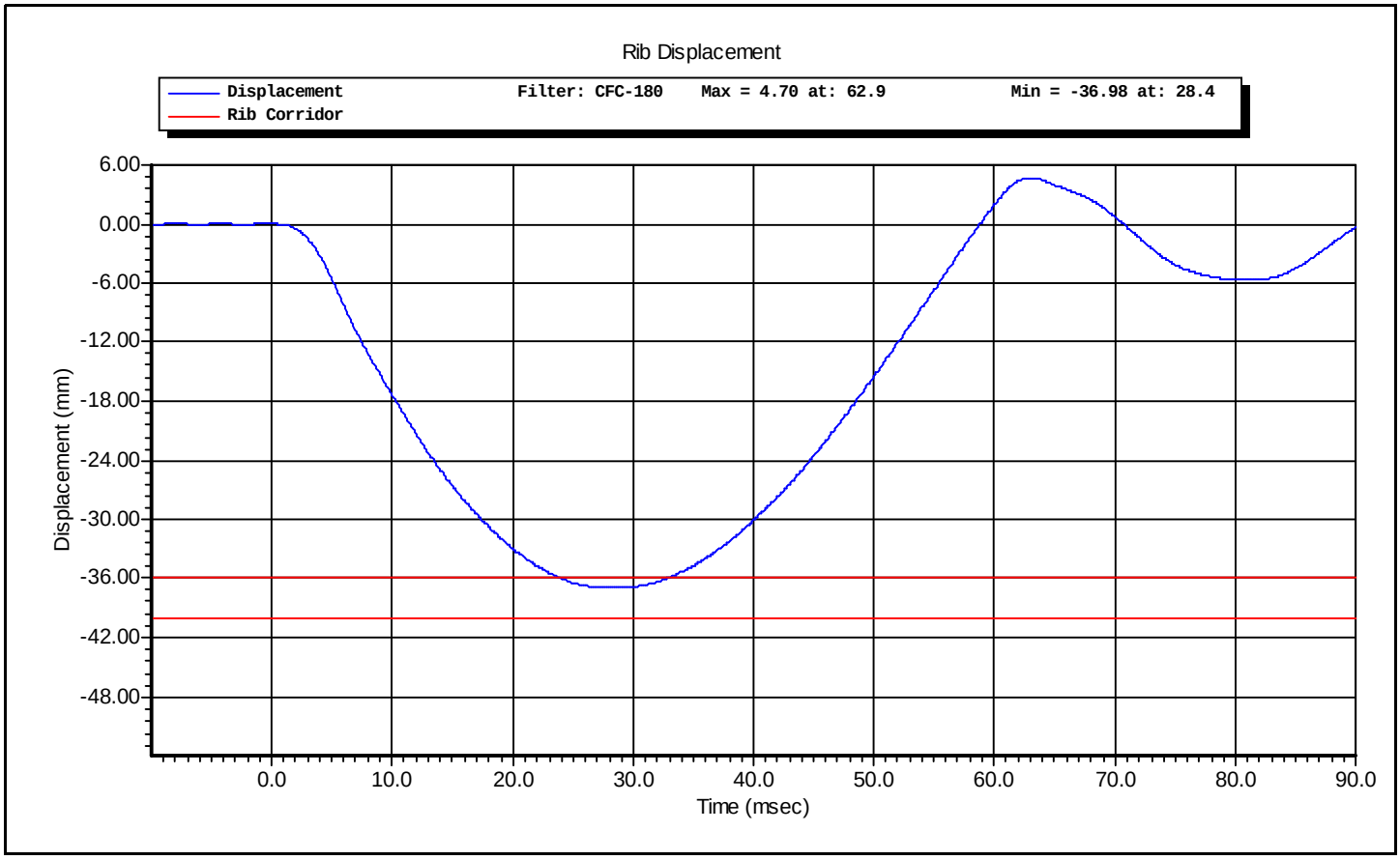
REFERENCE EQUIPMENT

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: **8:39:25 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:39:25 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:47:08 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.1**	deg C	P
Humidity	10.0	--	70.0	**23.0**	%RH	P
Velocity	3.90	--	4.10	**3.99**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-46.32**	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: _____

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

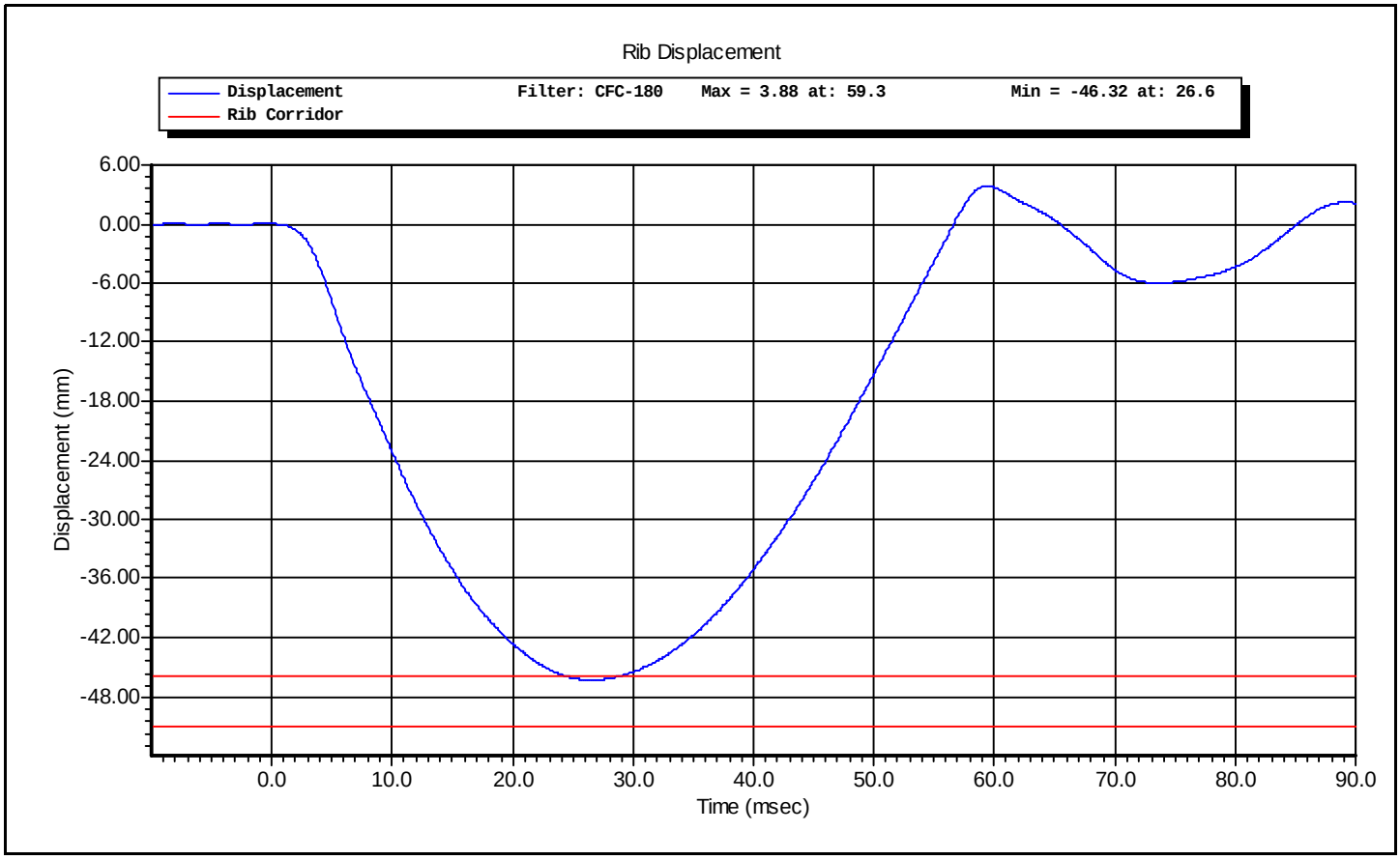
REFERENCE EQUIPMENT

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: **8:47:08 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:47:08 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:53:33 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.1**	deg C	P
Humidity	10.0	--	70.0	**23.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-36.73**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

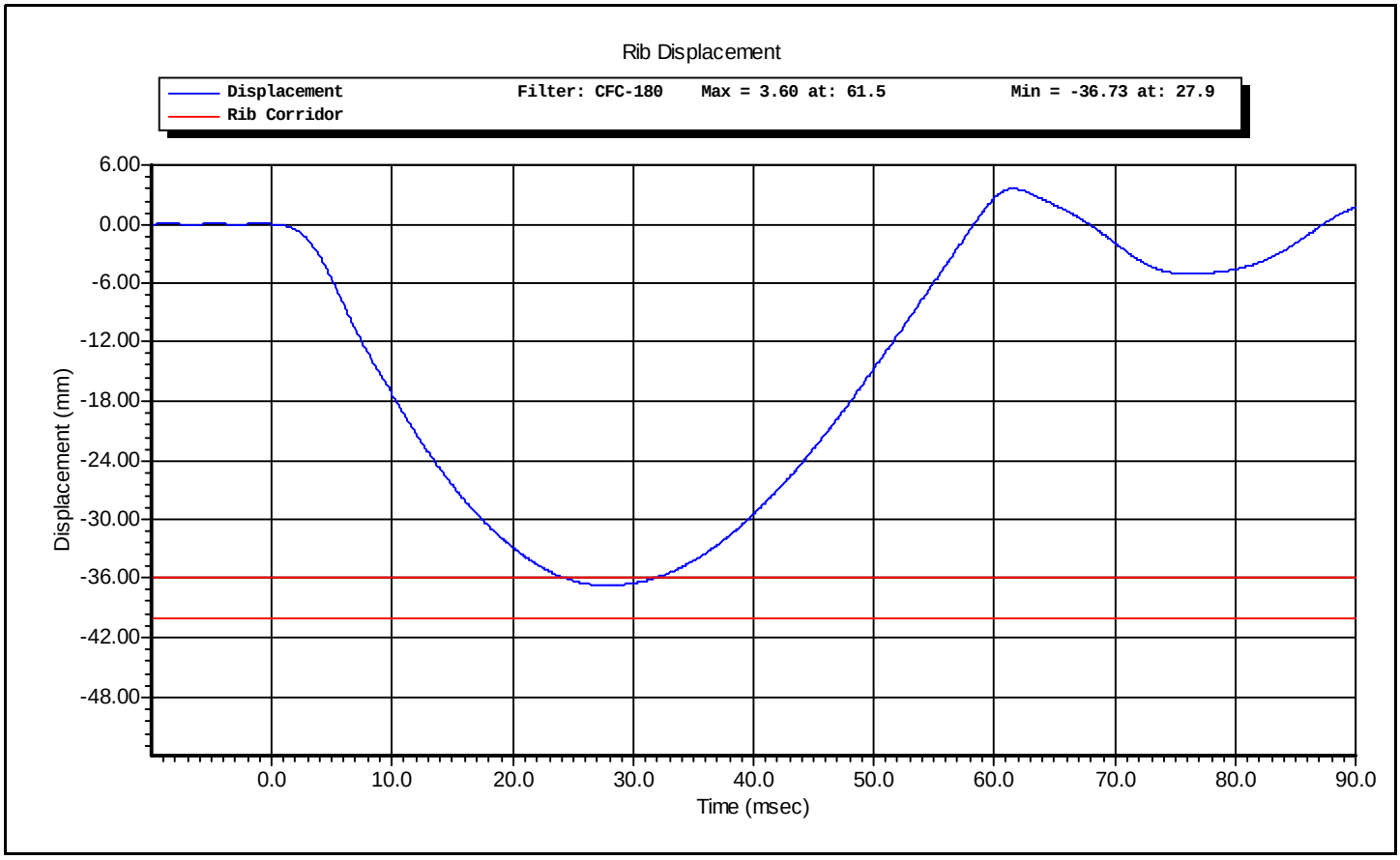
REFERENCE EQUIPMENT

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: **8:53:33 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**8:53:33 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**9:09:05 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**20.6**	deg C	P
Humidity	10.0	--	70.0	**24.0**	%RH	P
Velocity	3.90	--	4.10	**3.97**	m/s	P
Rib Displacement	-51.00	--	-46.00	**-47.55**	mm	P
Drop Height	807.0	--	823.0	**815.0**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

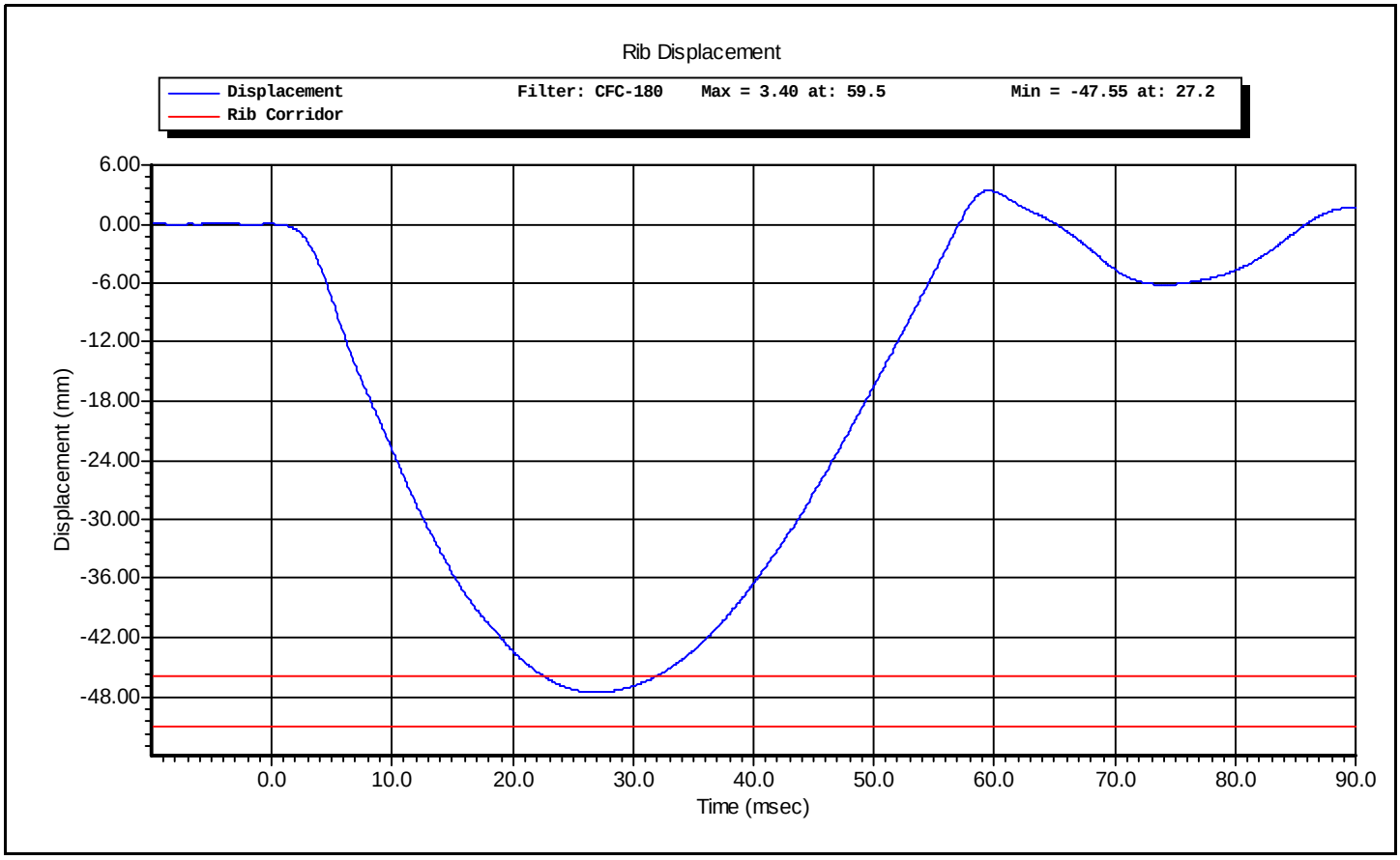
REFERENCE EQUIPMENT

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: **9:09:05 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**9:09:05 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 m/s**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**9:17:19 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**20.6**	deg C	P
Humidity	10.0	--	70.0	**24.0**	%RH	P
Velocity	2.90	--	3.10	**2.98**	m/s	P
Rib Displacement	-40.00	--	-36.00	**-36.84**	mm	P
Drop Height	454	--	464	**459**	mm	P

All test parameters are within specifications

Technician: _____ Signature: _____

Supervisor: _____ Signature: _____

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

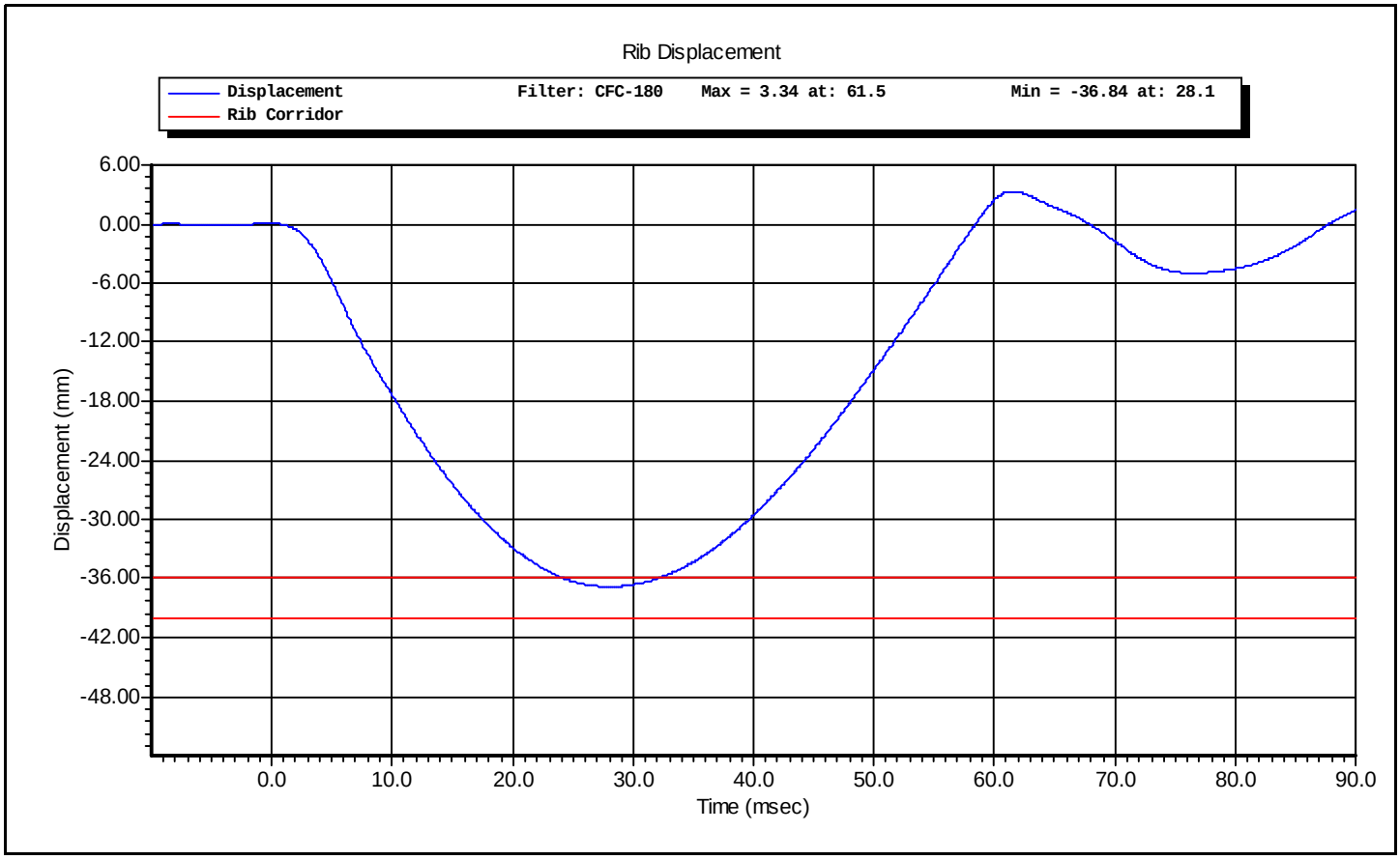
REFERENCE EQUIPMENT

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 m/s** Test Time: **9:17:19 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 m/s**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**9:17:19 AM**



Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**1**	Test Time:	**11:28:06 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**20.9**	deg C	P
Humidity	10.0	--	70.0	**26.0**	%RH	P
Velocity	5.40	--	5.60	**5.50**	m/s	P
Upper Rib Displacement	34.0	--	41.0	**36.5**	mm	P
Middle Rib Displacement	37.0	--	45.0	**41.1**	mm	P
Lower Rib Displacement	37.0	--	44.0	**41.3**	mm	P
Impactor Force	5100	--	6200	**5570**	N	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

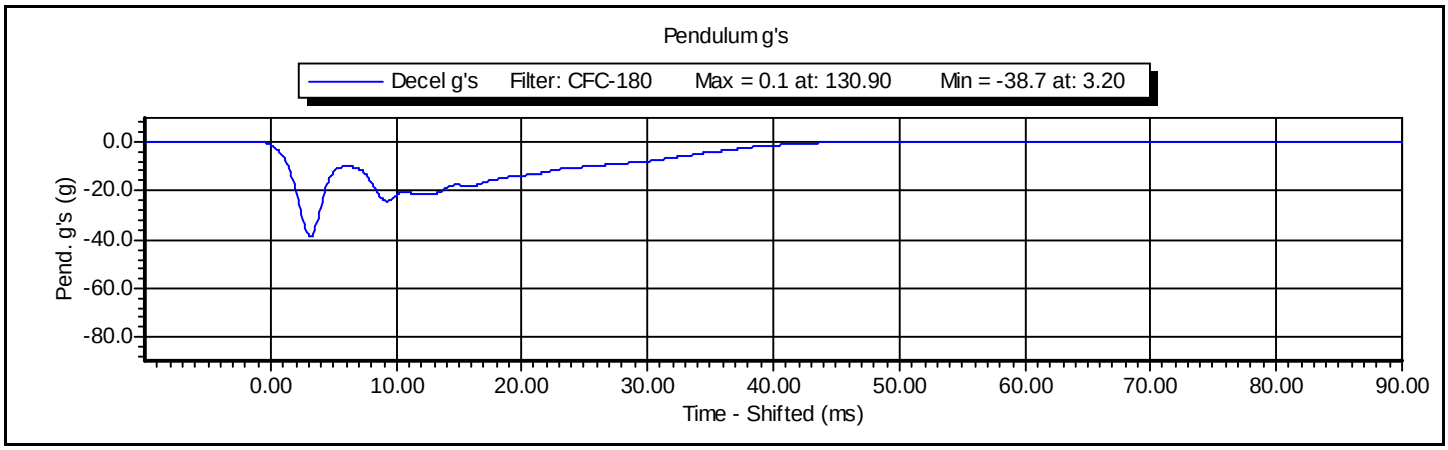
REFERENCE EQUIPMENT

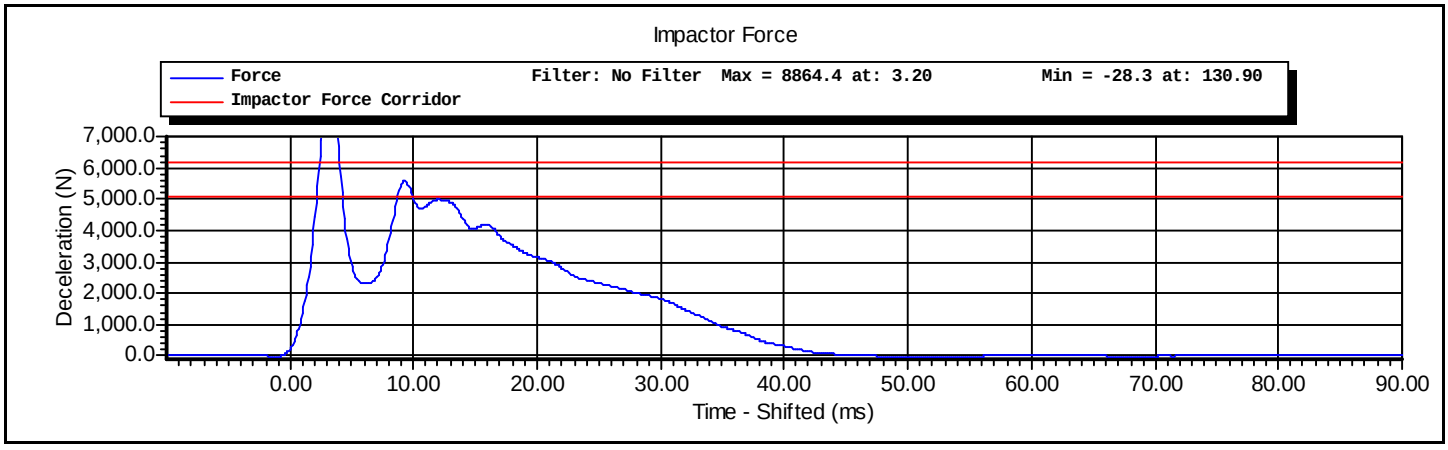
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Honeywell	**MLT-38000**	**DS-179**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-185**	**4/23/2010**
Honeywell	**MLT-38000**	**DS-178**	**4/23/2010**

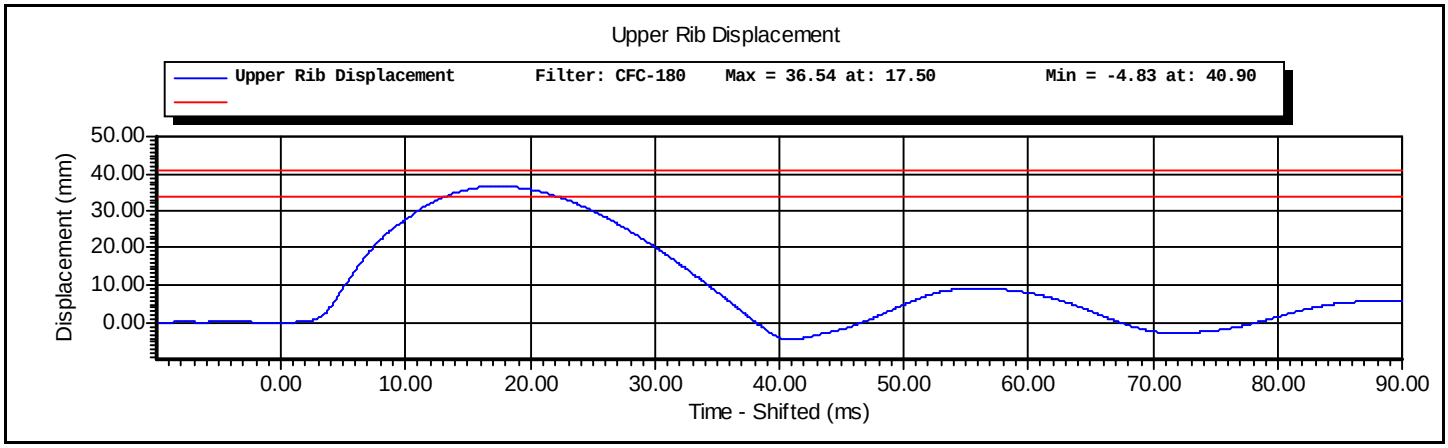
Test ID: **Thorax** Test Time: **11:28:06 AM** Test Date: **11/2/2010**

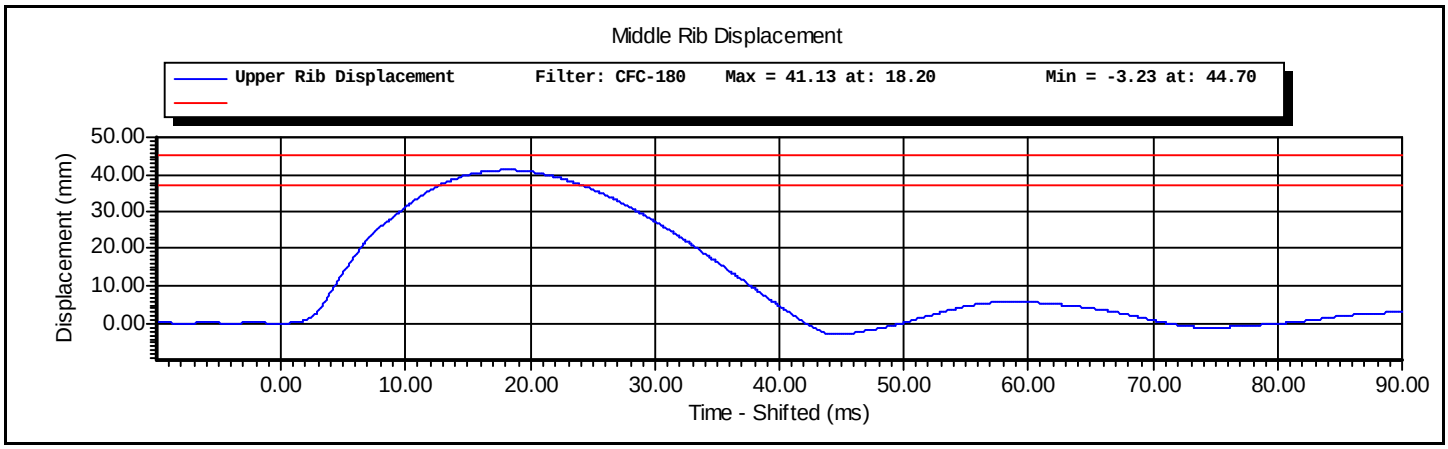
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

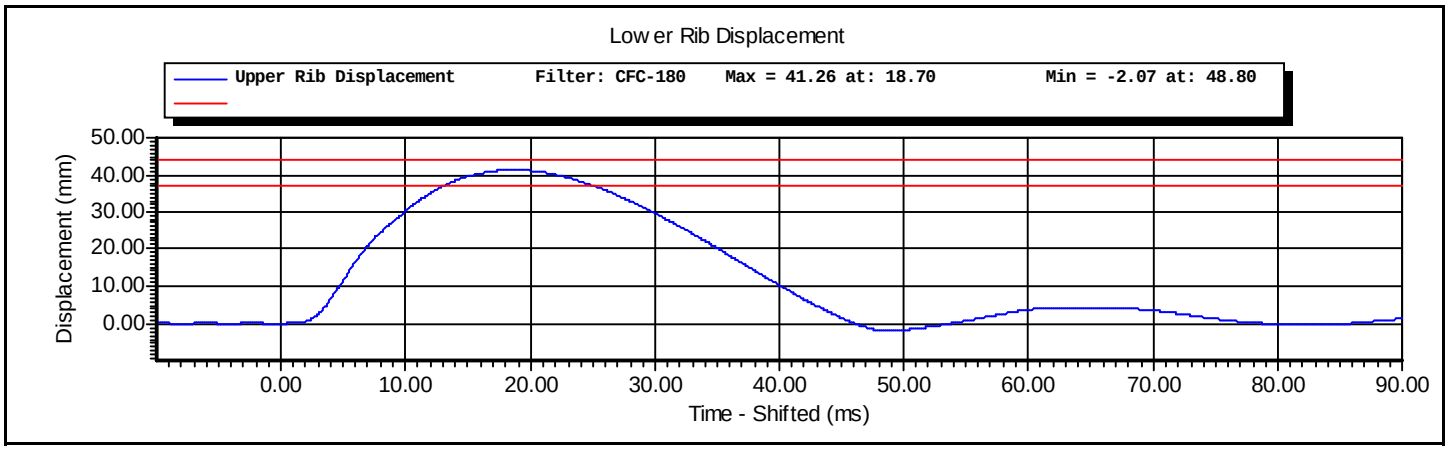
Test Name:	**Thorax Impact**	Revision:	**8/15/2008**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Thorax**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**11:28:06 AM**











Test ID: **Thorax** Test Time: **11:28:06 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**2**	Test Time:	**11:01:09 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.1**	deg C	P
Humidity	10	--	70	**24**	%RH	P
Velocity	3.90	--	4.10	**4.03**	m/s	P
Peak Abdominal Force	-2.70	--	-2.20	**-2.48**	kN	P
Time At Peak Abdominal Force	10.0	--	12.3	**10.7**	ms	P
Maximum Pendulum Force	-4.80	--	-4.00	**-4.52**	kN	P
Time at Peak Pendumlum Force	10.6	--	13.0	**10.8**	ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

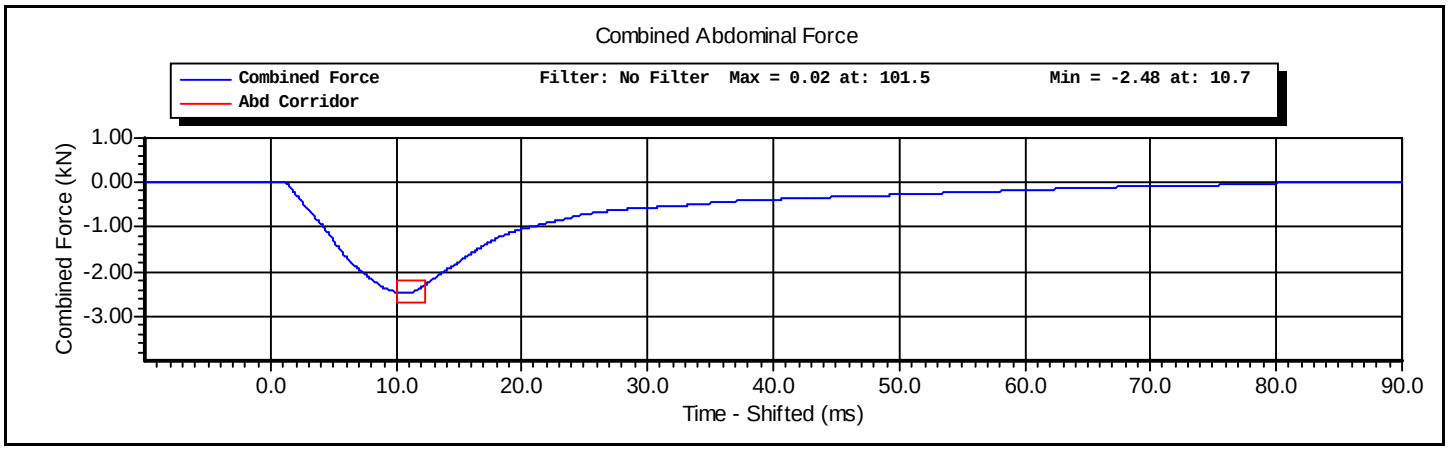
REFERENCE EQUIPMENT

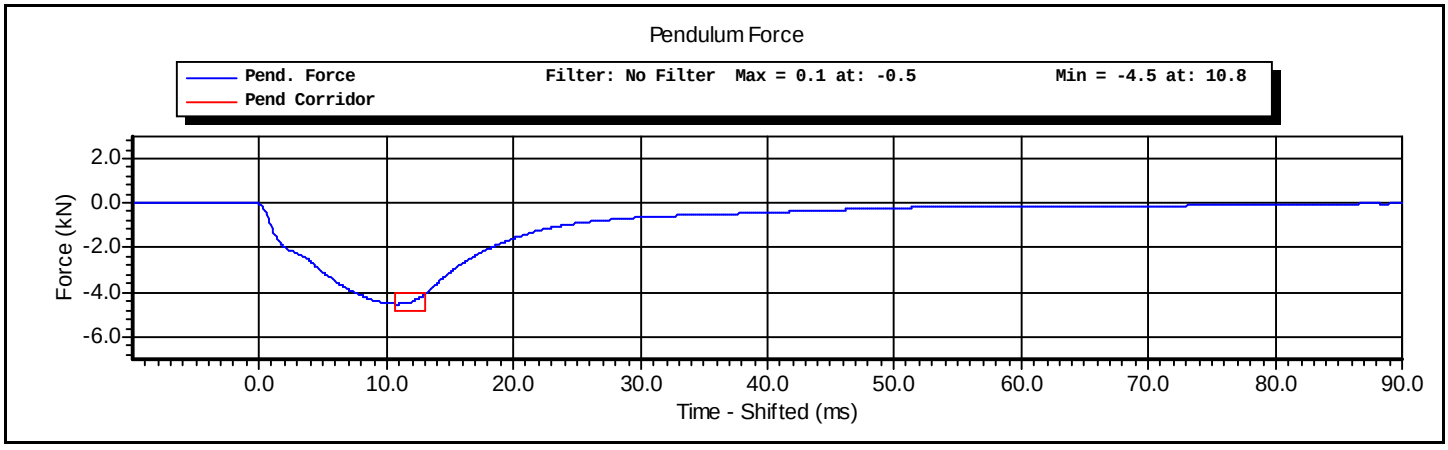
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**2631**	**LC-1524**	**4/22/2010**
Denton	**2631**	**LC-1523**	**4/22/2010**
Denton	**2631**	**LC-1530**	**4/22/2010**

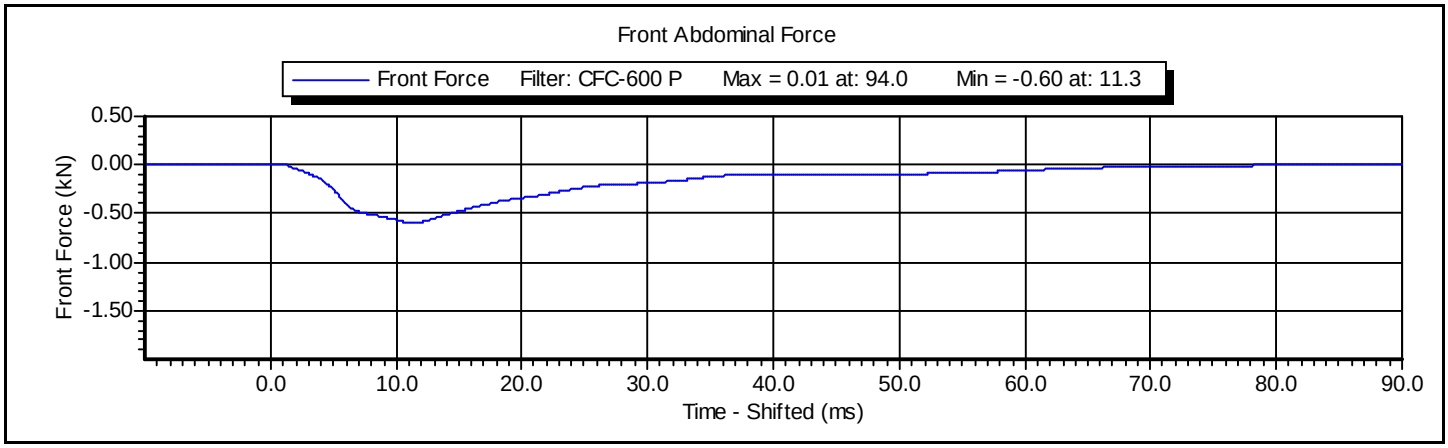
Test ID: **Abdomen** Test Time: **11:01:09 AM** Test Date: **11/2/2010**

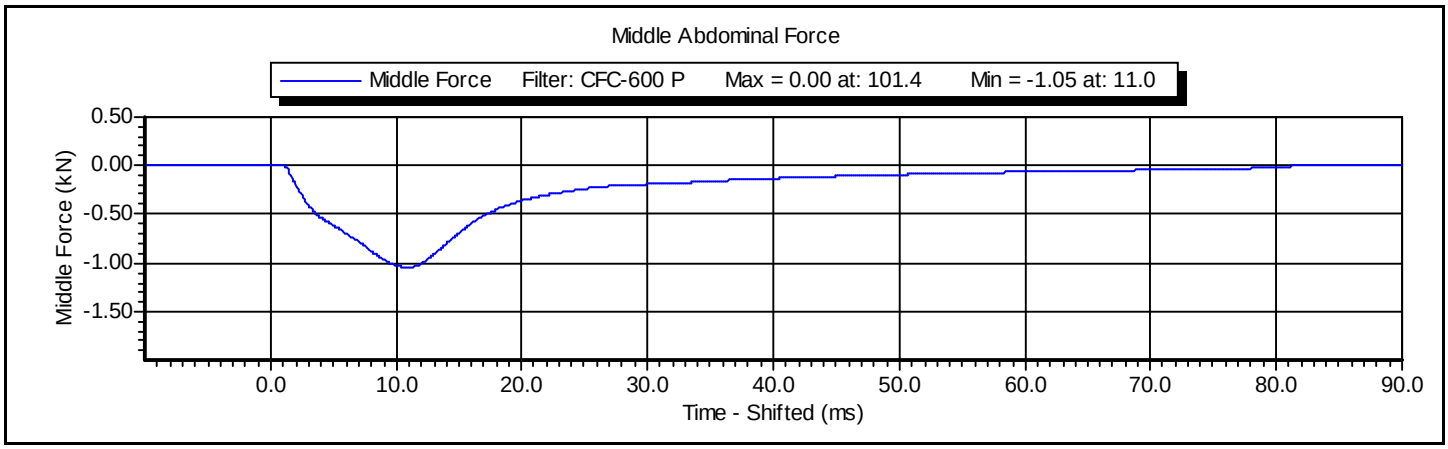
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

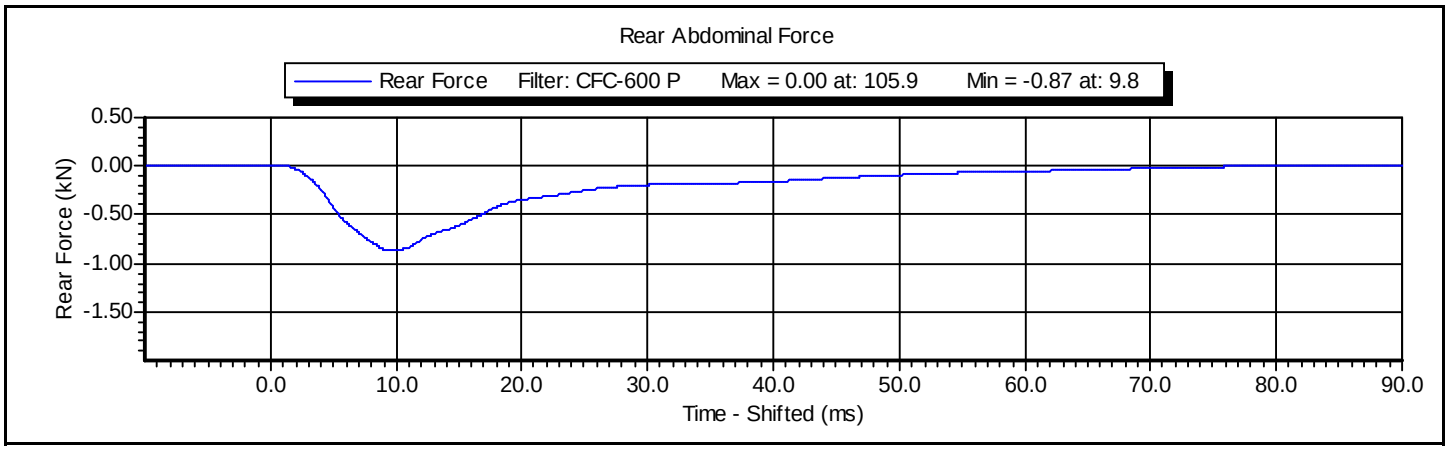
Test Name:	**Abdominal Impact**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Abdomen**	Test Date:	**11/2/2010**
Test Number:	**2**	Test Time:	**11:01:09 AM**











Test ID: **Abdomen** Test Time: **11:01:09 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**Lumbar Spine**	Test Date:	**11/1/2010**
Test Number:	**1**	Test Time:	**4:00:31 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	**23**	%RH	P
Velocity	5.95	--	6.15	**6.15**	m/s	P
Maximum Headform Flexion Angle	45.0	--	55.0	**48.5**	degrees	P
Time at Maximum Headform Flexion Angle	39.0	--	53.0	**43.8**	ms	P
Decay to Zero Degrees	37.0	--	57.0	**38.8**	ms	P
Velocity Corridor		--				P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

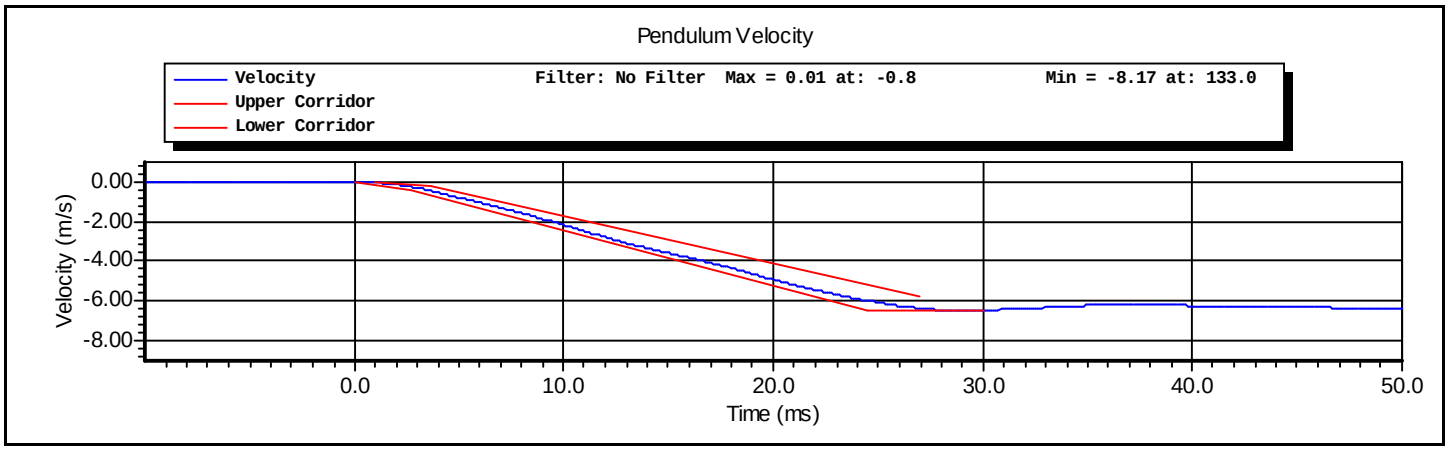
REFERENCE EQUIPMENT

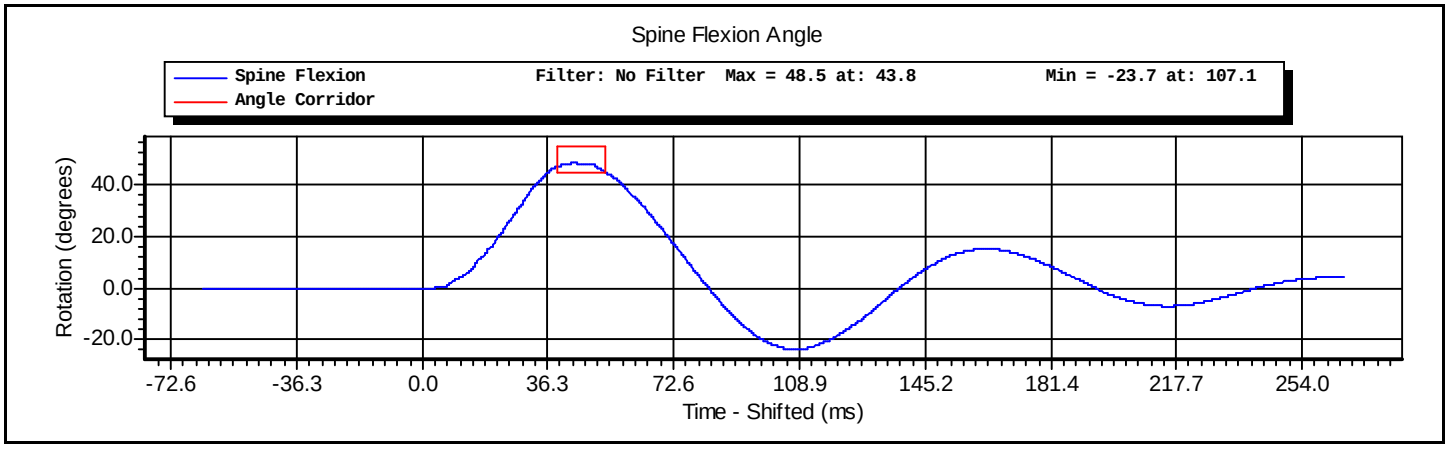
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
DentonATD	**7000428**	**094**	**4/27/2010**
DentonATD	**7000428**	**095**	**4/27/2010**
DentonATD	**7000428**	**093**	**4/27/2010**

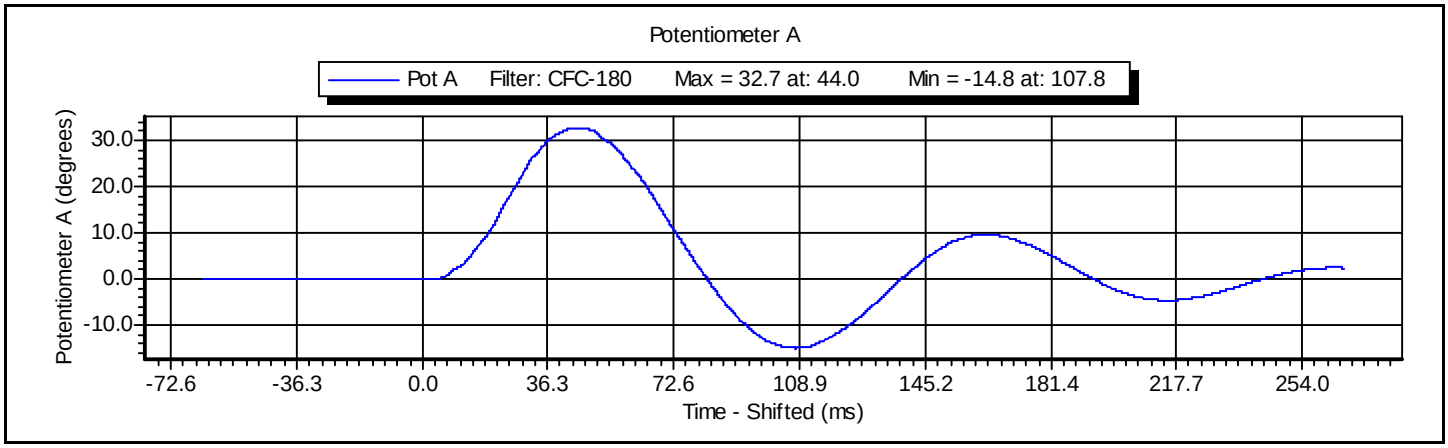
Test ID: **Lumbar Spine** Test Time: **4:00:31 PM** Test Date: **11/1/2010**

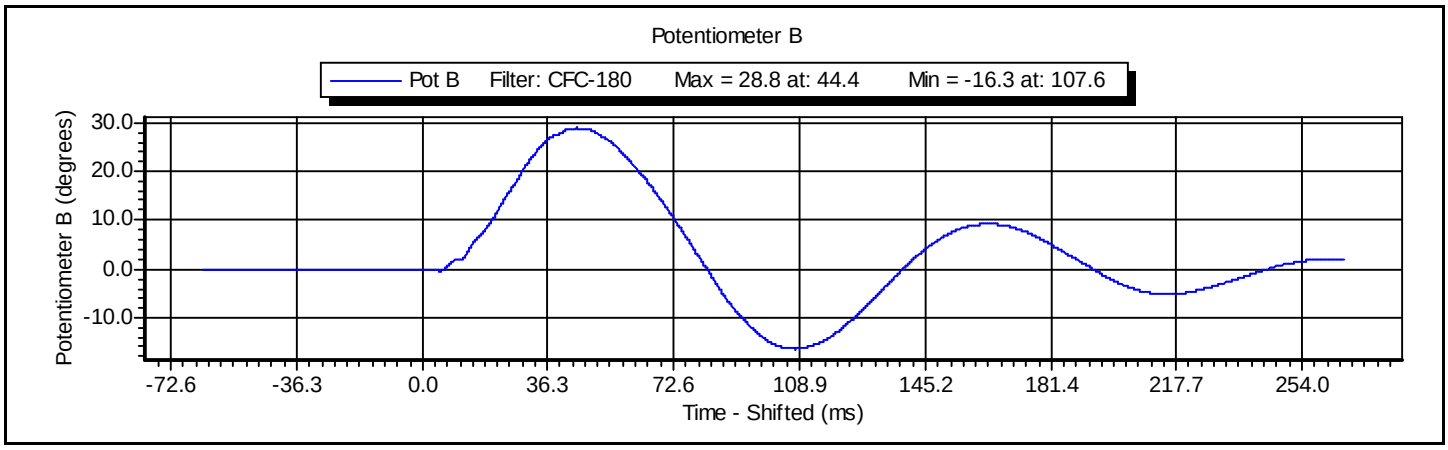
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

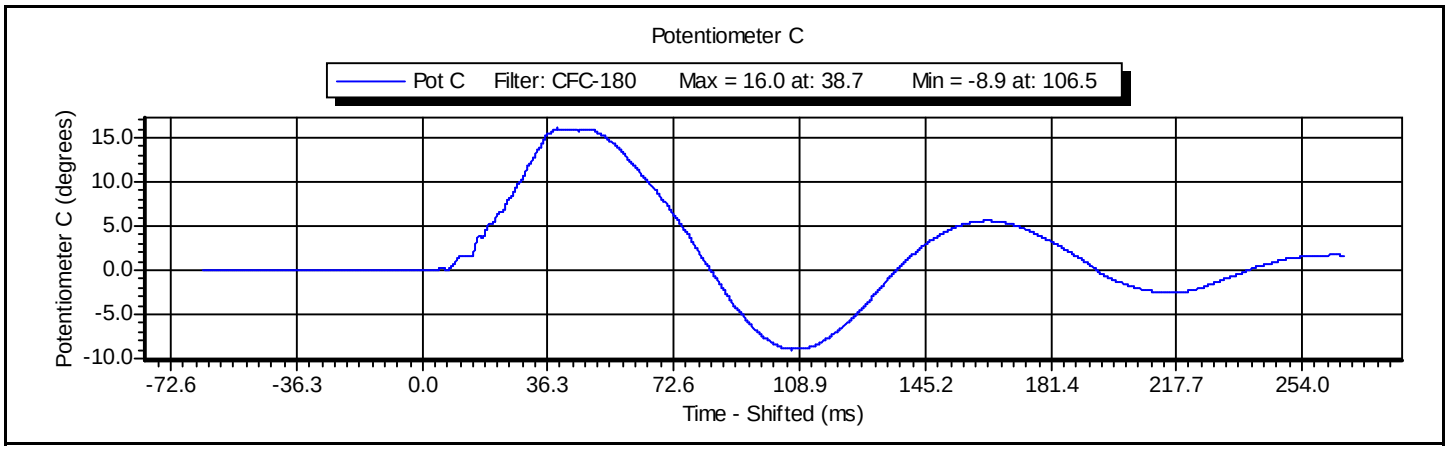
Test Name:	**Lumbar Spine**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**ES-2re**		
ATD Serial Number:	**F033**		
Test ID:	**Lumbar Spine**	Test Date:	**11/1/2010**
Test Number:	**1**	Test Time:	**4:00:31 PM**











Test ID: **Lumbar Spine** Test Time: **4:00:31 PM** Test Date: **11/1/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**2**	Test Time:	**10:12:28 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**20.6**	deg C	P
Humidity	10	--	70	**24**	%RH	P
Velocity	4.20	--	4.40	**4.32**	m/s	P
Peak Pendulum Force	-5.40	--	-4.70	**-4.91**	kN	P
Time at Peak Pendulum Force	11.80	--	16.10	**13.23**	ms	P
Peak Pubic Symphysis Force	-1.59	--	-1.23	**-1.32**	kN	P
Time at Peak Pubic Symphysis Force	12.20	--	17.00	**15.33**	ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

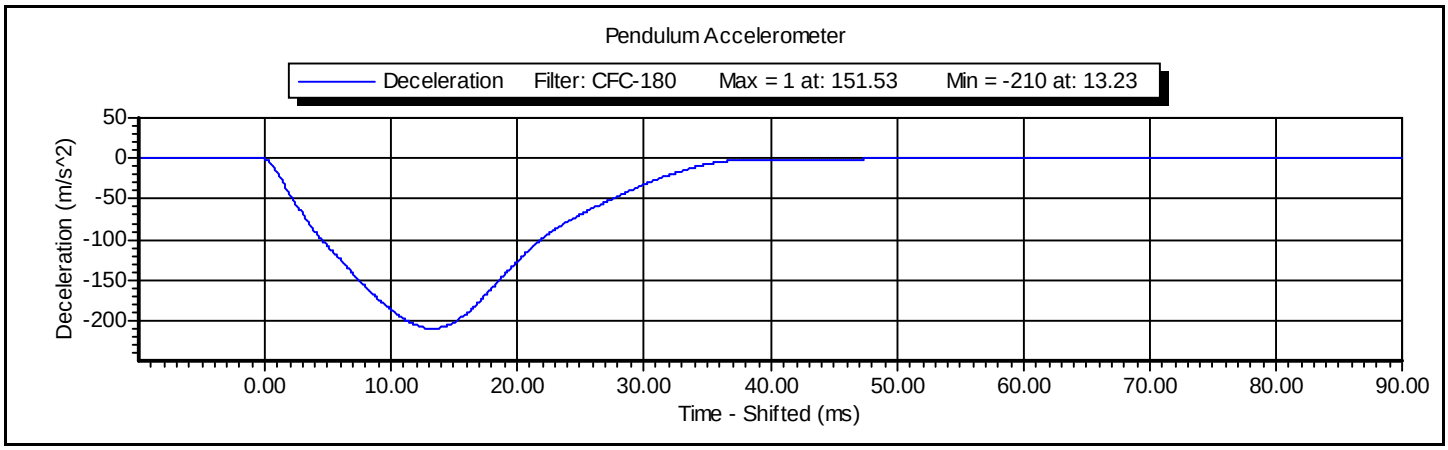
REFERENCE EQUIPMENT

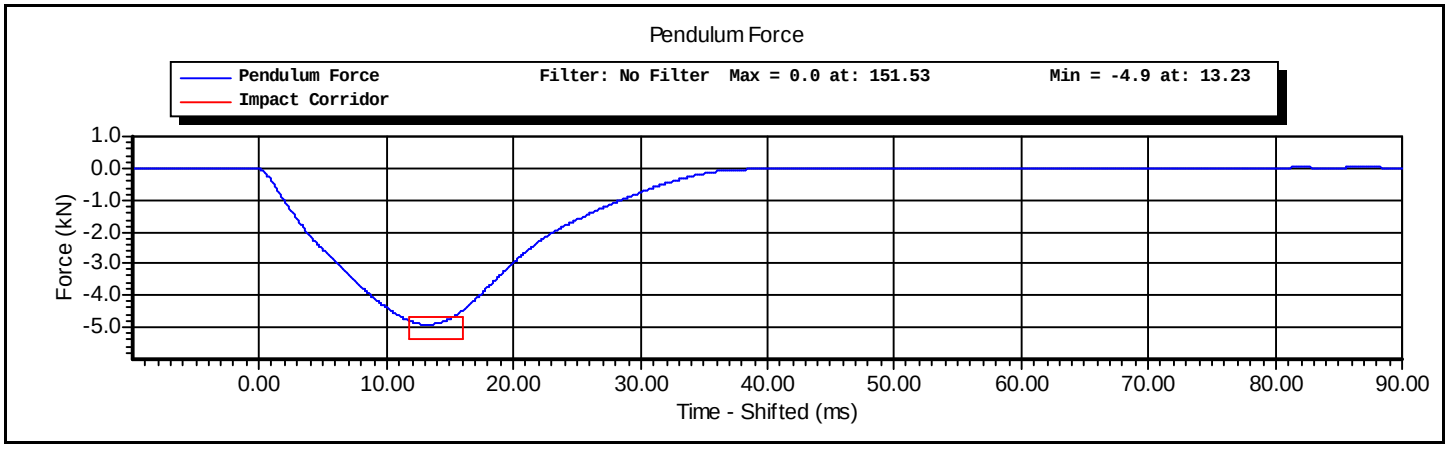
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Denton	**3096**	**LC-456Fy**	**4/22/2010**

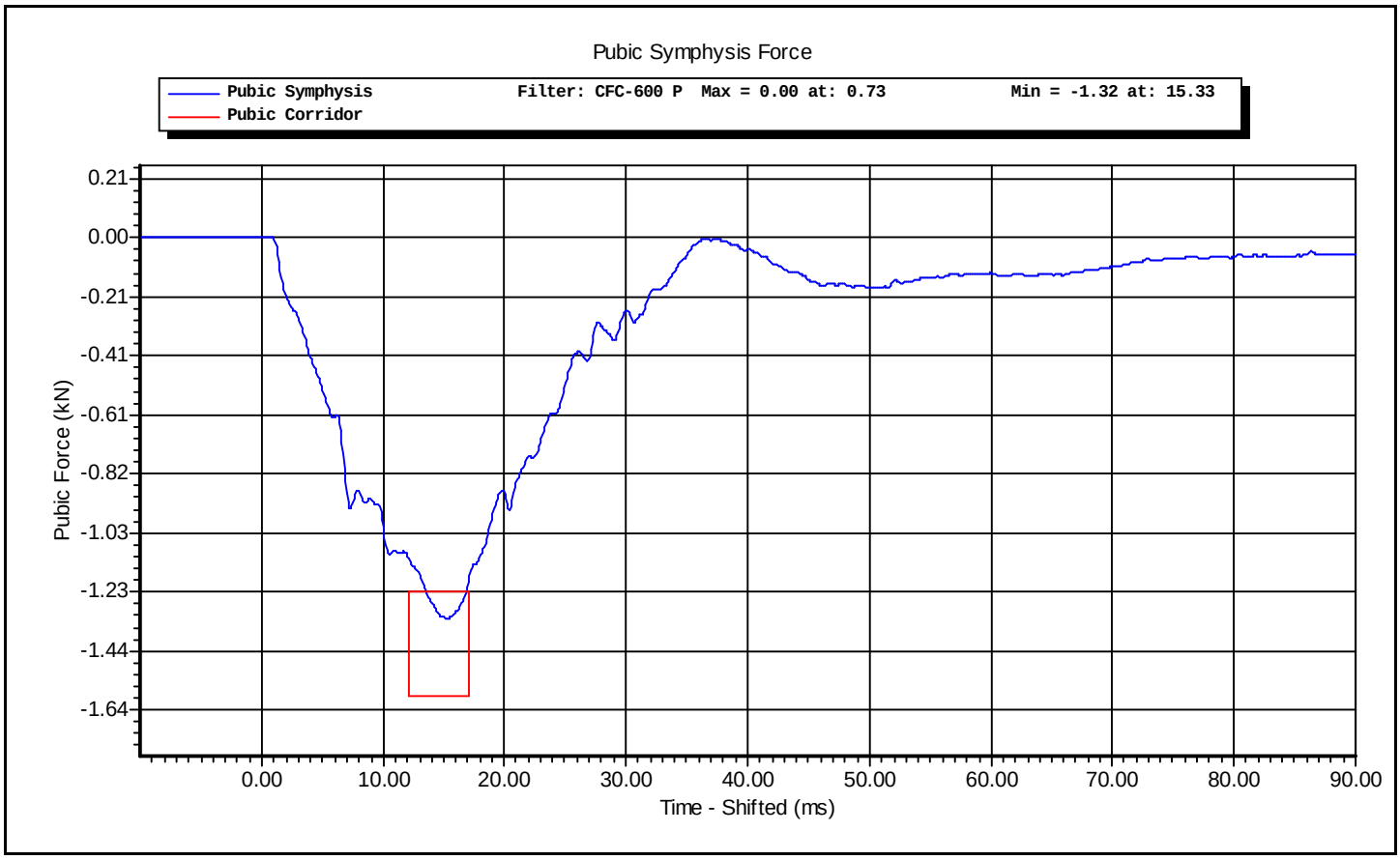
Test ID: **Pelvis** Test Time: **10:12:28 AM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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:	**11/2/2010**
Test Number:	**2**	Test Time:	**10:12:28 AM**







Test ID: **Pelvis** Test Time: **10:12:28 AM** Test Date: **11/2/2010**

CALIBRATION TEST RESULTS

POST-TEST

SID-IIs No: 304

CONFIGURED FOR LEFT SIDE IMPACT

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

SID-IIsD External Measurements

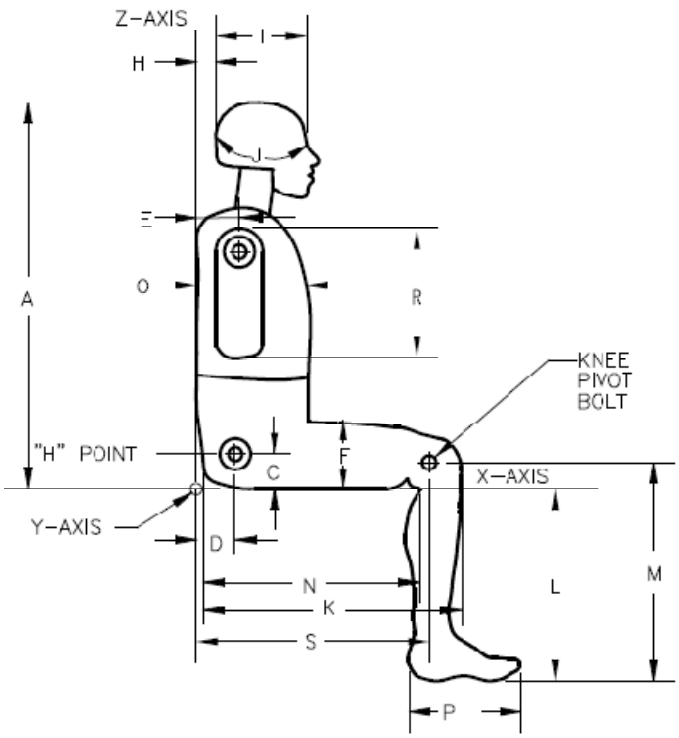
NHTSA ATD S/N 304

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	439	Yes
C	H-Point Height	79.0 - 89.0	83	Yes
D	H-Point from Seat Back	141.0 - 151.0	146	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	104	Yes
F	Thigh Clearance	119.0 - 135.0	126	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	43	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	546	Yes
K	Buttock to Knee Length	514.0 - 540.0	528	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	398	Yes
N	Buttock Popliteal Length	416.0 - 442.0	428	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	318	Yes
R	Arm Length	249.0 - 259.0	251	Yes
S	Knee Joint to Seat back	478.0 - 493.0	485	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	353	Yes
W	Foot Width (right)	78.0 - 94.0	80	Yes
W	Foot Width (left)	78.0 - 94.0	80	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	782	Yes

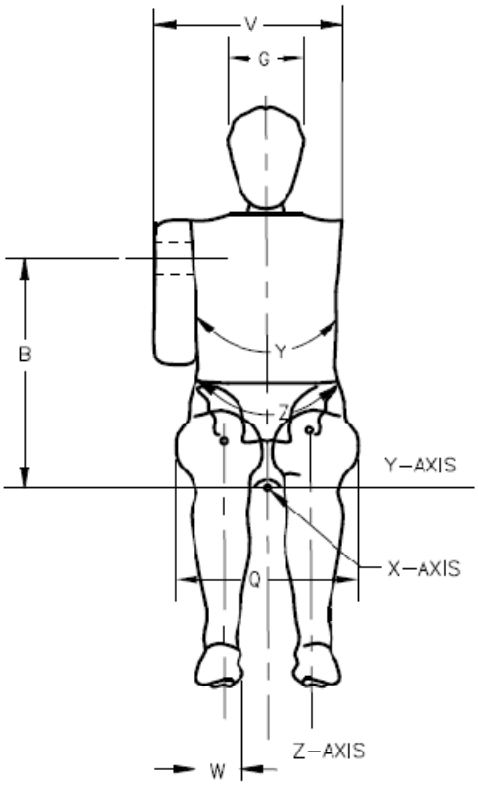
Technician: SZ

Date: 11/04/2010

SID-IIsD External Dimension Reference Diagram



SIDE VIEW



FRONT VIEW

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Head Drop**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**3:17:08 PM**

Component Part Number	Component Serial Number
Head Skin - 180-1002	**1371**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.0**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Resultant Acceleration	115.0	--	137.0	**121.3**	g	P
Oscillation	0.0	--	15.0	**11.3**	%	P
Fore-Aft Acceleration	-15.0	--	15.0	**-5.4**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

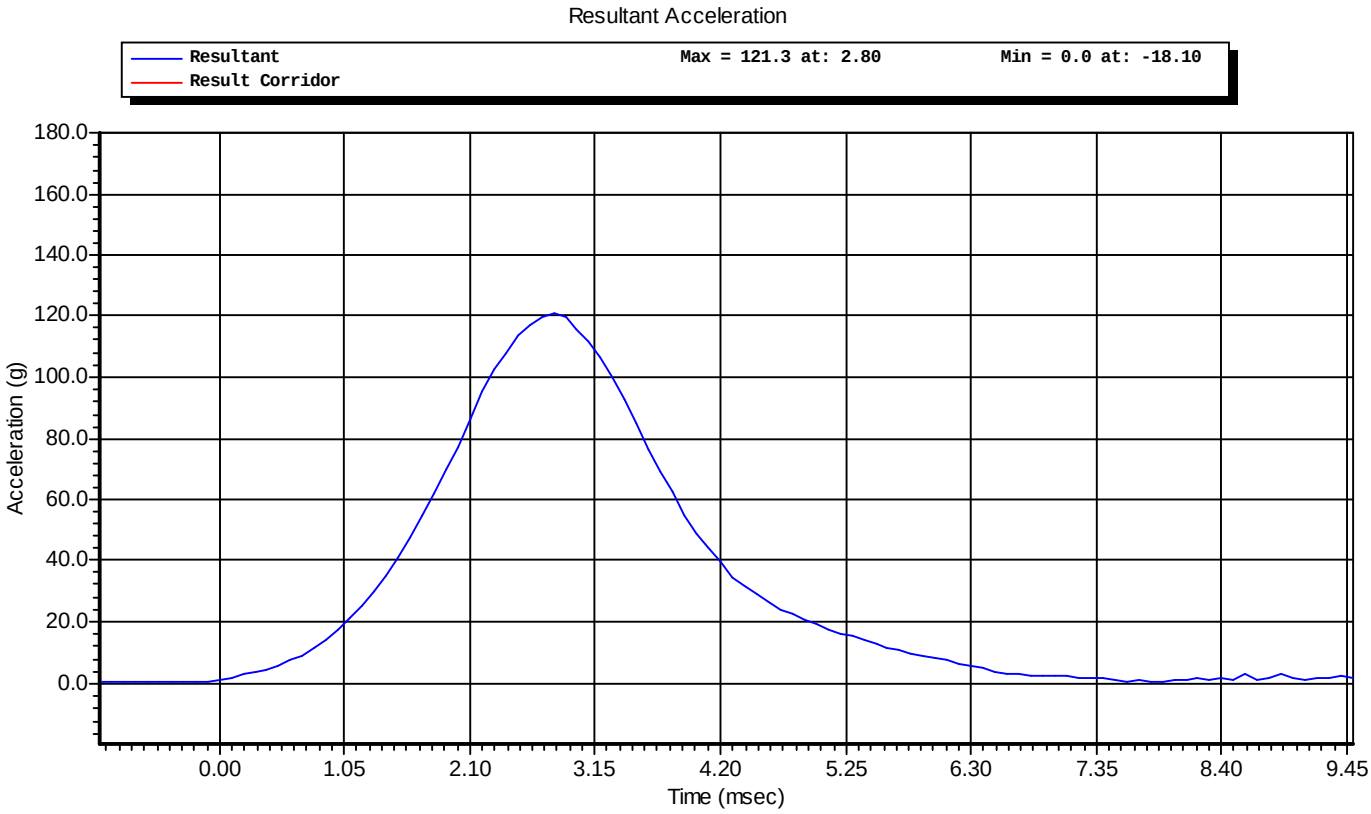
REFERENCE EQUIPMENT

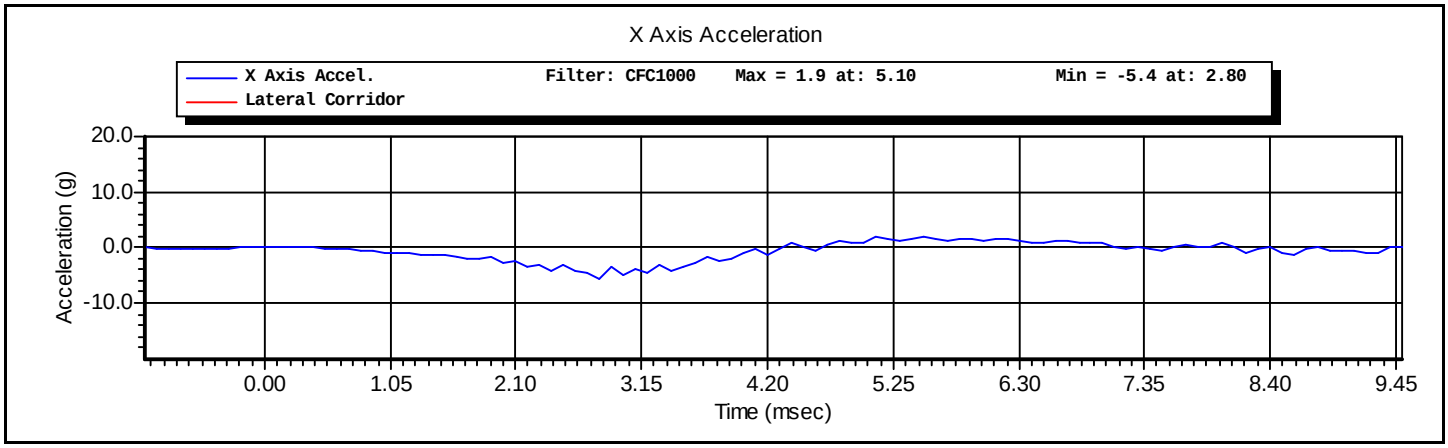
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P66943**	**10/25/2010**
Endevco	**7264-2000**	**P66931**	**10/25/2010**
Endevco	**7264-2000**	**P66926**	**10/25/2011**

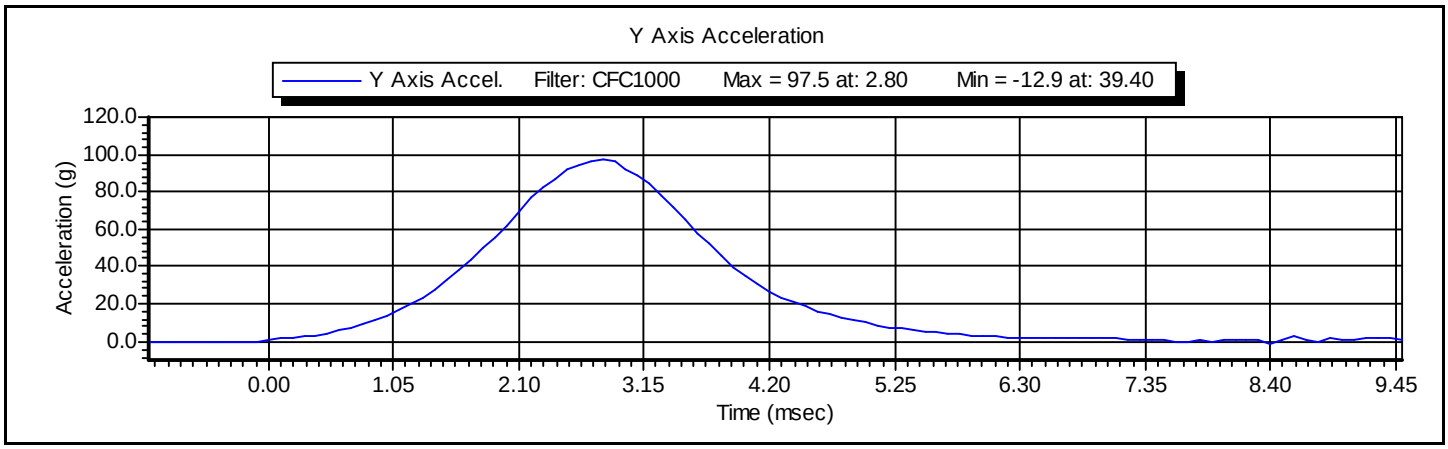
Test ID: **Head Drop** Test Time: **3:17:08 PM** Test Date: **11/2/2010**

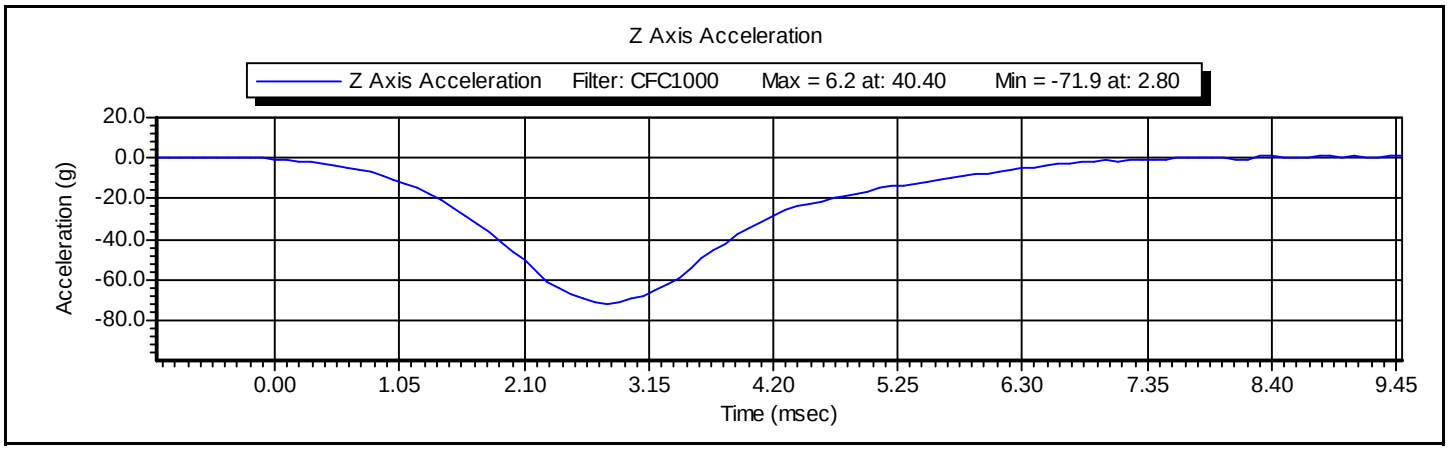
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Head Drop**	Revision:	**12/14/2006**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Head Drop**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**3:17:08 PM**









Test ID: **Head Drop** Test Time: **3:17:08 PM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Neck Flexion**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**3:53:26 PM**

Component Part Number	Component Serial Number
Neck - 180-2000	**AB8239**

Test Parameters	Test Specifications	Test Results	
Temperature	20.6 -- 22.2	**22.2** deg C	P
Humidity	10 -- 70	**25** %RH	P
Velocity	5.51 -- 5.63	**5.56** m/s	P
Pendulum Impulse at 10 ms	2.20 -- 2.80	**2.26** m/s	P
Pendulum Impulse at 15 ms	3.30 -- 4.10	**3.33** m/s	P
Pendulum Impulse at 20 ms	4.40 -- 5.40	**4.56** m/s	P
Pendulum Impulse at 25 ms	5.40 -- 6.10	**5.44** m/s	P
Pendulum Impulse between 25 and 100 ms	5.50 -- 6.20	**5.86** m/s	P
Max D Plane Rotation	71.0 -- 81.0	**71.6** degrees	P
Time at Max Rotation	50.0 -- 70.0	**61.7** ms	P
Moment about OC	-44.0 -- -36.0	**-38.1** Nm	P
Moment Decay to Zero	102.0 -- 126.0	**116.4** ms	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

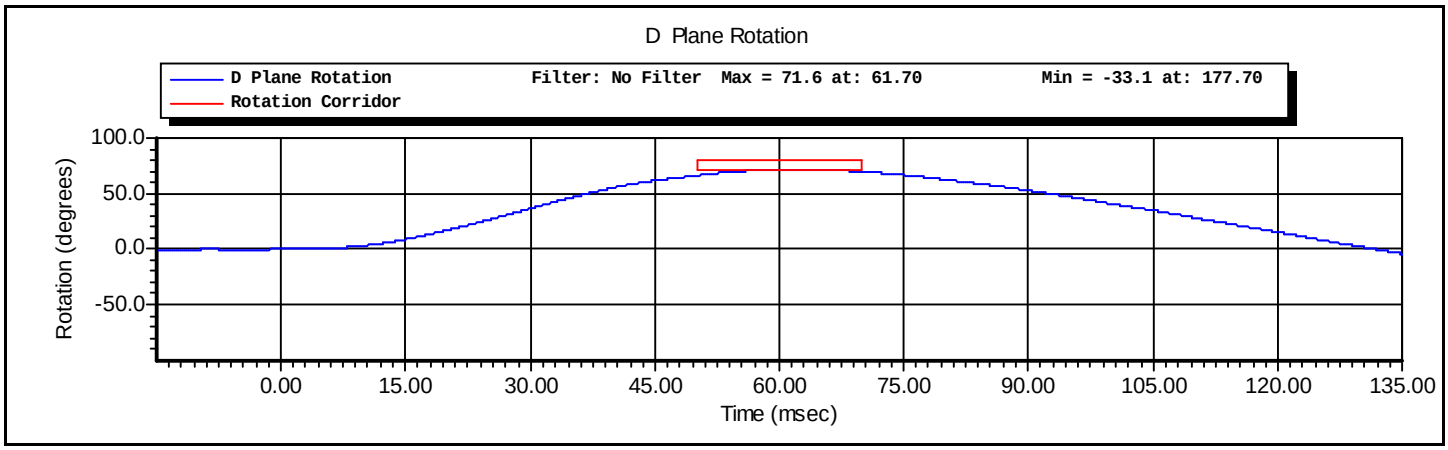
REFERENCE EQUIPMENT

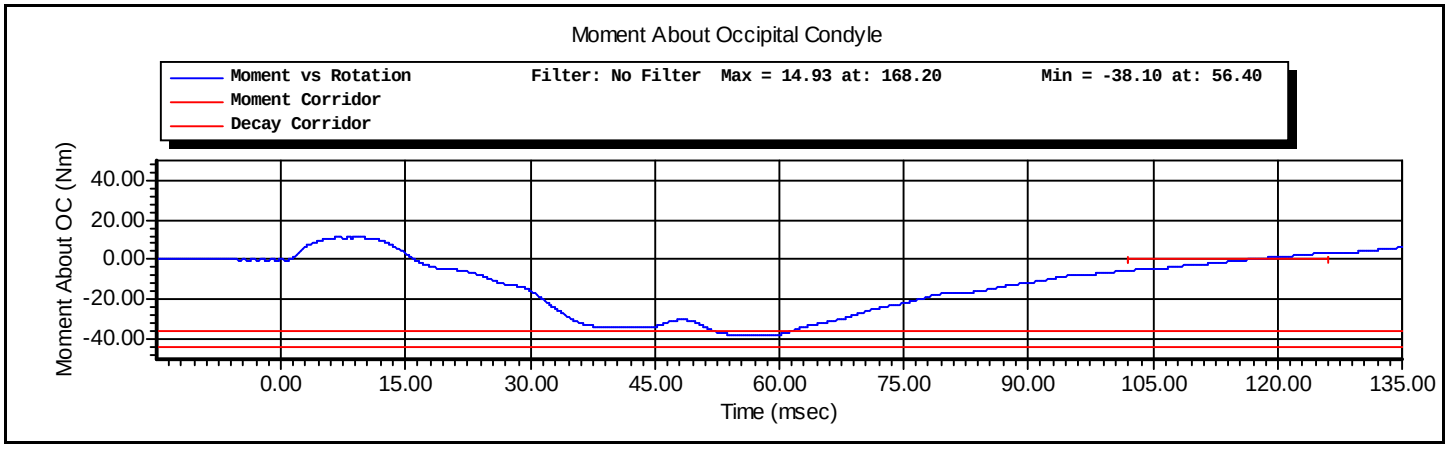
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7231CT**	**C16510**	**5/10/2010**
FTSS	**IF-205**	**LC-283Fy**	**4/9/2010**
FTSS	**IF-205**	**LC-283Mx**	**4/9/2010**
DentonATD	**78051-342**	**184**	**4/30/2010**
DentonATD	**78051-342**	**174**	**4/30/2010**
DentonATD	**78051-342**	**185**	**4/30/2010**

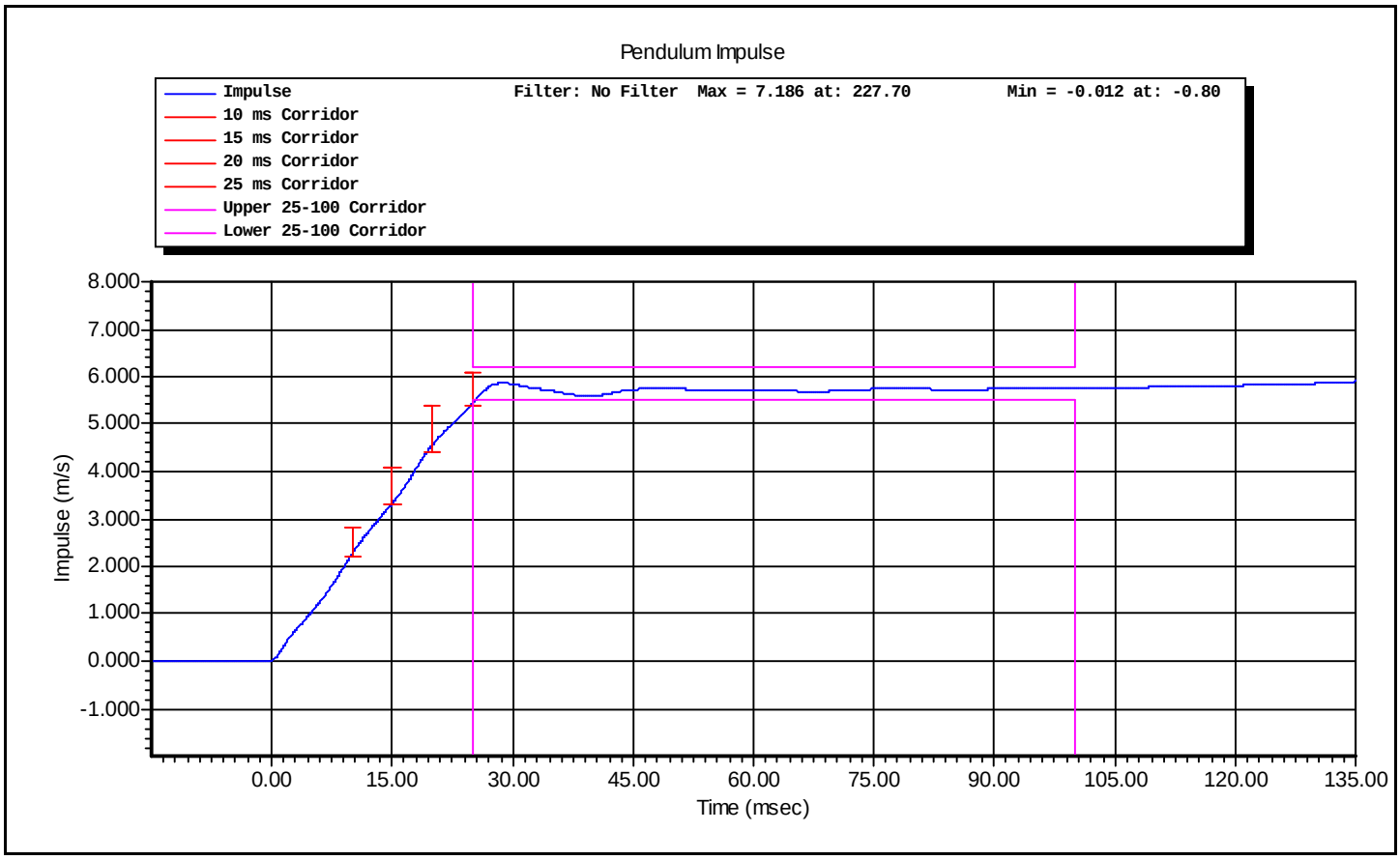
Test ID: **Neck Flexion** Test Time: **3:53:26 PM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Neck Pendulum**	Revision:	**8/24/2009**
Sub Test Name:	**Left Side**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Neck Flexion**	Test Date:	**11/2/2010**
Test Number:	**1**	Test Time:	**3:53:26 PM**







Test ID: **Neck Flexion** Test Time: **3:53:26 PM** Test Date: **11/2/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Shoulder**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**3:17:40 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.20**	deg C	P
Humidity	10.0	--	70.0	**26.0**	%RH	P
Velocity	4.20	--	4.40	**4.30**	m/s	P
Probe Acceleration	13.0	--	18.0	**15.5**	g	P
Shoulder Deflection	28.0	--	37.0	**28.8**	mm	P
T1 Acceleration	17.0	--	22.0	**19.7**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

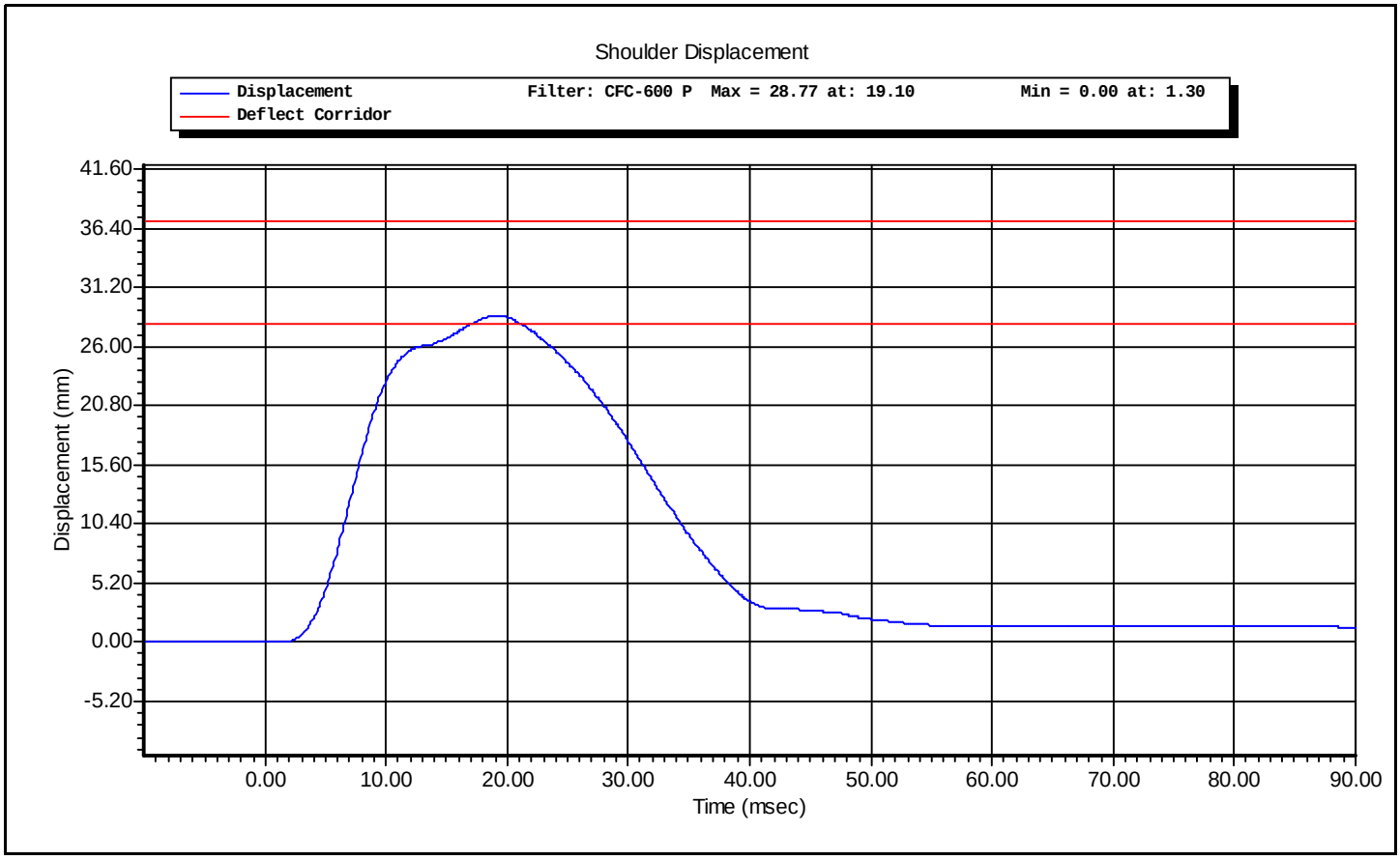
REFERENCE EQUIPMENT

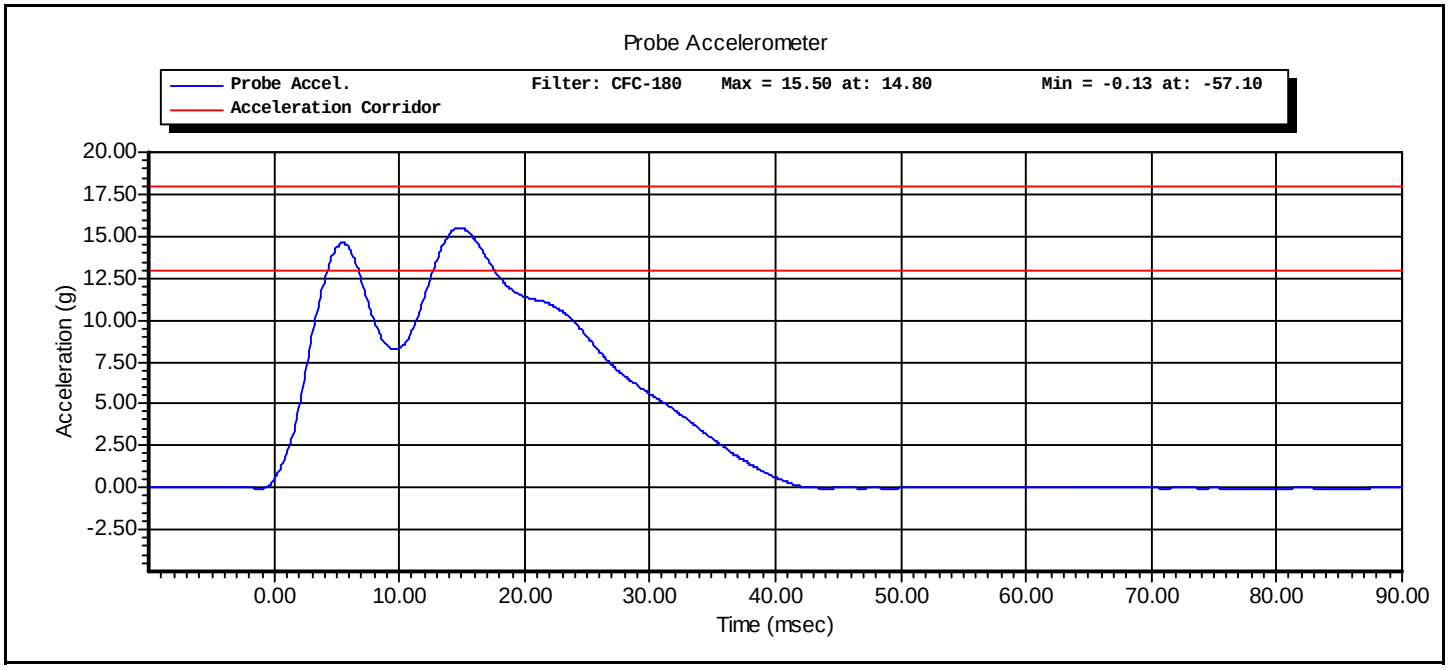
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1154**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**

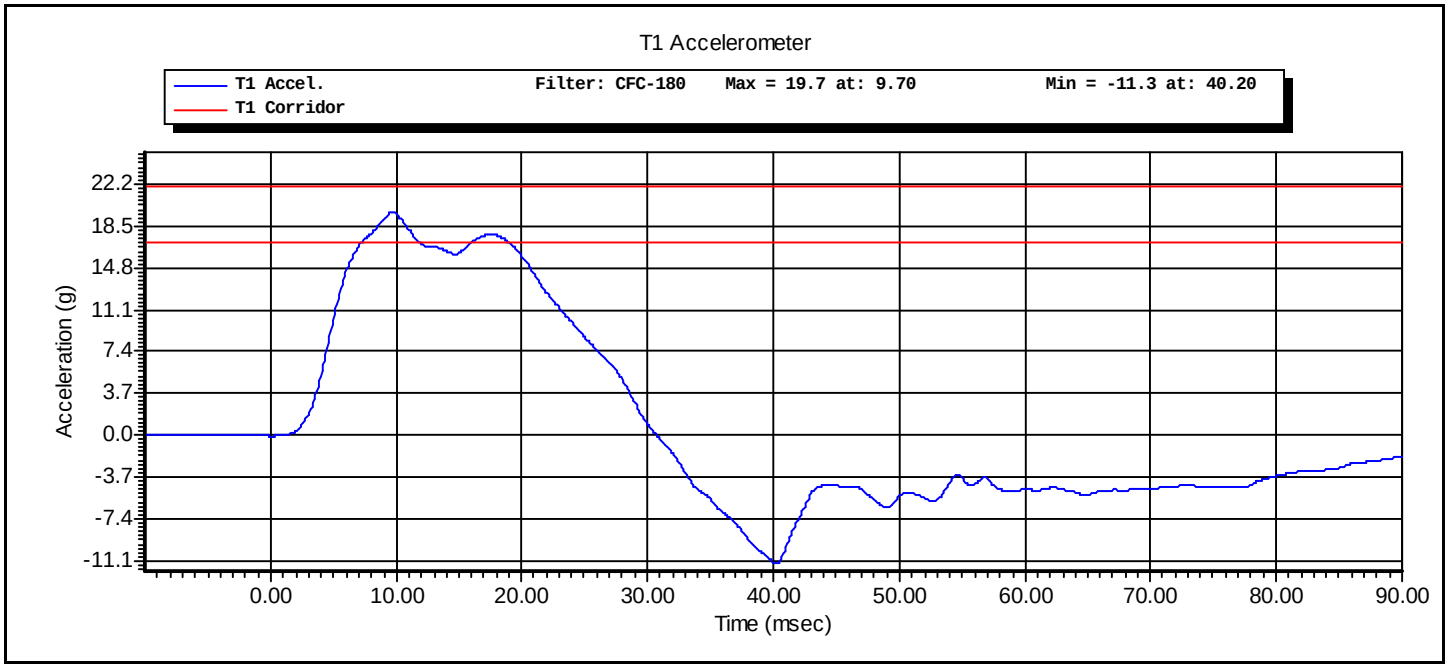
Test ID: **Shoulder** Test Time: **3:17:40 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Shoulder Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Shoulder**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**3:17:40 PM**







Test ID: **Shoulder** Test Time: **3:17:40 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Thorax Without Arm**	Test Date:	**11/3/2010**
Test Number:	**2**	Test Time:	**3:02:22 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Velocity	4.20	--	4.40	**4.32**	m/s	P
Probe Acceleration	14.0	--	18.0	**16.7**	g	P
Upper Thorax Rib Deflection	32.0	--	40.0	**35.5**	mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	**41.5**	mm	P
Lower Thorax Rib Deflection	35.0	--	43.0	**38.9**	mm	P
Upper Spine Acceleration T1	13.0	--	17.0	**16.9**	g	P
Lower Spine Acceleration T12	7.0	--	11.0	**10.3**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

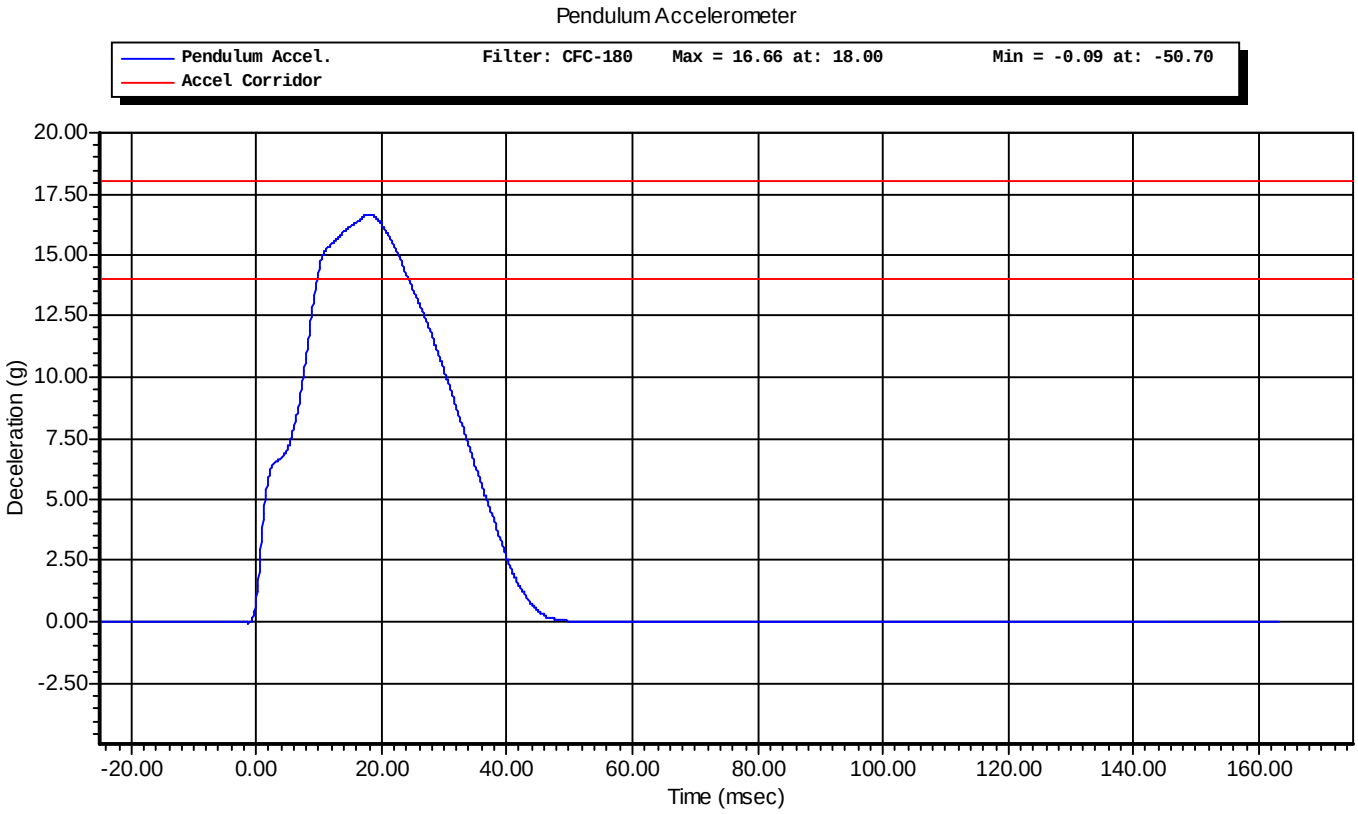
REFERENCE EQUIPMENT

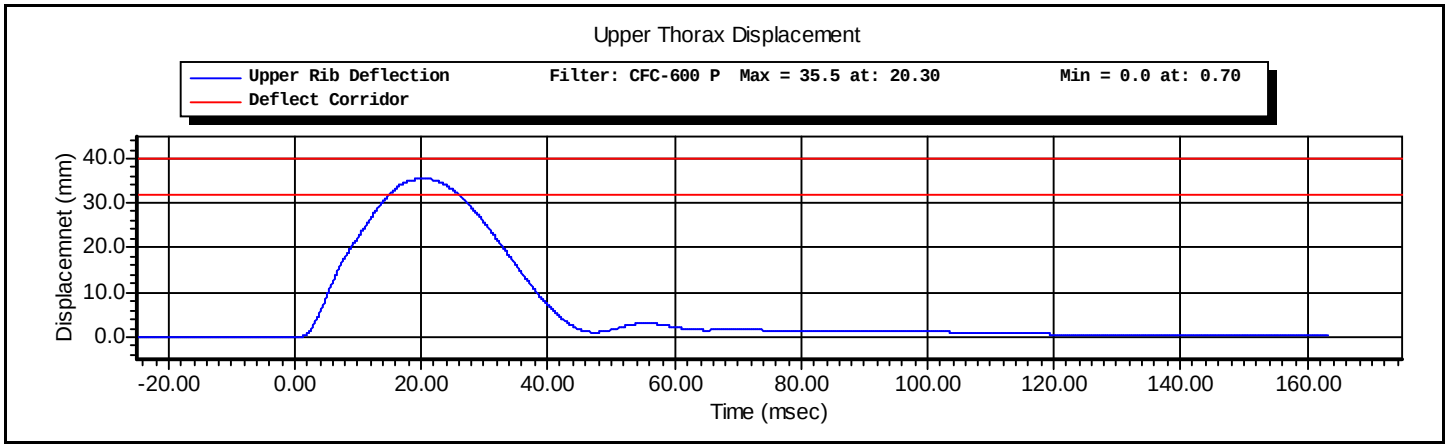
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1188**	**3/26/2010**
Servo	**180-3885**	**DS-1269**	**3/26/2010**
Servo	**180-3885**	**DS-1260**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**

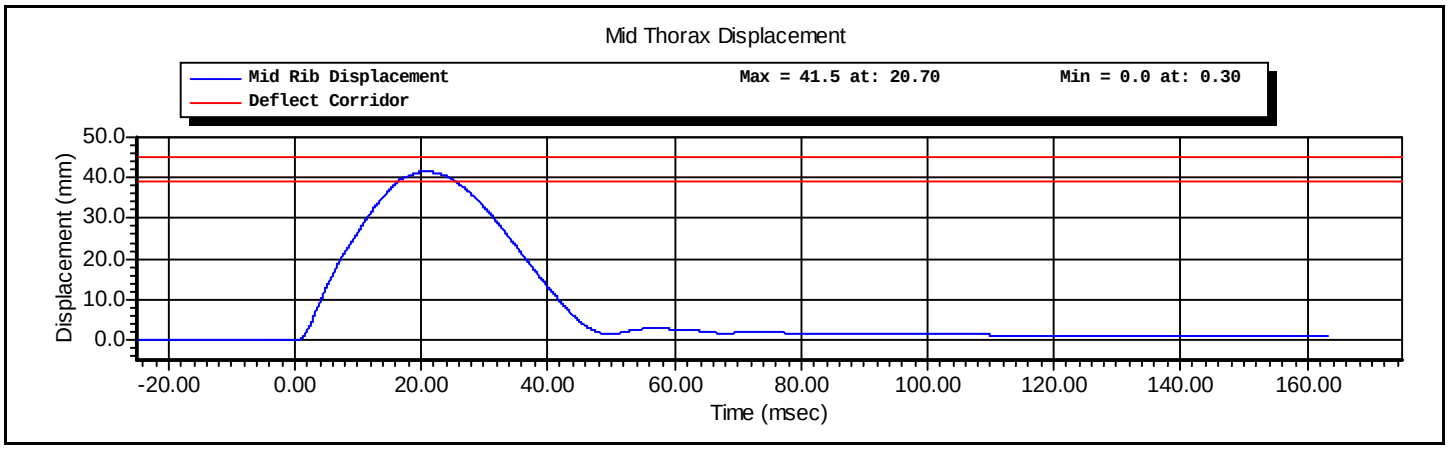
Test ID: **Thorax Without Arm** Test Time: **3:02:22 PM** Test Date: **11/3/2010**

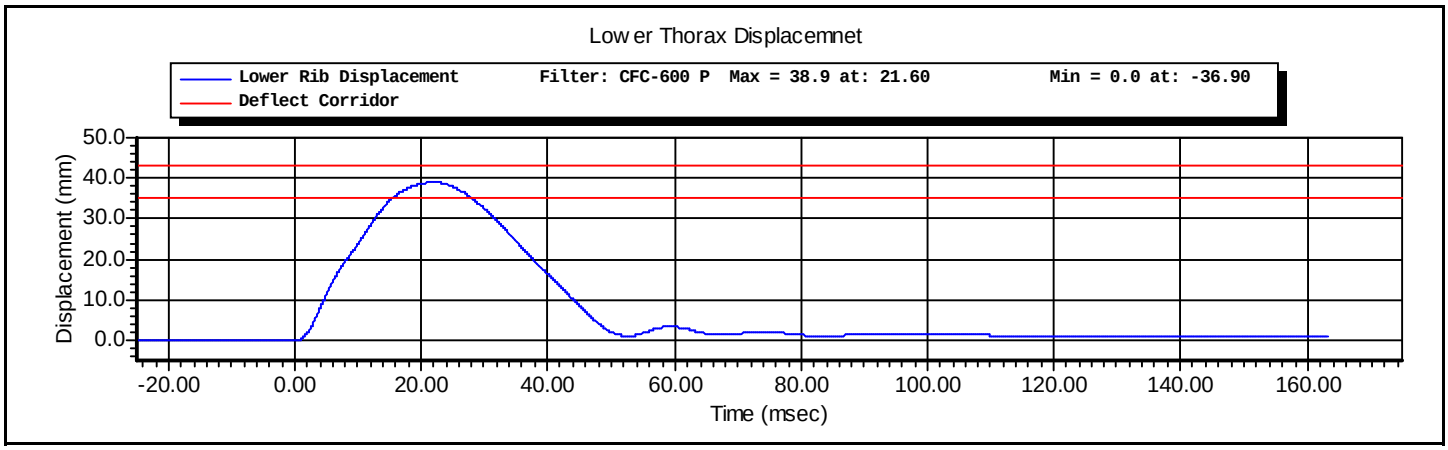
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Thorax Impact without Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Thorax Without Arm**	Test Date:	**11/3/2010**
Test Number:	**2**	Test Time:	**3:02:22 PM**

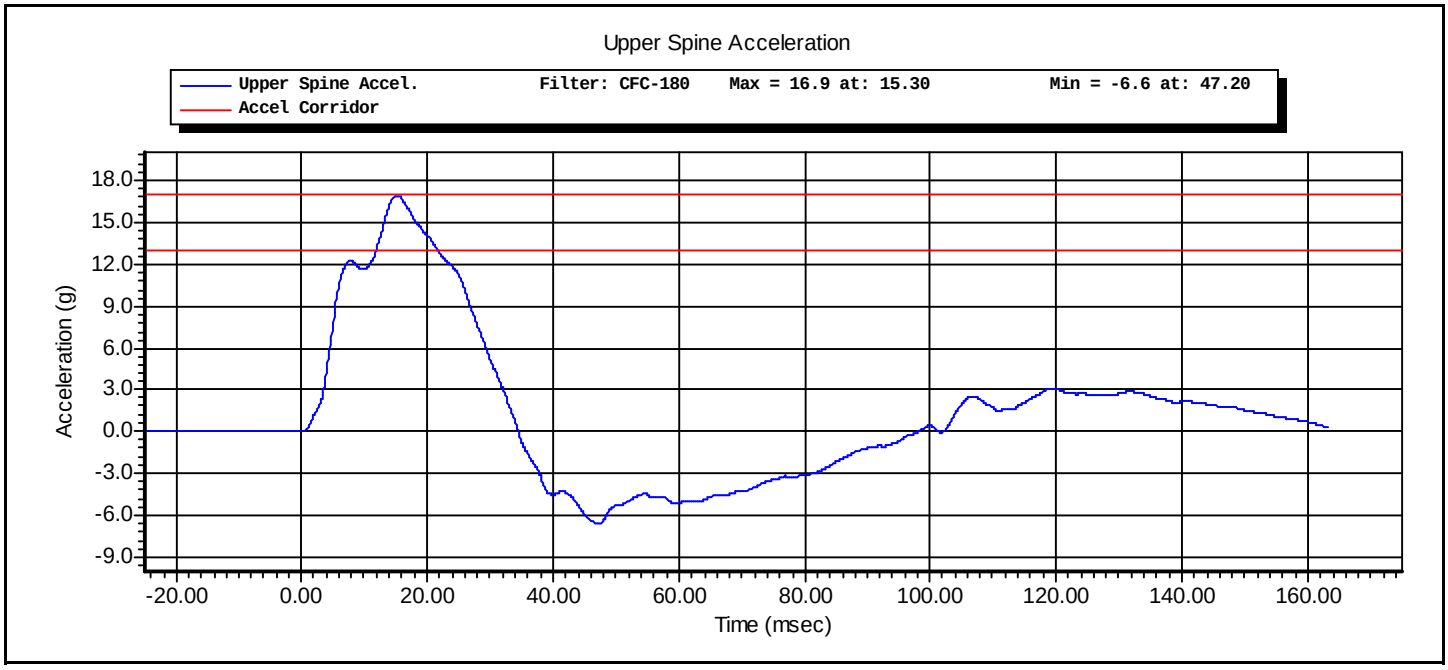


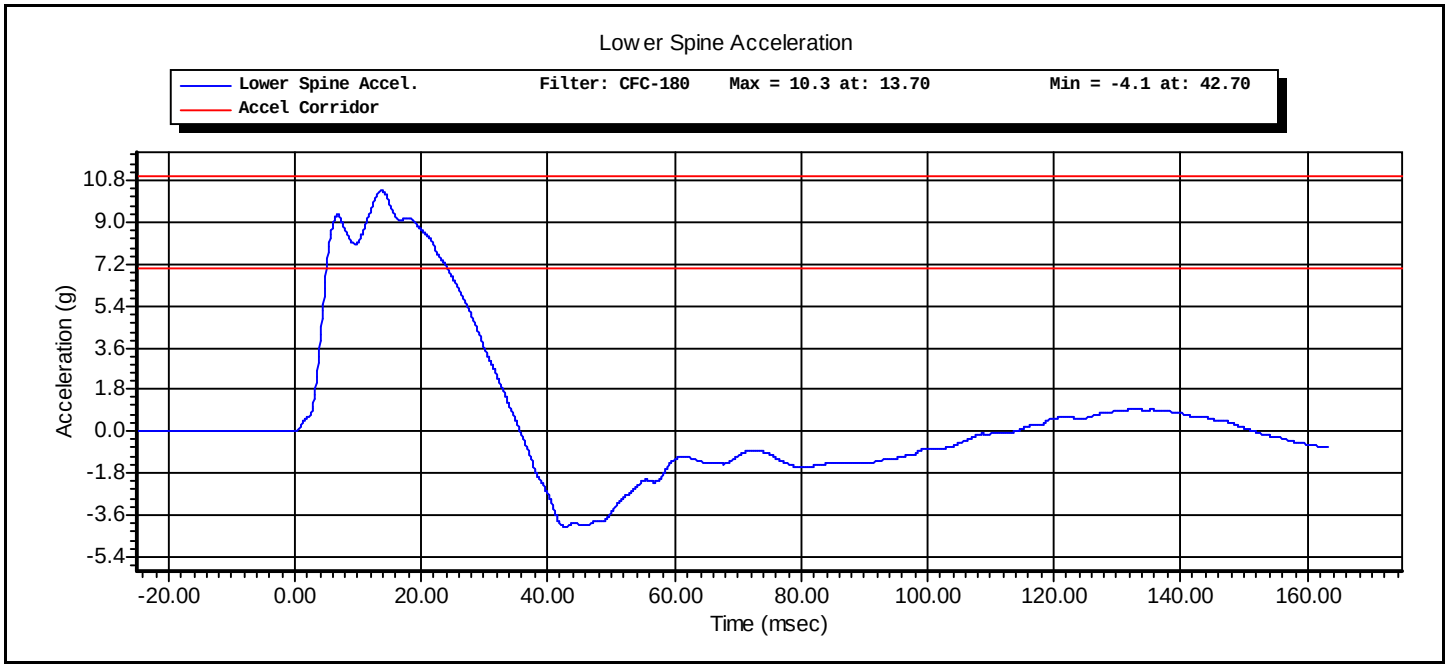






Test ID: **Thorax Without Arm** Test Time: **3:02:22 PM** Test Date: **11/3/2010**





Test ID: **Thorax Without Arm** Test Time: **3:02:22 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Thorax With Arm**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**3:43:01 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.2**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Velocity	6.60	--	6.80	**6.67**	m/s	P
Probe Acceleration after 5ms	30.0	--	36.0	**33.9**	g	P
Upper Thorax Rib Deflection	25.0	--	32.0	**26.9**	mm	P
Mid Thorax Rib Deflection	30.0	--	36.0	**31.2**	mm	P
Lower Thorax Rib Deflection	32.0	--	38.0	**33.5**	mm	P
Upper Spine Acceleration ("y")	34.0	--	43.0	**42.5**	g	P
Lower Spine Acceleration ("y")	29.0	--	37.0	**34.0**	g	P
Shoulder Deflection	31.0	--	40.0	**34.6**	mm	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

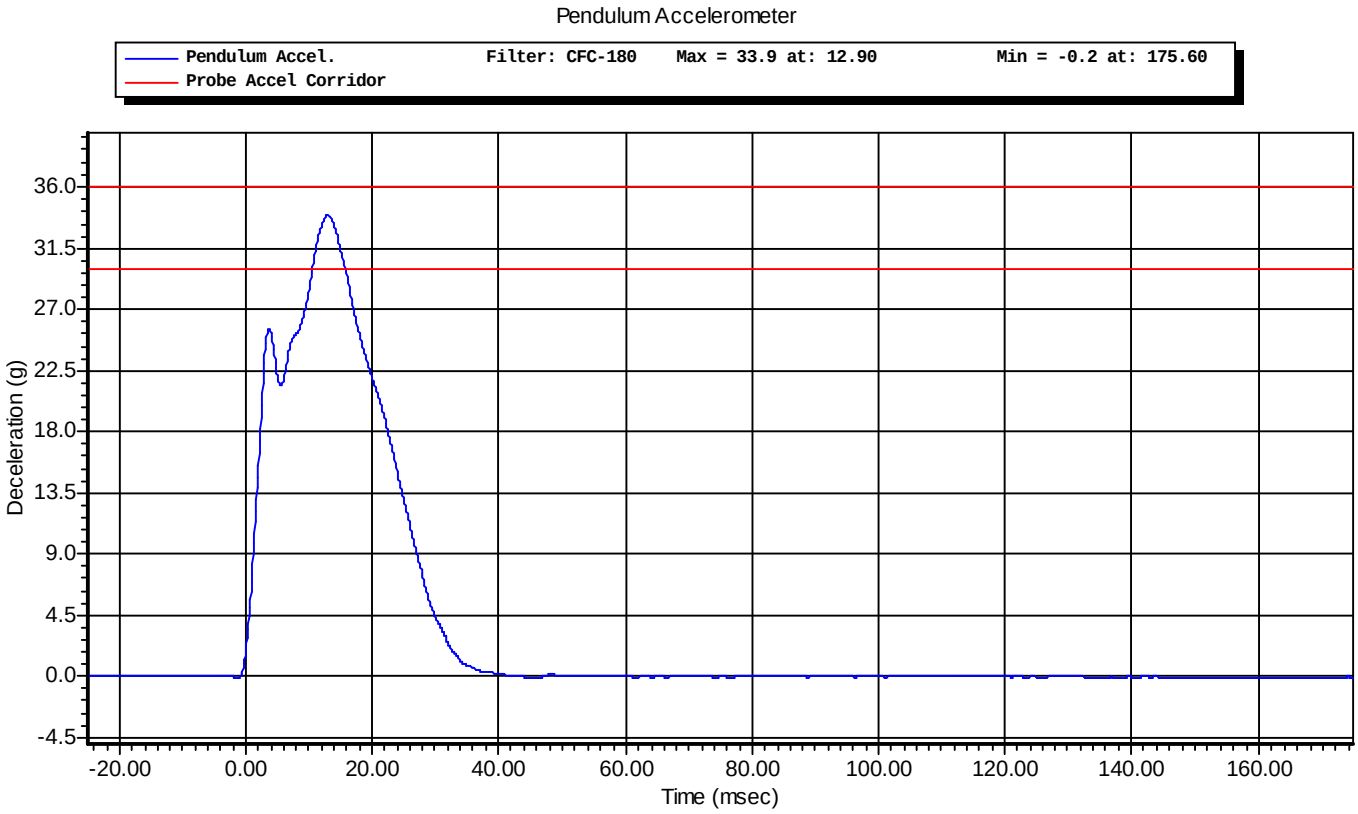
REFERENCE EQUIPMENT

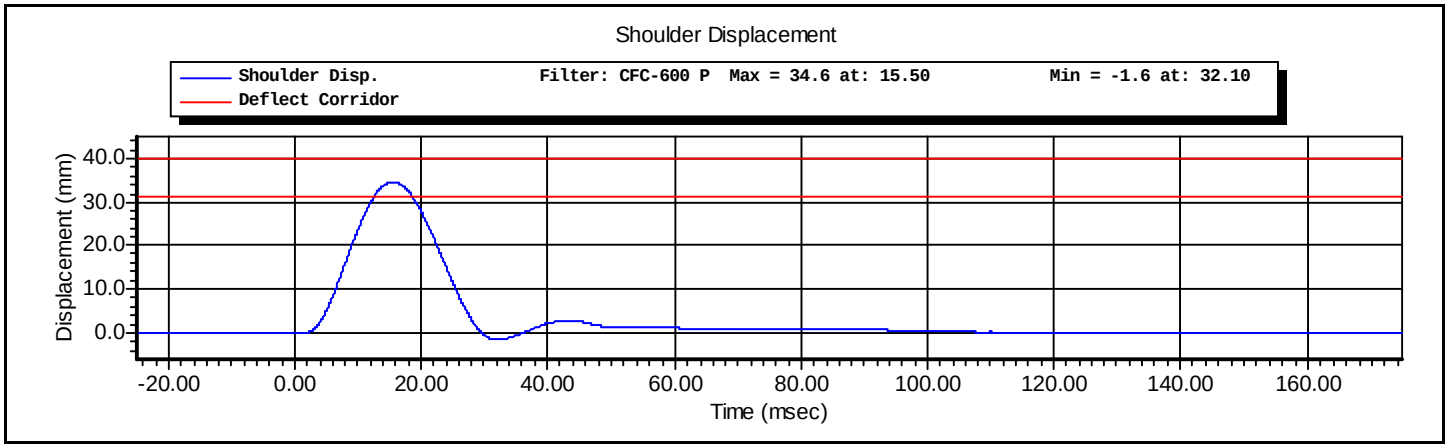
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1188**	**3/26/2010**
Servo	**180-3885**	**DS-1269**	**3/26/2010**
Servo	**180-3885**	**DS-1260**	**3/26/2010**
Endevco	**7264-2000**	**P52415**	**10/12/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**
Servo	**180-3885**	**DS-1154**	**3/26/2010**

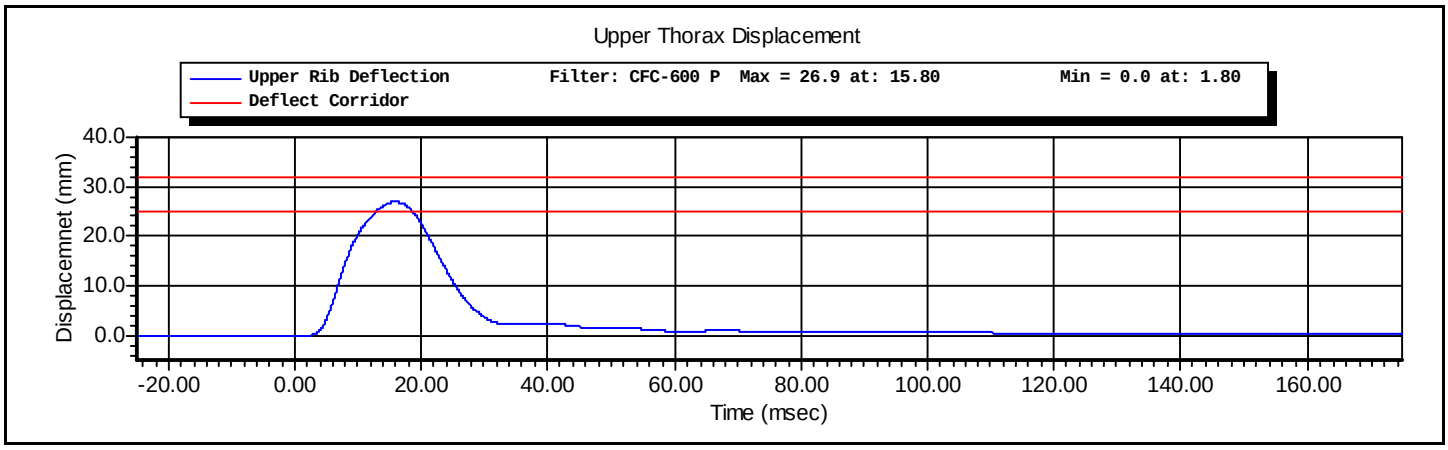
Test ID: **Thorax With Arm** Test Time: **3:43:01 PM** Test Date: **11/3/2010**

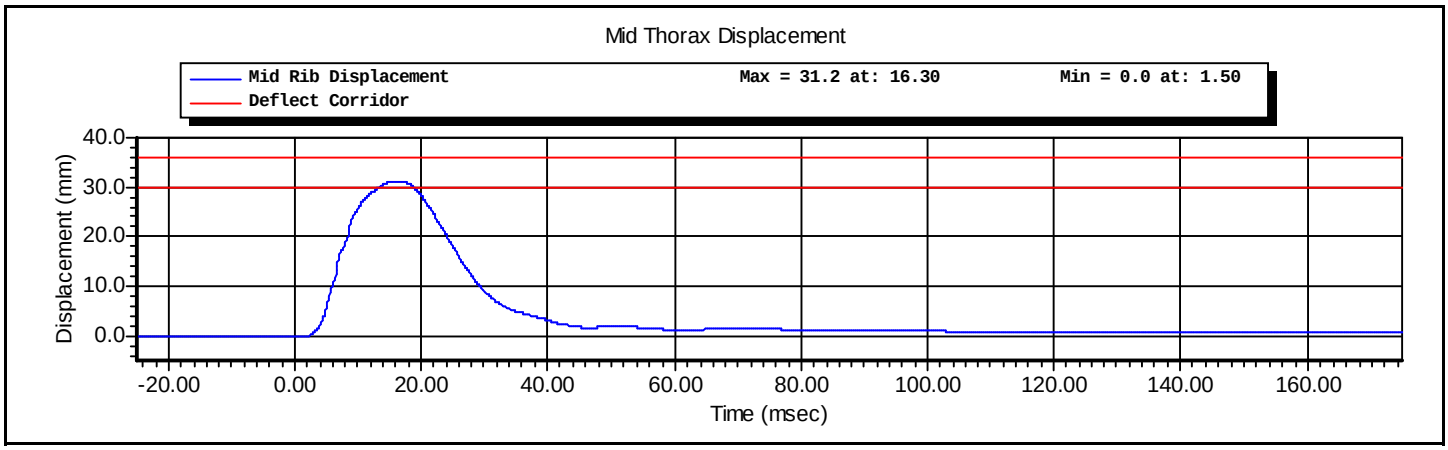
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Thorax Impact with Arm**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Thorax With Arm**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**3:43:01 PM**

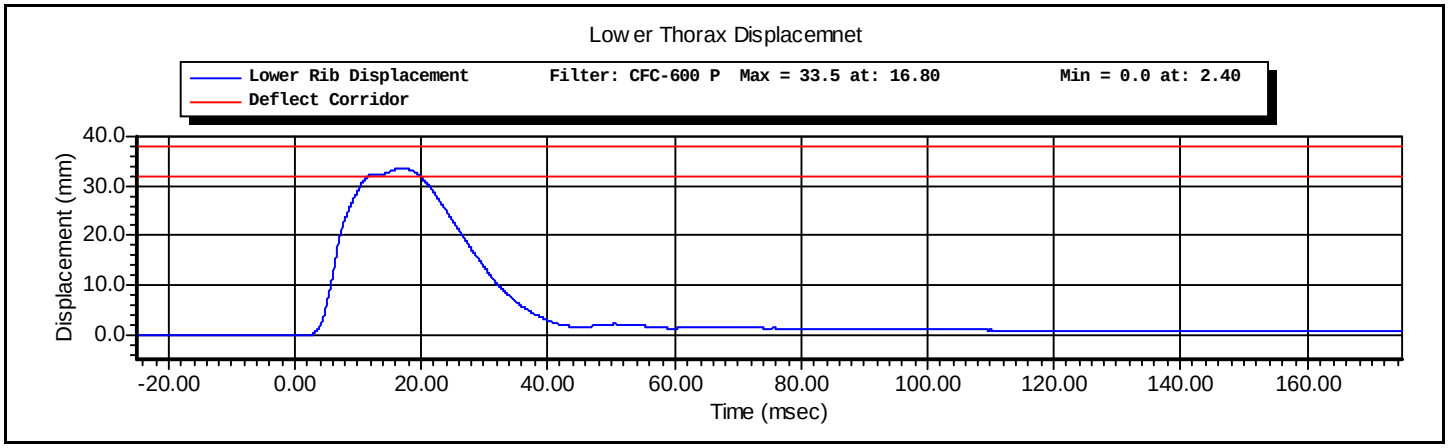


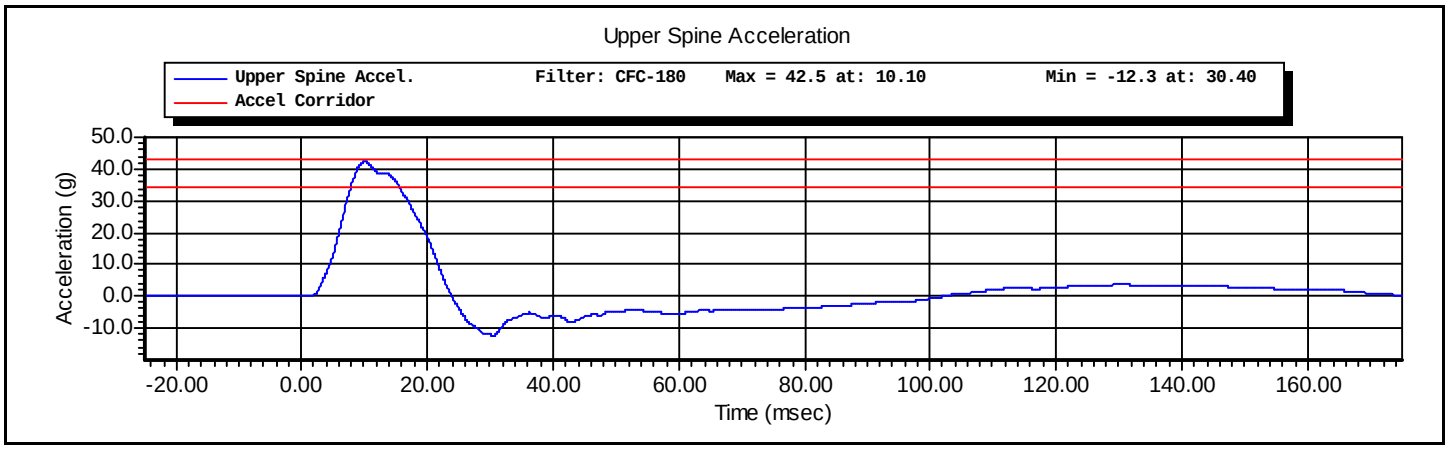


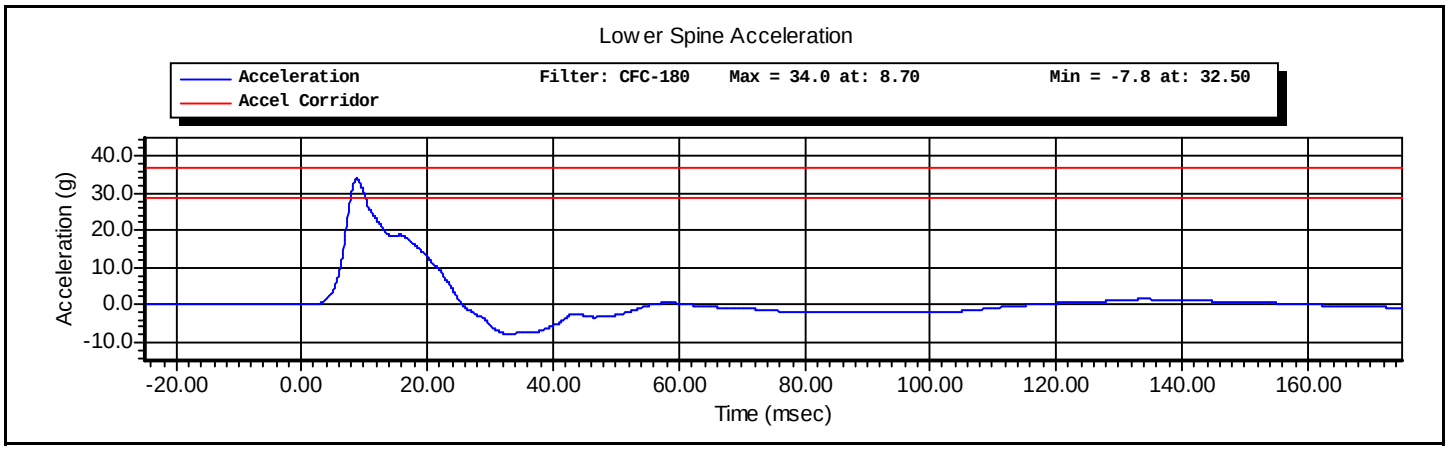




Test ID: **Thorax With Arm** Test Time: **3:43:01 PM** Test Date: **11/3/2010**







Test ID: **Thorax With Arm** Test Time: **3:43:01 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Abdomen**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**1:24:14 PM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.7**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Velocity	4.20	--	4.40	**4.34**	m/s	P
Probe Acceleration	12.0	--	16.0	**15.6**	g	P
Upper Abdominal Rib Deflection	36.0	--	47.0	**38.8**	mm	P
Lower Abdominal Rib Deflection	33.0	--	44.0	**38.4**	mm	P
Lower Spine Acceleration - T12	9.0	--	14.0	**11.7**	g	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

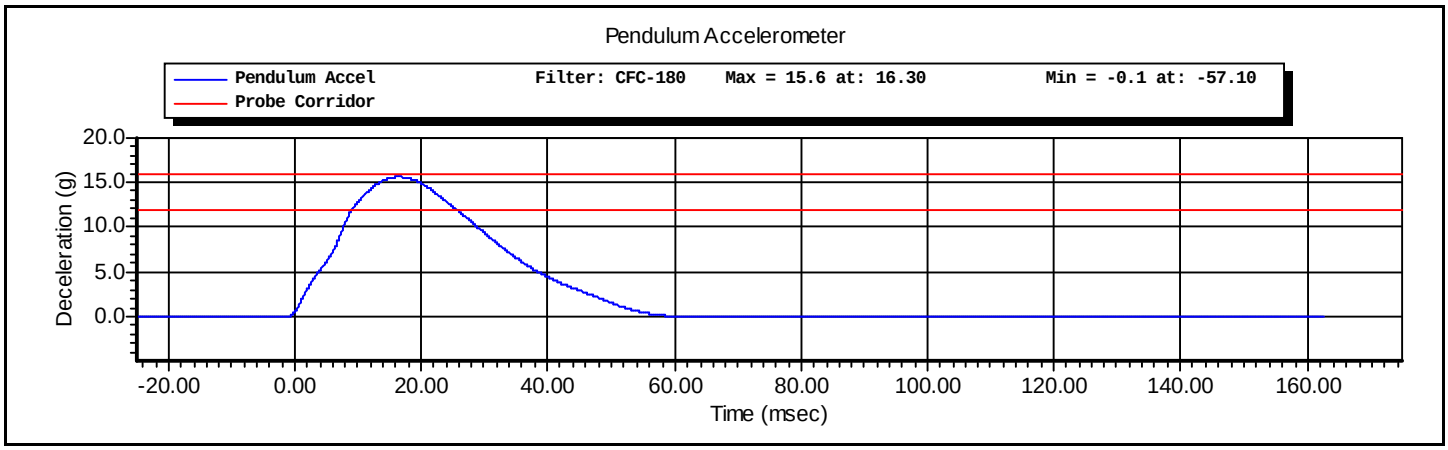
REFERENCE EQUIPMENT

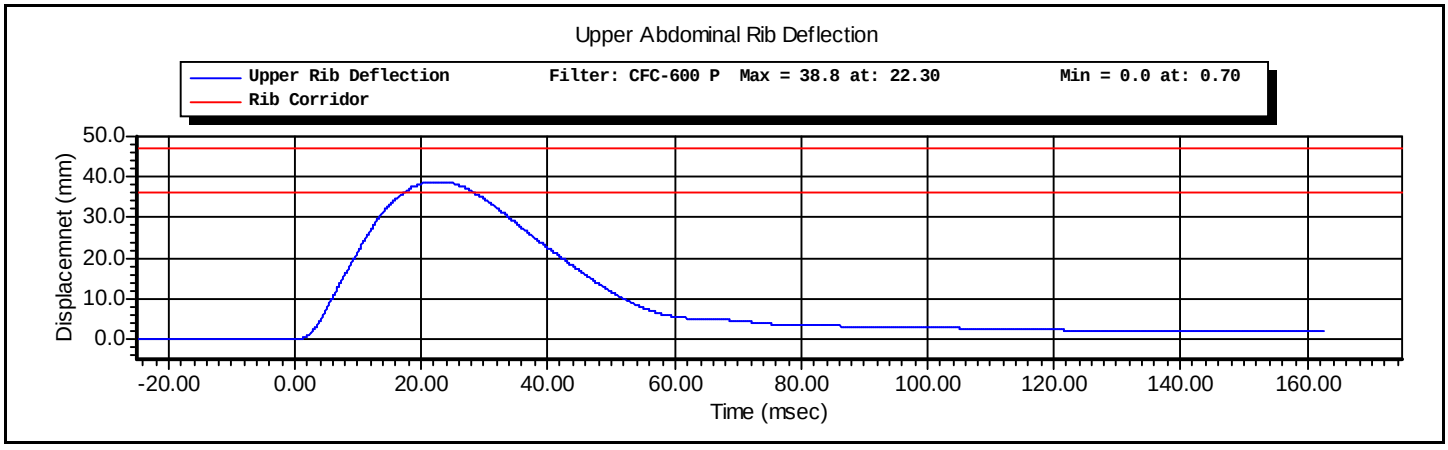
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Servo	**180-3885**	**DS-1207**	**3/26/2010**
Servo	**180-3885**	**DS-1204**	**3/26/2010**
Endevco	**7264-2000**	**P58839**	**10/14/2010**

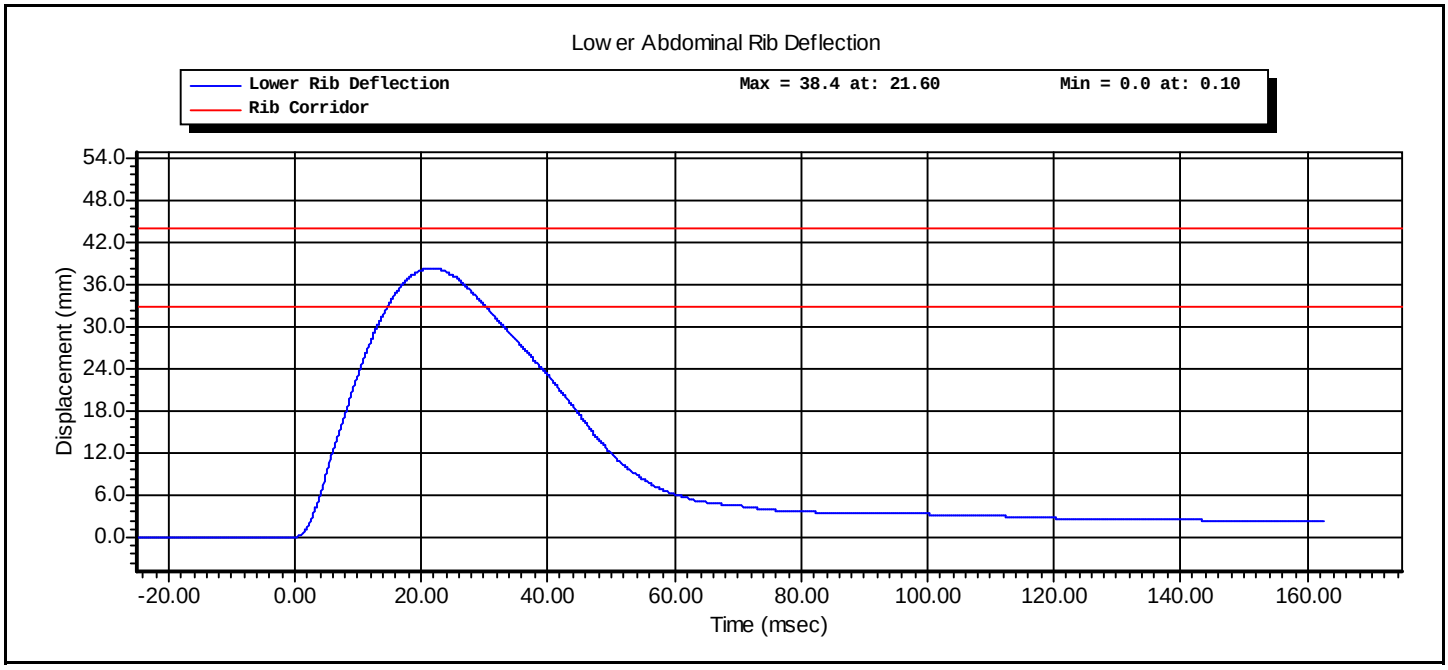
Test ID: **Abdomen** Test Time: **1:24:14 PM** Test Date: **11/3/2010**

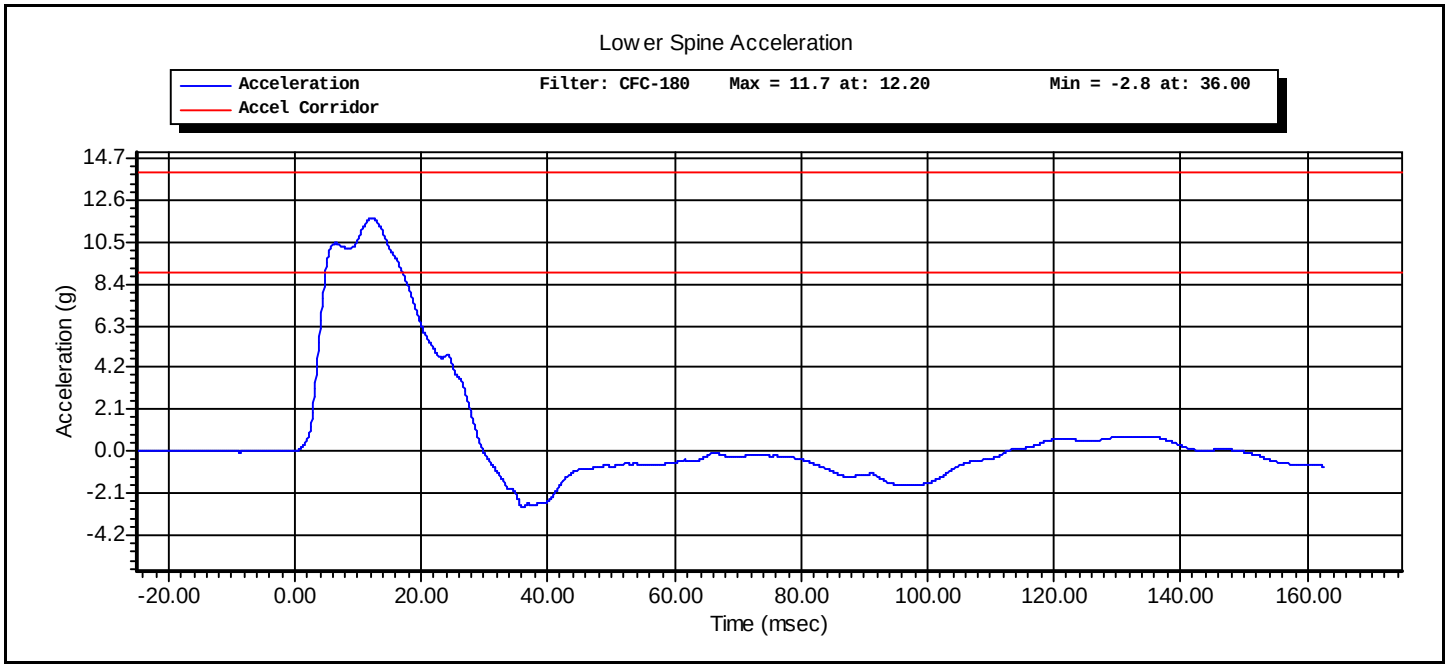
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Abdominal Impact**	Revision:	**8/24/2009**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Abdomen**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**1:24:14 PM**









Test ID: **Abdomen** Test Time: **1:24:14 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Acetabulum**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**12:39:55 PM**

Comments:

Pelvis Plug Used for Certification:
FTSS S/N 8142
Force @ 3mm = 1494N

Pelvis Plug Used for Full Scale Test:
FTSS S/N 12754
Force @ 3mm = 1498N

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.7**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Velocity	6.60	--	6.80	**6.61**	m/s	P
Peak Probe Acceleration	38.0	--	47.0	**42.9**	g	P
Peak Pelvis Acceleration	34.0	--	42.0	**39.1**	g	P
Peak Acetabulum Force	3.60	--	4.30	**3.93**	kN	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

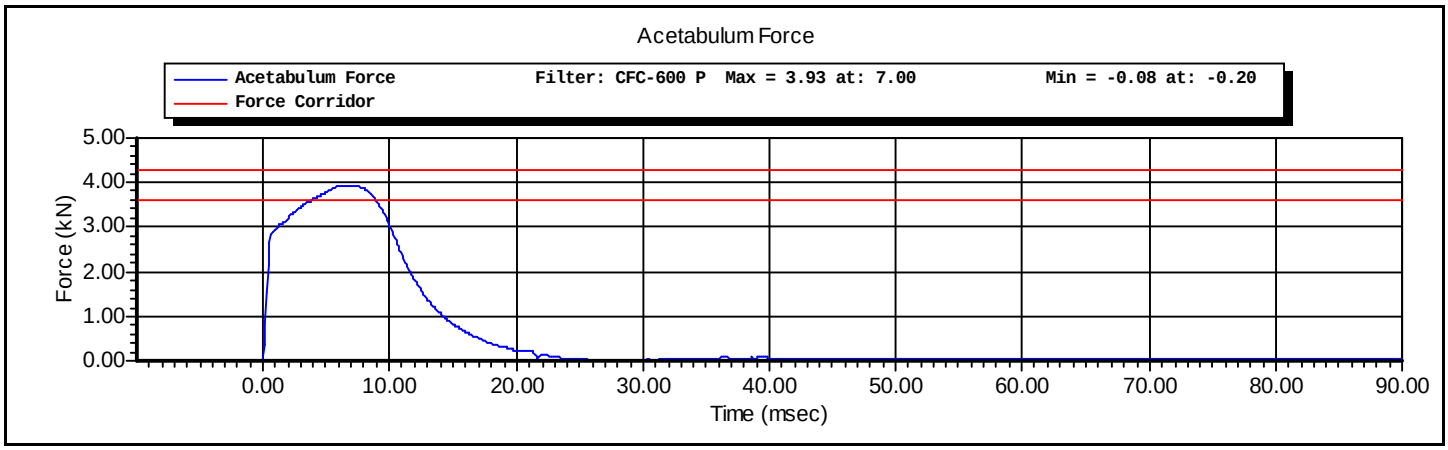
REFERENCE EQUIPMENT

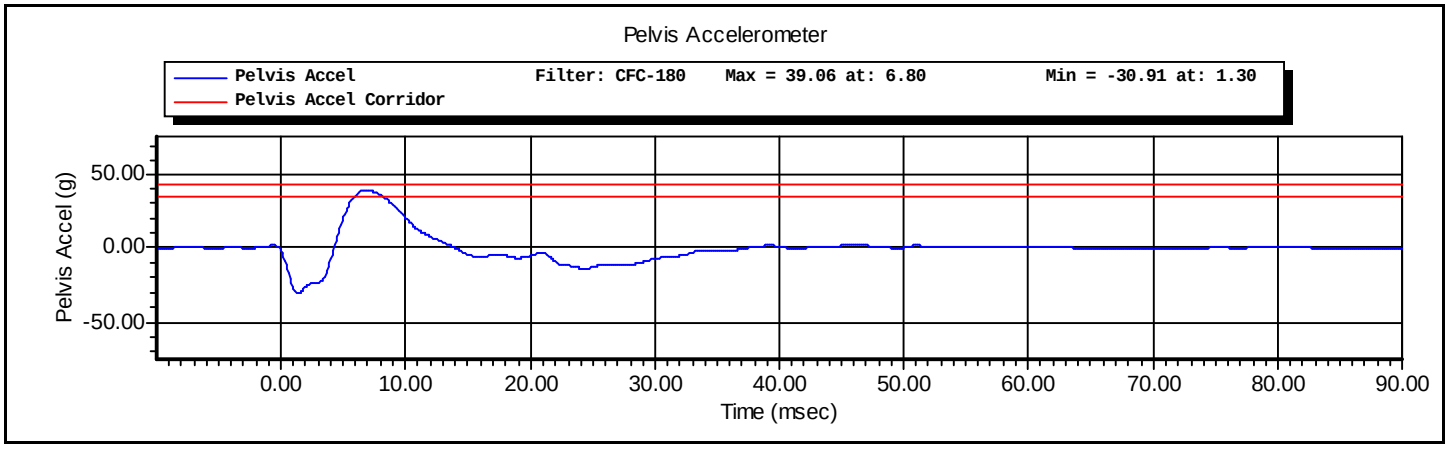
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P49217**	**10/12/2010**
DentonATD	**3249J**	**LC-267Fy**	**4/9/2010**

Test ID: **Acetabulum** Test Time: **12:39:55 PM** Test Date: **11/3/2010**

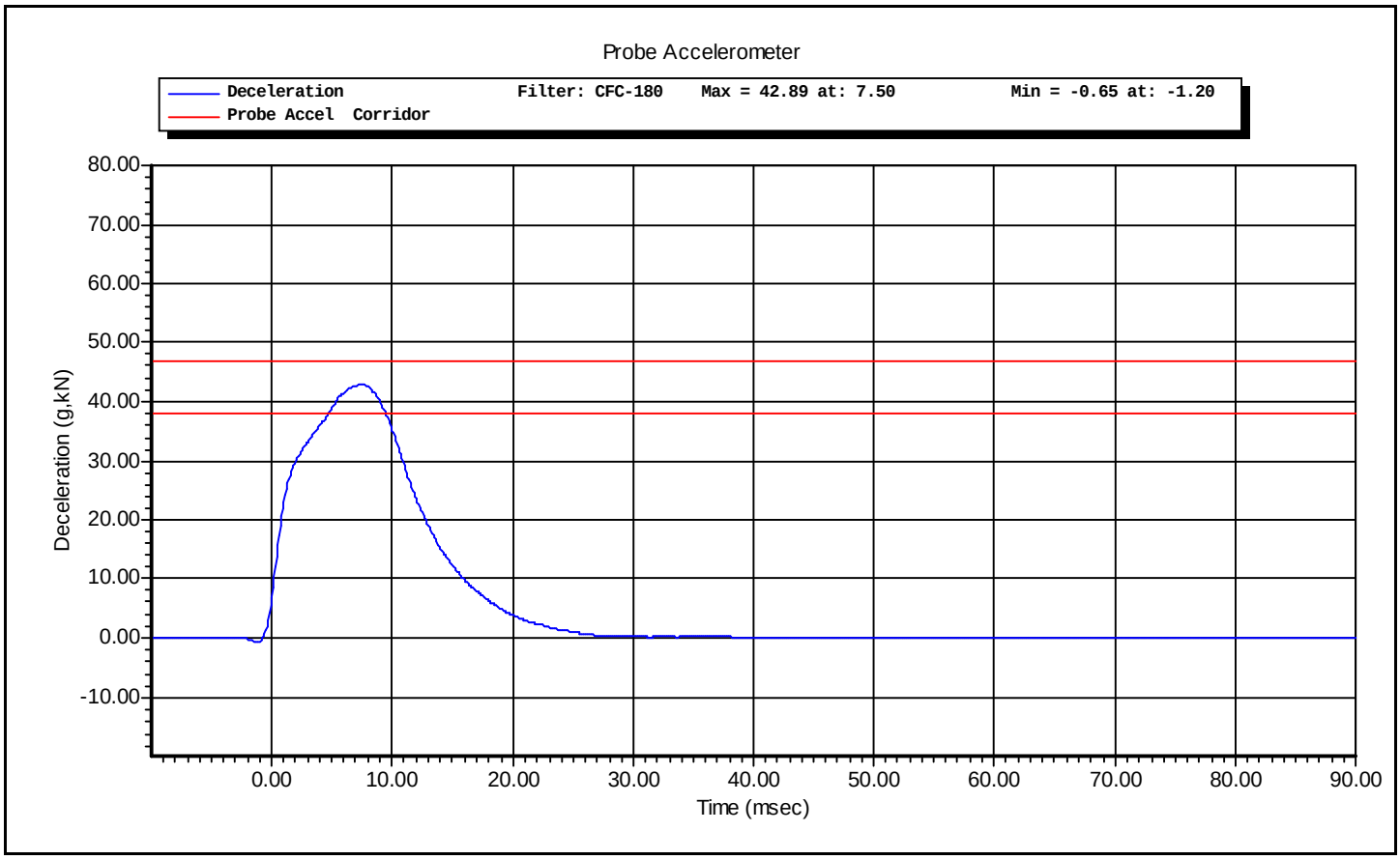
Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Acetabulum Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Acetabulum**	Test Date:	**11/3/2010**
Test Number:	**1**	Test Time:	**12:39:55 PM**





Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500



Test ID: **Acetabulum** Test Time: **12:39:55 PM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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 304**		
Test ID:	**Iliac Pelvis**	Test Date:	**11/3/2010**
Test Number:	**3**	Test Time:	**11:40:38 AM**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.3**	deg C	P
Humidity	10	--	70	**26**	%RH	P
Velocity	4.20	--	4.40	**4.23**	m/s	P
Peak Probe Acceleration	36.0	--	45.0	**40.8**	g	P
Peak Pelvis Acceleration	28.0	--	39.0	**34.3**	g	P
Peak Iliac Force	4.10	--	5.10	**4.70**	kN	P

All test parameters are within specifications

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

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

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

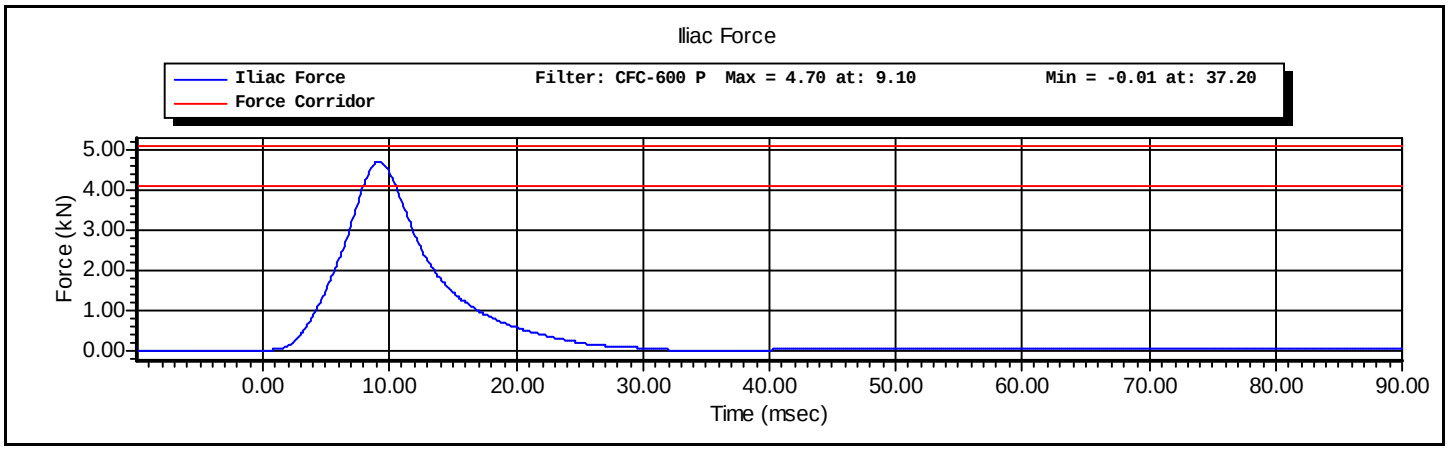
REFERENCE EQUIPMENT

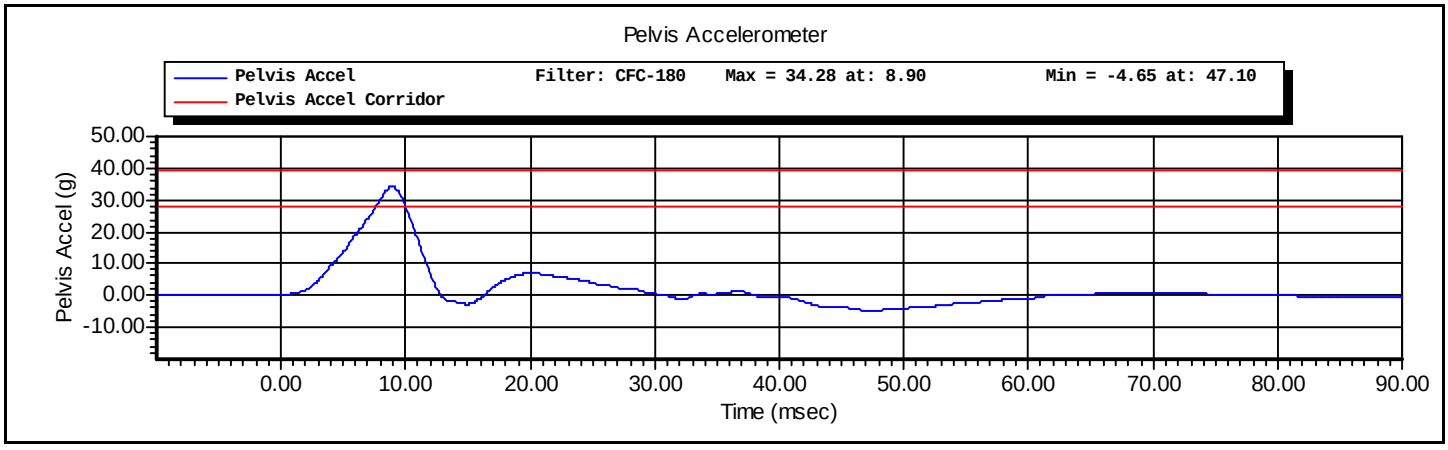
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2010**
Endevco	**7264-2000**	**P66930**	**10/5/2010**
Endevco	**7264-2000**	**P49217**	**10/12/2010**
DentonATD	**3228J**	**LC-281 Fy**	**4/9/2010**

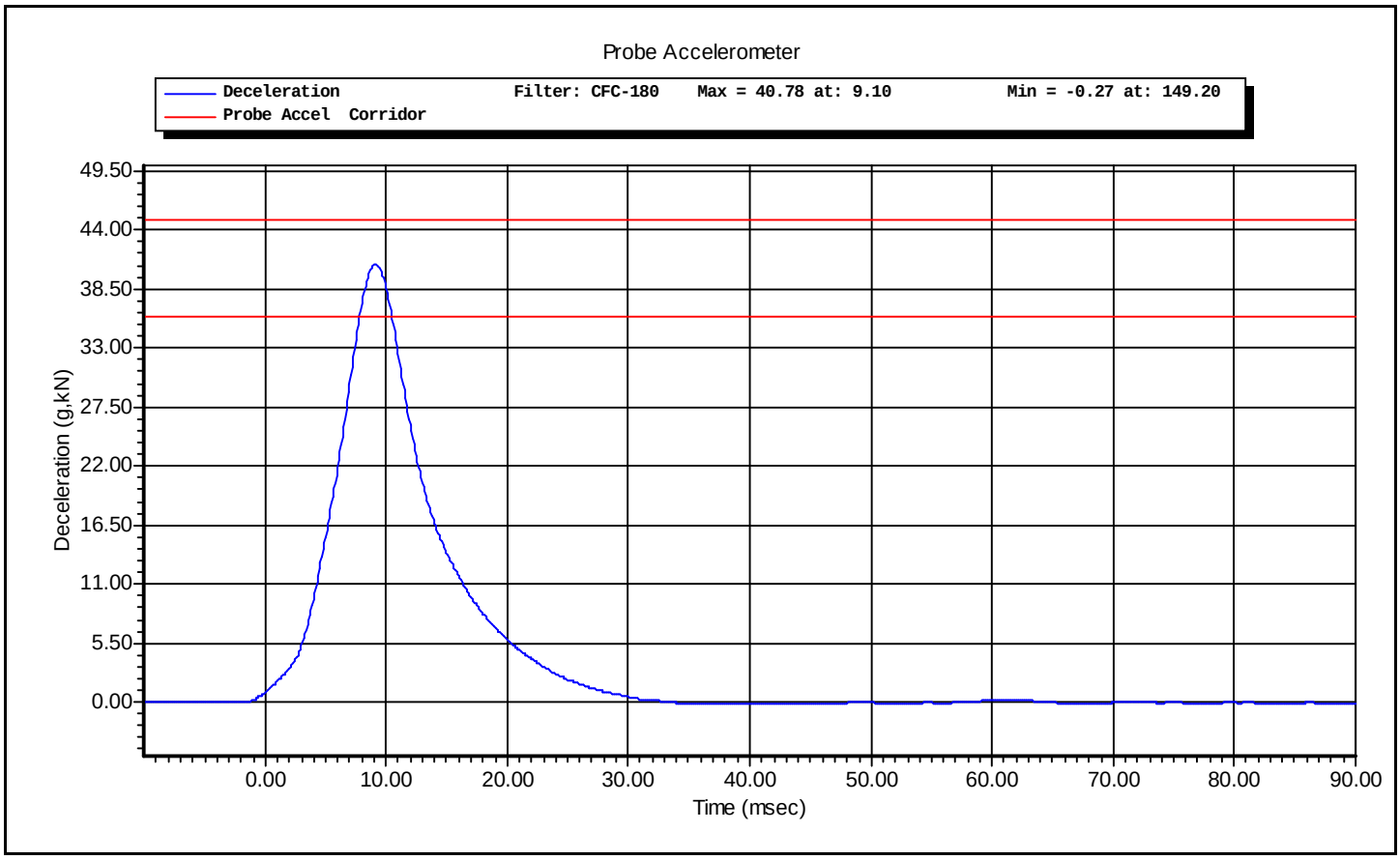
Test ID: **Iliac Pelvis** Test Time: **11:40:38 AM** Test Date: **11/3/2010**

Calspan - Transportation Research Group
www.calspan.com
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	**Pelvis**	Revision:	**8/24/2009**
Sub Test Name:	**Iliac Impact**	Spec Type:	**NHTSA**
ATD Type:	**SID-IIs**		
ATD Serial Number:	**SID 304**		
Test ID:	**Iliac Pelvis**	Test Date:	**11/3/2010**
Test Number:	**3**	Test Time:	**11:40:38 AM**

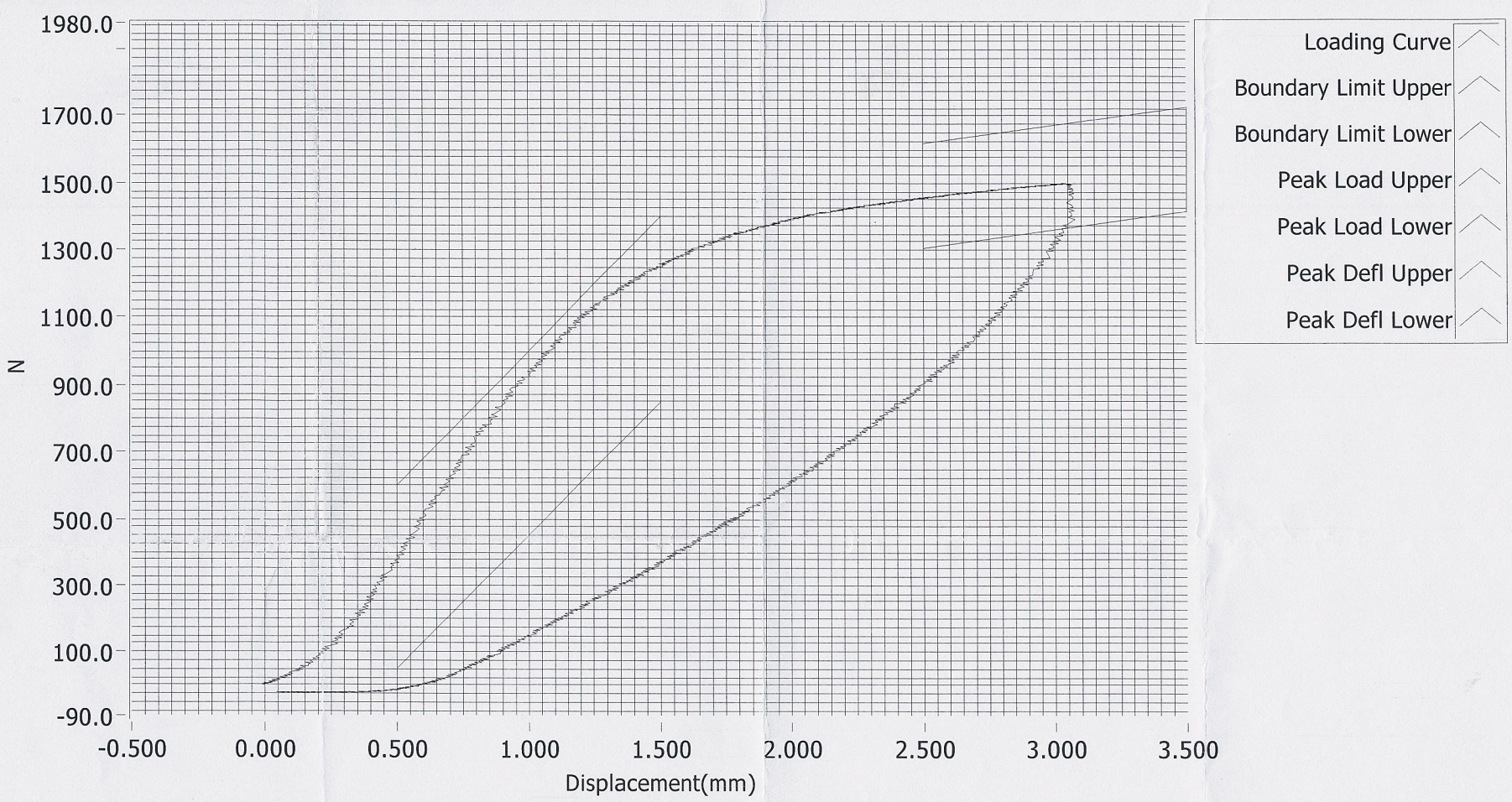






Test ID: **Iliac Pelvis** Test Time: **11:40:38 AM** Test Date: **11/3/2010**

Resultant Data - SIDIIs Plug Compression

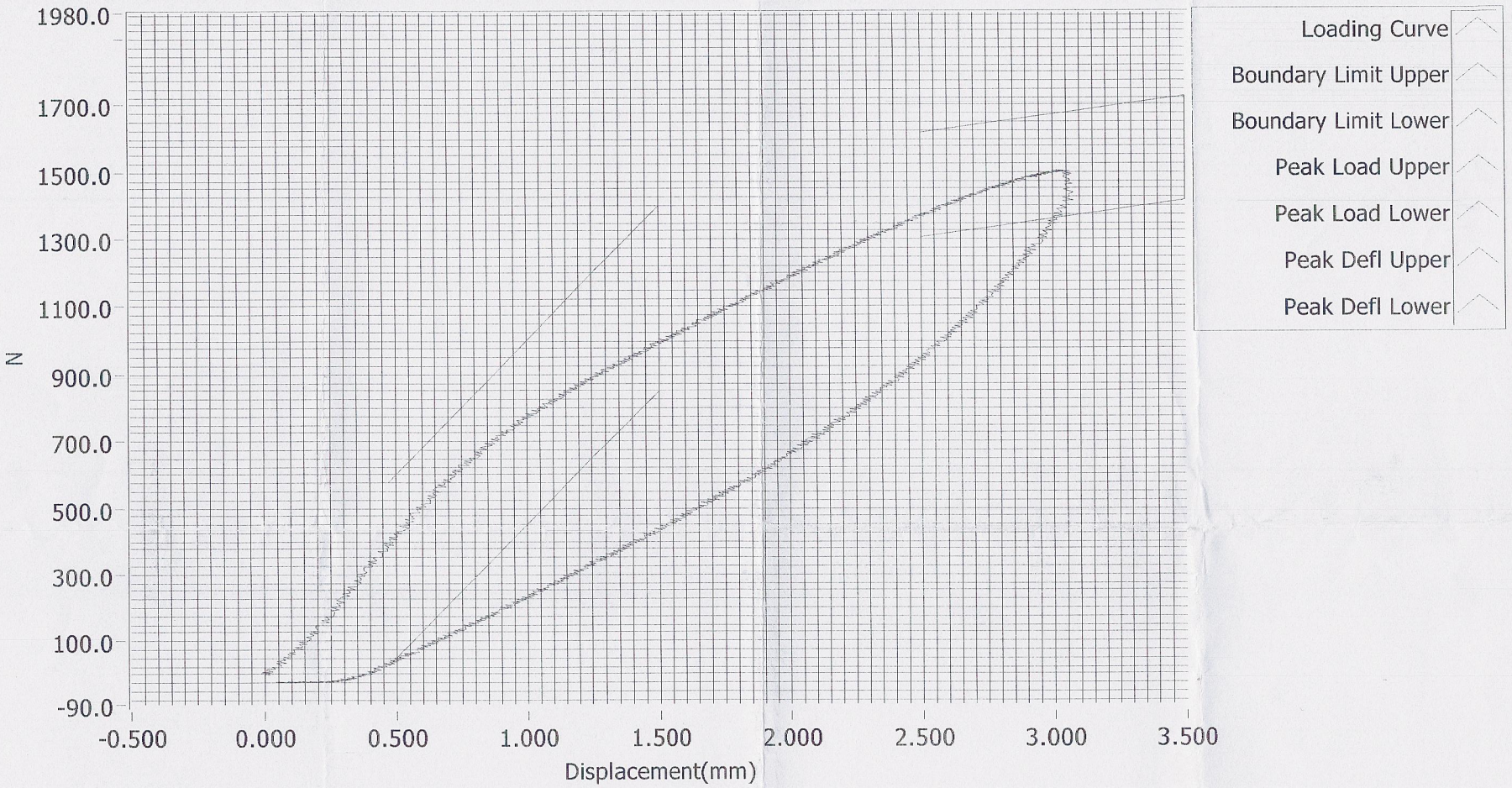


ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		2/19/2007	5:41 AM
Cert ID	ATD Serial Number	ATD Type	
	8142	SIDIIs	

Current Date : 2/19/2007 Current Time : 05:42:44

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
		7/16/2007	2:23 PM

Cert ID	ATD Serial Number	ATD Type
	12754	SIDIIs

Current Date : 7/16/2007 Current Time : 14:24:06