

REPORT NUMBER: NCAP-CAL-11-009

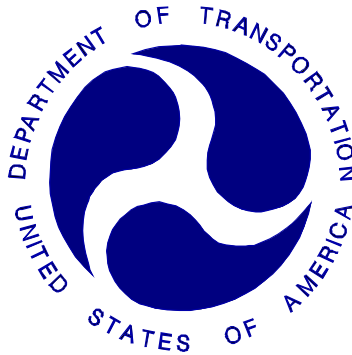
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**General Motors
2011 Chevrolet Traverse 1LT
SUV**

NHTSA NUMBER: MB0124

CALSPAN TEST NUMBER: TR2489

**CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
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BUFFALO, NEW YORK 14225**



November 18, 2010

FINAL REPORT

PREPARED FOR:

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
1200 New Jersey Ave SE, Room W43-410
Washington, DC 20590**

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Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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4. Title and Subtitle Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Frontal Crash Test of a 2011 Chevrolet Traverse 1LT SUV NHTSA No. MB0124				5. Report Date 11/18/2010			
				6. Performing Organization Code CAL			
7. Author(s) David J. Travale, Program Manager Bethany Koetje, Project Engineer				8. Performing Organization Report No. TR2489			
9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225				10. Work Unit No.			
				11. Contract or Grant No. DTNH22-06-D-00024			
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, DC 20590				13. Type of Report and Period Covered Final Test Report 11/18/2010			
				14. Sponsoring Agency Code NVS-111			
15. Supplementary Notes							
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Chevrolet Traverse 1LT SUV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Calspan Corporation's crash test facility in Buffalo, New York on 9/22/2010. The impact velocity of the vehicle was 56.3 km/h, and the ambient temperature at the barrier face at the time of impact was 22°C. The target vehicle post-test maximum crush was 530 mm of Vehicle. The test vehicle's performance is as follows:							
		Driver ATD			Pass. ATD		
	Measurement Description	Units	Threshold	Result	Units	Threshold	Result
	Head Injury Criteria (HIC ₁₅)	N/A	700	257.1	N/A	700	368.0
	Maximum Chest Compression	mm	63	-20.0	mm	52	-17.3
	Nij	n/a	1	0.32	n/a	1	0.34
	Neck Tension	Newtons	4170	1137.6	Newtons	2620	886.1
	Neck Compression	Newtons	4000	-125.9	Newtons	2520	-454
	Left Femur Force	Newtons	10008	-1215.3	Newtons	6805	-829.2
	Right Femur Force	Newtons	10008	-1821.9	Newtons	6805	-1204.8
17. Key Words 35 mph Frontal Barrier Impact test New Car Assessment Program (NCAP)					18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, DC 20590		
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

A load cell barrier consisting of 36 load cells was impacted by a 2011 Chevrolet Traverse 1LT SUV at a velocity of 56.3 kph. The test was performed at Calspan on 9/22/2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E, 50th percentile male anthropomorphic test devices (ATDs), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger according to dummy placement instructions specified in the Frontal NCAP Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 61) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 129 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 530 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the lower instrument panel. The passenger's visible contact points were as follows: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the dash panel.

The occupant data is summarized below.

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	257.13	86.2	101.2	-20.0	0.32	1137.6	-125.9	-1215.3	-1821.9
Passenger (5 th)	367.96	71.8	86.8	-17.3	0.34	886.1	-454.0	-829.2	-1204.8

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

TEST VEHICLE INFORMATION

NHTSA No.	MB0124
Make	Chevrolet
Model	Traverse 1LT
Body Style	SUV
VIN	1GNKVGED0BJ128564
Color	Silver
Delivery Date	
Odometer Reading (mi)	19
Odometer Reading (km)	30.571
Dealer	Joe Basil Chevrolet
Transmission	Automatic
Final Drive	AWD
Type/No. Cyl	V6
Engine Disp. (L)	3.6
Engine Placement	Lateral
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

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

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

No

DATA FROM CERTIFICATION LABEL

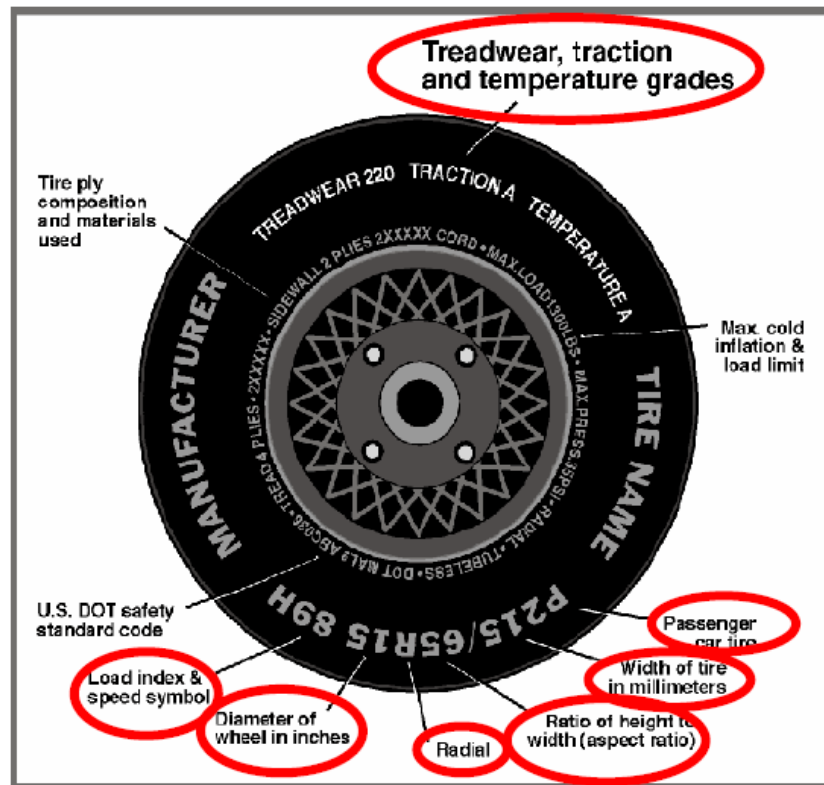
Manufactured By	General Motors	GVWR (kg)	2930
Date of Manufacture	7/1/2010	GAWR Front (kg)	1450
		GAWR Rear (kg)	1600

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Split Bench	
Number of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				705
Cargo Wt. (RCLW) (kg)				228

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

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P255/65R18	P255/65R18
Tire Size on Vehicle	P255/65R18	P255/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Fortera	Fortera
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Plies Polyester	2 Plies Polyester
Tire Plies Body	2 Polyester + 2 Steel	2 Polyester + 2 Steel
Load Index/Speed Symbol	109S	109S
Tire Material	-	-
DOT Safety Code Right	4BXM ARDR 2610	4BXM ARDR 2610
DOT Safety Code Left	4BXM ARDR 2610	4BXM ARDR 2610

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

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	618.5	486.5		639	598	
Right	kg	623	475		639	595	
Ratio	%	56.4%	43.6%		51.7%	48.3%	
Totals	kg	1241.5	961.5	2203.0	1278.0	1193.0	2471.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2203.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	136.0
Calculated Vehicle Target Weight (TVTW)	kg	2479.6

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	872	879	905	902	1319
As Tested	mm	870	875	877	872	1459
Post Test	mm					

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3023
Total Vehicle Length at Left Side	mm	5087
Total Vehicle Length at Centerline	mm	5192
Total Vehicle Length at Right Side	mm	5088
Weight of Ballast in Cargo Area	kg	116
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	76.4

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5192
2	Total Width	1957
3	Bumper Top Height	614
4	Bumper Bottom Height	469
5	Longitudinal Member Top Height	666
6	Distance Between Longitudinal Members	0
7	Longitudinal Member Width	0
8	Engine Top Height	1049
9	Engine Bottom Height	236
10	Engine and Gearbox Width	597
11	Front Bumper-Engine Distance	580
12	Front Shock Absorber Fixing Height	965
13	Bonnet Leading Edge Height	938
14	Front Shock Absorber Fixing Width	651
15	Front Bumper – Front Axle Distance	1021
16	Front Axle – A Pillar Distance	527
17	A- Pillar – B-Pillar Distance	1098
18	B-Pillar – Rear Axle Distance	1401
19	B-Pillar – C-Pillar Distance	976
20	Roof Sill Bottom Height	1595
21	Roof Sill Top Height	1709
22	Floor Sill Bottom Height	443
23	Floor Sill Top Height	483

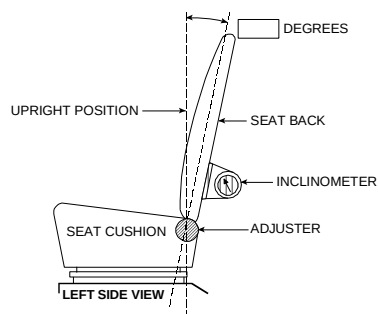
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
 Test Program: Frontal NCAP Test Date: 9/22/2010

NORMAL DESIGN RIDING POSITION

Driver seat: All power adjustments were placed in the full down position as per Form1

Passenger Seat:

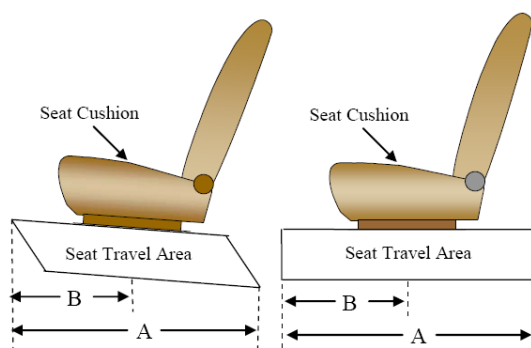


	Deg
Driver Seat Back Angle	3.8
Passenger Seat Back Angle	0.8

SEAT FORE/AFT POSITIONS

The Driver's seat was positioned at the mid-point of fore-aft travel. The passenger's seat was positioned at the forward most position of fore-aft travel

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	254	127 (mid position)
Passenger Seat	240	0 (full forward)



SEAT BELT UPPER ANCHORAGES

The driver and passenger belt upper anchorages were placed in the top most detent of five possible positions

	Total # of Positions	Placed in Position #
Driver Seat	5	0 (upper most)
Passenger Seat	5	0 (upper most)

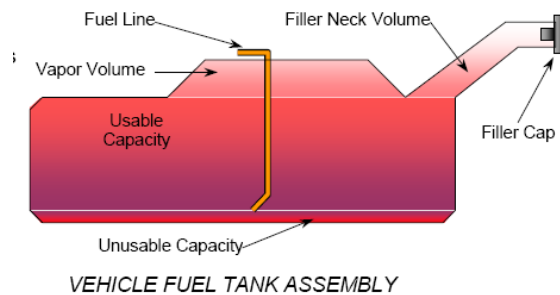
DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

FUEL TANK CAPACITY

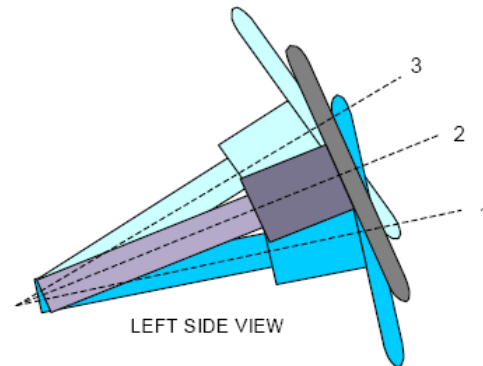
	Liters
Usable Capacity of "Standard Tank"	82.1
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	75.6-77.2
Actual Amount of Solvent Used	76.4
1/3 of Usable Capacity	27.4

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



STEERING COLUMN ADJUSTMENT

The steering column was positioned at the mid-point of tilt range and the mid-point of column for-aft telescoping travel



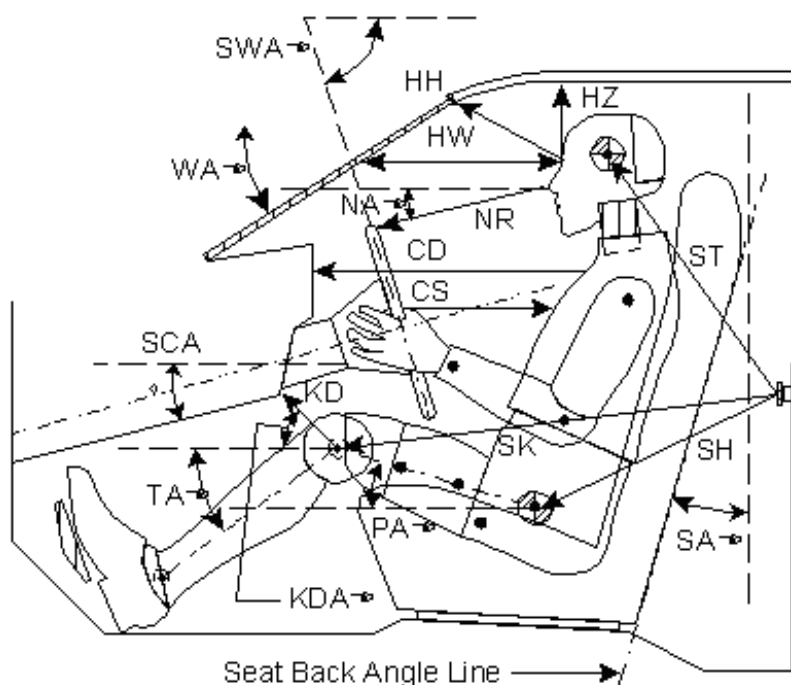
STEERING COLUMN POSITIONS

	Degrees	
Lowermost position No. 1	25.0	
Geometric center position No. 2	22.2	
Uppermost position No. 3	19.4	
Telescoping Steering Wheel Travel		50
Test Position	22.2	25

STEERING COLUMN ASSEMBLY

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

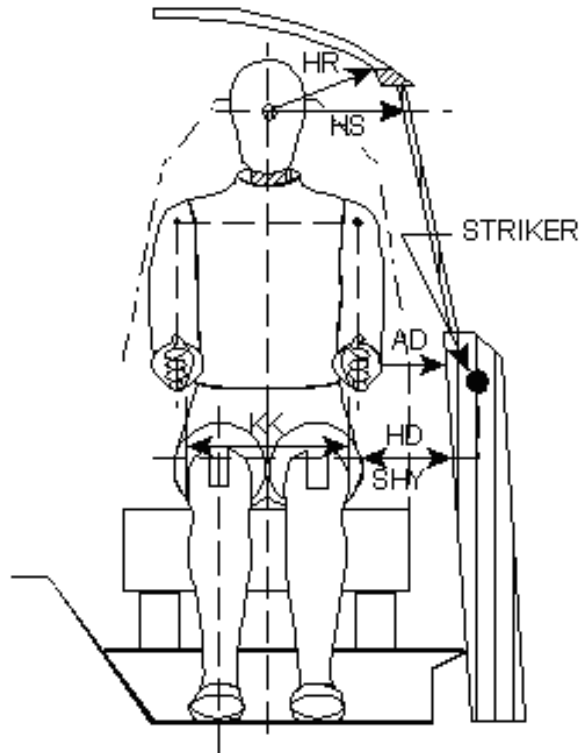
Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		29.0		
SWA°	Steering Wheel Angle		68.6		
SCA°	Steering Column Angle		21.4		
SA°	Seat Back Angle (on headrest post)		3.8		0.8
HZ	Head to Roof (Z)	261	90.0	286	90.0
HH	Head to Header	432	27.0	398	40.0
HW	Head to Windshield	736	0.0	756	0.0
NR	Nose to Rim	362	10.0	NA	NA
CD	Chest to Dash	551		428	
CS	Chest to Steering Hub	282	0.0		
RA	Rim to Abdomen	190	0.0		
KDL	Left Knee to Dash	178	10.0	132	31.0
KDR	Right Knee to Dash	154	NA	132	31.0
PA°	Pelvic Angle		23.6		19.4
TA°	Tibia Angle		52.0		52.7
SK	Striker to Knee	622	6.9	705	1.5
ST	Striker to Head	670	62.7	558	68.8
SH	Striker to H-Point	224	-16.6	335	-3.1

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

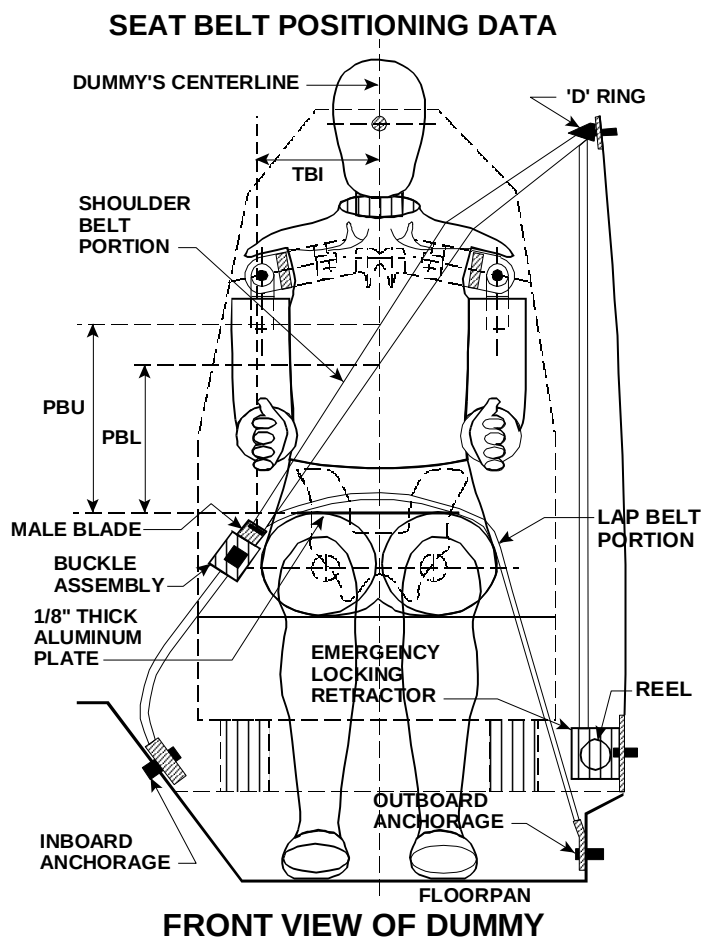
Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



Code	Description	Driver	Passenger
AD	Arm to Door	134	192
HD	H-Point to Door	162	191
HR	Head to Side Header	285	301
HS	Head to Side Window	363	411
KK	Knee to Knee	371	235
SHY	Striker to H-Point (Y Direction)	275	325
AA	Ankle to Ankle	362	175

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	355	307
PBL — Top surface of aluminum plate to belt lower edge	mm	280	220

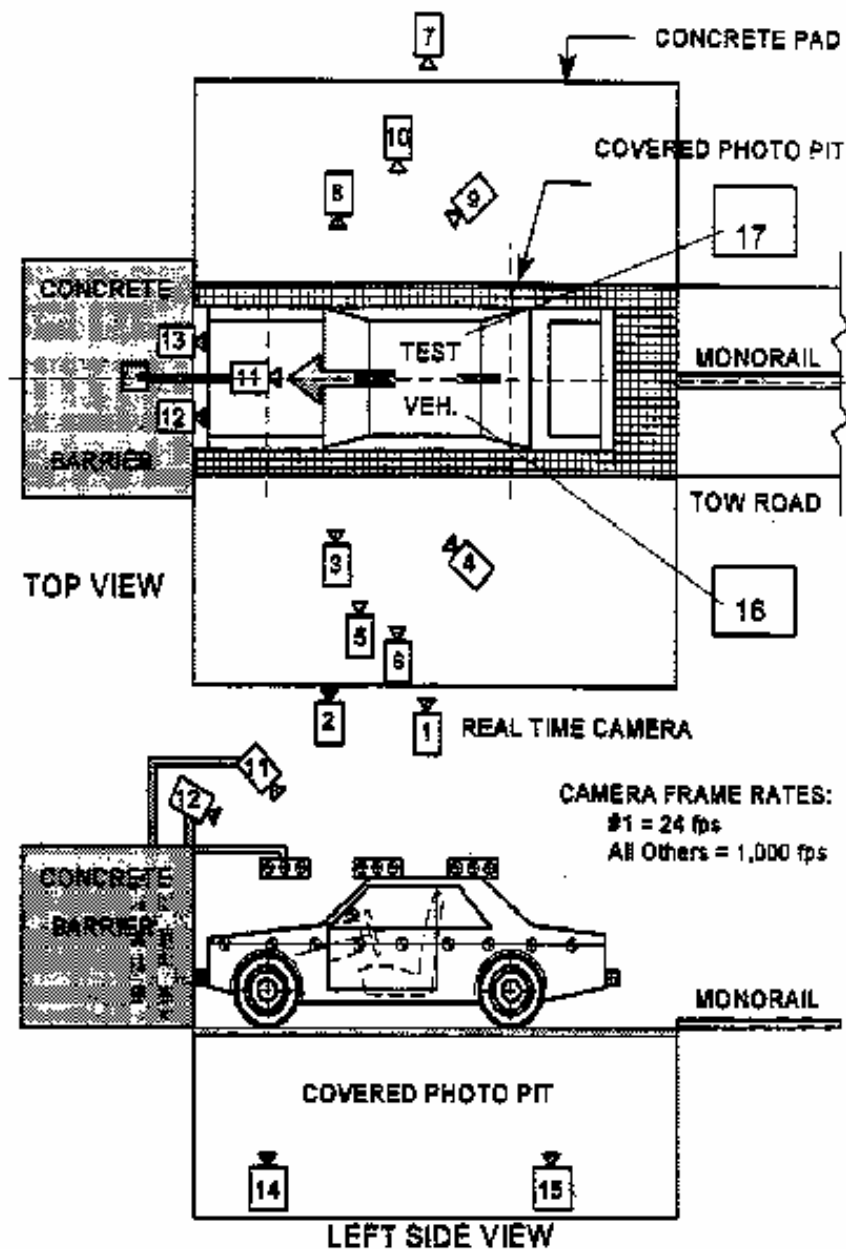
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	860	910
Lap Belt Length as measured on ATD	mm	545	520
Remainder of belt on reel	mm	0	0
Total belt length for continuous webbing systems	mm	1405	1430

DATA SHEET NO. 6
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 (CONTINUED)
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

CAMERA LOCATIONS

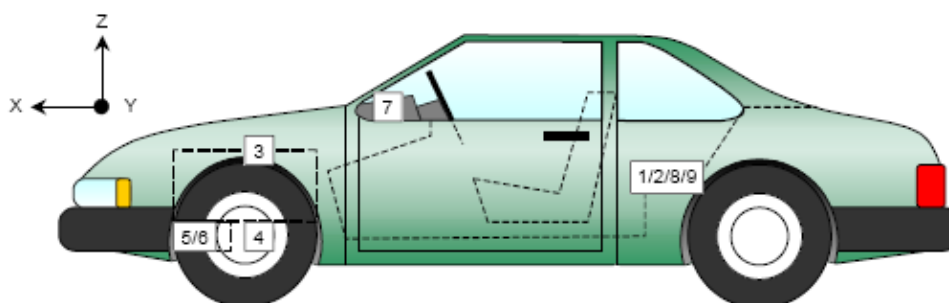
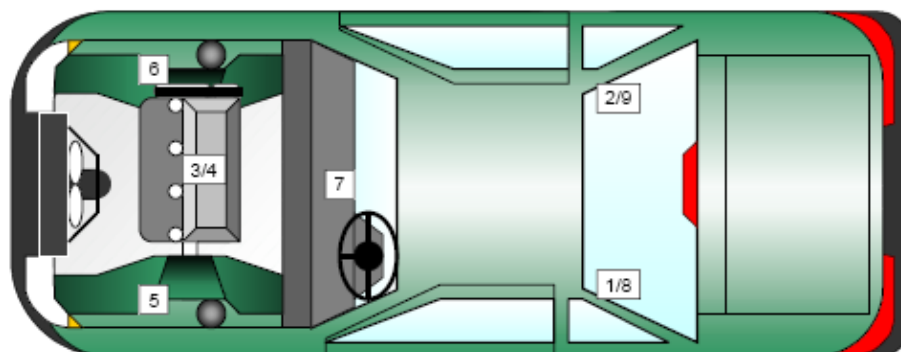
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				-	24
2	Left Front View	890	9634	955	28	1000
3	Steering Column Top	1870	7316	1220	24-70	1000
4	Steering Column Bottom	1870	7316	1800	28-70	1000
5	Driver Close-Up	1510	7730	1040	50	1000
6	Driver Angle	2940	6391	1960	50	1000
7	Right Overall	1930	7506	945	24	1000
8	Right Passenger Half	1690	8050	1115	50	1000
9	Right Close-Up	1305	9500	955	50	1000
10	Right Angle	2780	6706	1830	50	1000
11	Windshield	0	-530	3374	25	500
12	Top Driver	620	-92	1987	24	500
13	Top Passenger	620	-92	1987	24	500
14	Pit Front	0	615	-3048	12.5	1000
15	Pit Rear	0	2870	-3048	12.5	1000
16	Onboard Driver Side (Optional)	N/A	N/A	N/A	N/A	N/A
17	Onboard Passenger Side (Optional)	N/A	N/A	N/A	N/A	N/A

* COORDINATES:

+X = forward of impact plane
+Y = right of monorail center
+Z = into ground

DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	2074	-709	471
2	Right Rear X-Member X	2069	716	475
3	Engine Top X	4612	83	892
4	Engine Bottom X			
5	Left Brake Caliper X	4112	-686	459
6	Right Brake Caliper X	4106	691	834
7	Instrument Panel X	4112	-686	791
8	Left Rear X-Member Z	2074	-709	471
9	Right Rear X-Member Z	2069	716	475

Reference Points:

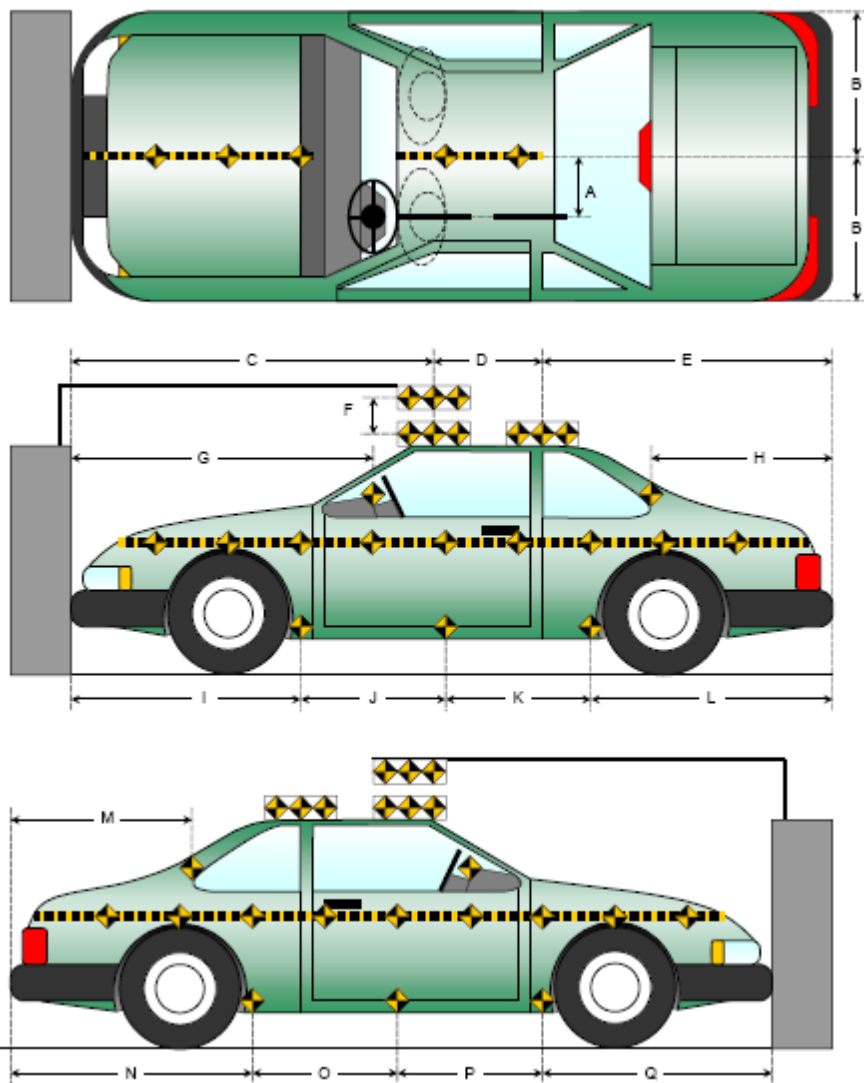
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

Item	Value
A	392
B	705
C	2414
D	1222
E	1555
F	NA
G	1872
H	1532
I	1527
J	1021
K	1024
L	1619
M	1538
N	1621
O	1020
P	1021
Q	1530

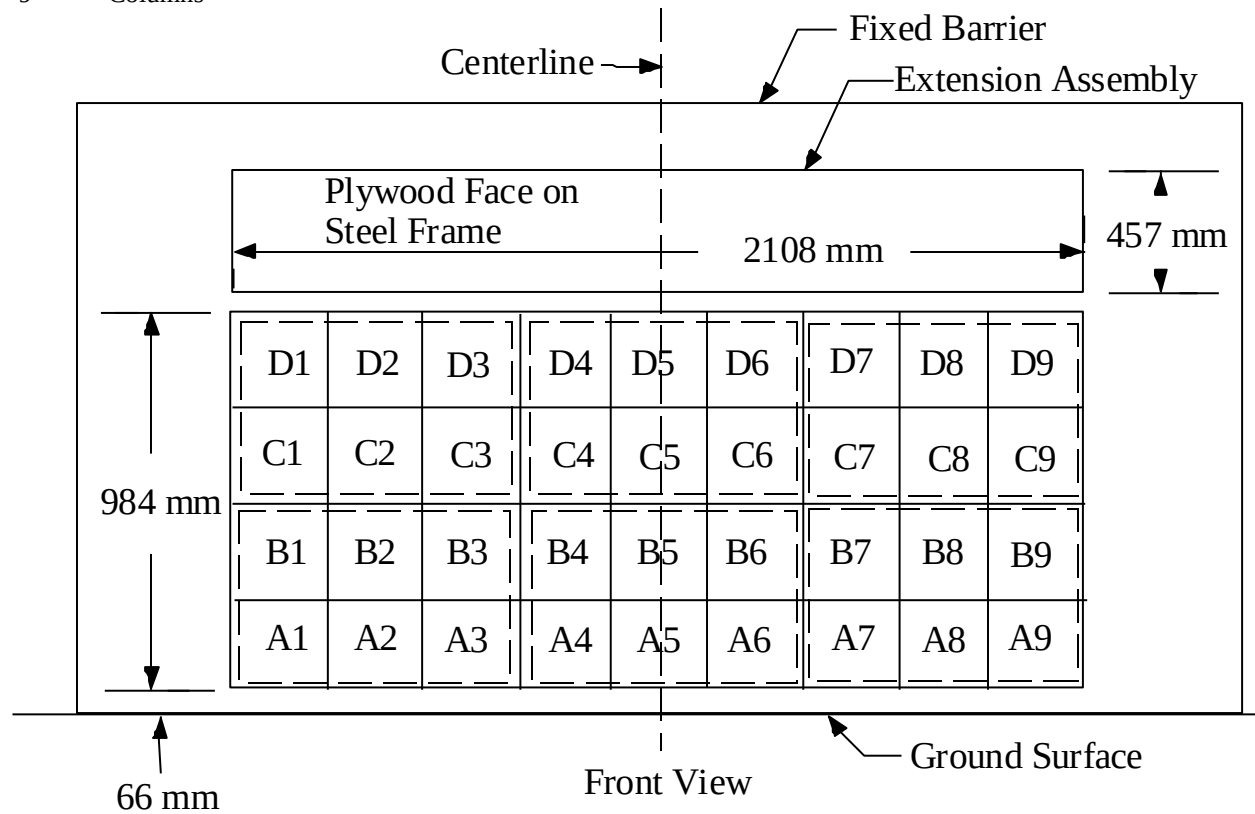
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
Test Program: Frontal NCAP Test Date: 9/22/2010

INSTRUMENTATION

Driver Dummy Channels	40
Passenger Dummy Channels	40
Belt load cells	4
Vehicle Structure Accelerometers	8
Barrier load cells	36
Total	128

CAMERA COVERAGE

High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
Total	15

DATA SHEET NO. 11
POST TEST OBSERVATIONS

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	061	273
Head Contact	Face to airbag, rear of head to head restraint	Face to airbag, rear of head to head rest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	Airbag	Airbag
Left Knee Contact	Instrument Panel	Glove Box Door
Right Knee Contact	Instrument Panel	Glove Box Door

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Locked	Locked
Front Door Opening	Closed, operable	Closed, operable
Rear Door Opening	Closed, operable	Closed, operable
Seat Track Shift (mm)	2	5
Seat Back Failure	None	None
Glazing Damage	None	

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

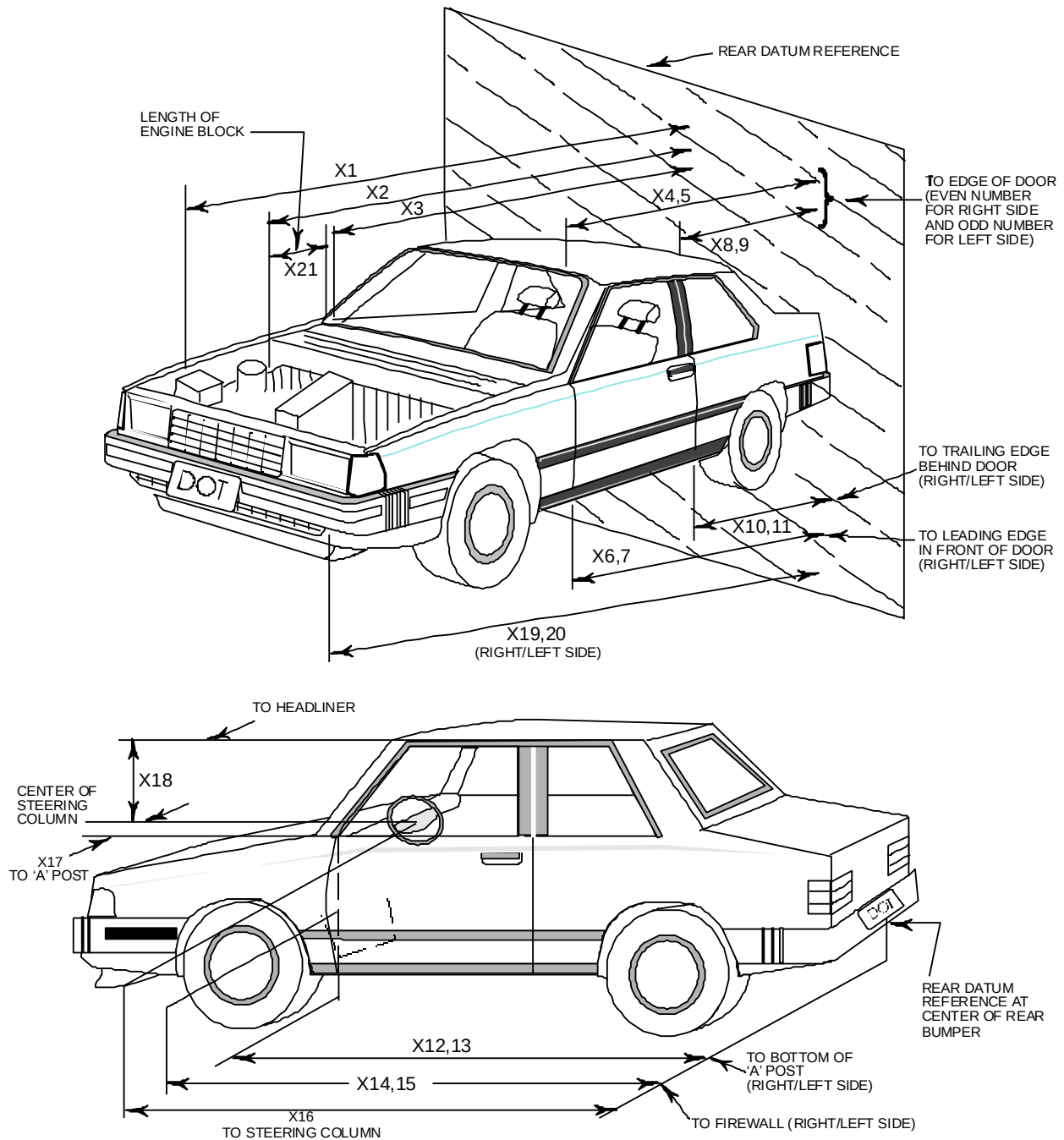
Measured Parameter	Units	Value
Left Side	mm	626
Center	mm	687
Right Side	mm	708
Average	mm	674

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Curtain Airbag	Yes	No	Yes	No
Side Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No	NA	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5192	4662	530
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4612	4372	240
3	RSOV to Firewall	4253	4236	17
4	RSOV to Upper Leading Edge of Right Door	3649	4653	-4
5	RSOV to Upper Leading Edge of Left Door	3647	3648	-1
6	RSOV to Lower Leading Edge of Right Door	3639	3647	-8
7	RSOV to Lower Leading Edge of Left Door	3639	3639	0
8	RSOV to Upper Trailing Edge of Right Door	2556	2560	-5
9	RSOV to Upper Trailing Edge of Left Door	2555	2555	-1
10	RSOV to Lower Trailing Edge of Right Door	2565	2573	-8
11	RSOV to Lower Trailing Edge of Left Door	2563	2565	-3
12	RSOV to Bottom of "A" Post of Right Side	3760	3764	-4
13	RSOV to Bottom of "A" Post of Left Side	3758	3758	-1
14	RSOV to Firewall, Right Side	4142	4154	-12
15	RSOV to Firewall, Left Side	4145	4155	-10
16	RSOV to Steering Column	3171	3235	-64
17	Center of Steering Column to "A" Post	303	291	12
18	Center of Steering Column to Headliner	488	491	-3
19	RSOV to Right Side of Front Bumper	5088	4589	499
20	RSOV to Left Side of Front Bumper	5087	4626	461
21	Length of Engine Block	306	314	-8
RD	RSOV to Right Side of Dash Panel	3370	3374	-3
CD	RSOV to Center of Dash Panel	3373	3372	1
LD	RSOV to Left Side of Dash Panel	3370	3370	0

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

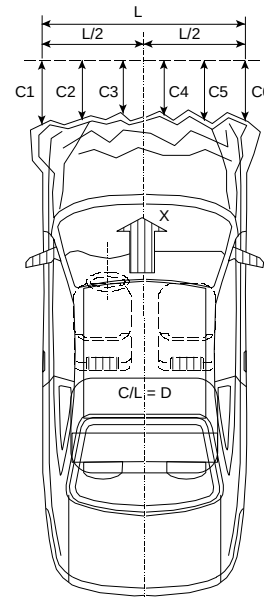
Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010

VEHICLE INFORMATION

VIN	1GNKVGED0BJ128564	Wheelbase (mm)	3023
Vehicle Size Category	Multi-purpose Vehicle	Test Weight (kg)	2471.0

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on page 2-13
 Cal. Procedure/Interval: Calspan Procedure / 6 month
 Integration Algorithm: Trapezoidal Linearity: >99%
 Impact Velocity (km/h): 56.3
 Velocity Change (km/h): 63.1
 Time of Separation (msec): 93



CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
 Midpoint of Damage: 786
 Damage Region Length (mm): 1571
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4932	4605	-327
C2	Crush zone 2 at left side	mm	5086	4618	-468
C3	Crush zone 3 at left side	mm	5162	4675	-487
C4	Crush zone 4 at right side	mm	5161	4655	-506
C5	Crush zone 5 at right side	mm	5086	4596	-491
C6	Crush zone 6 at right side	mm	4935	4655	-280
L	C1 to C6	mm	1571	1635	64

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

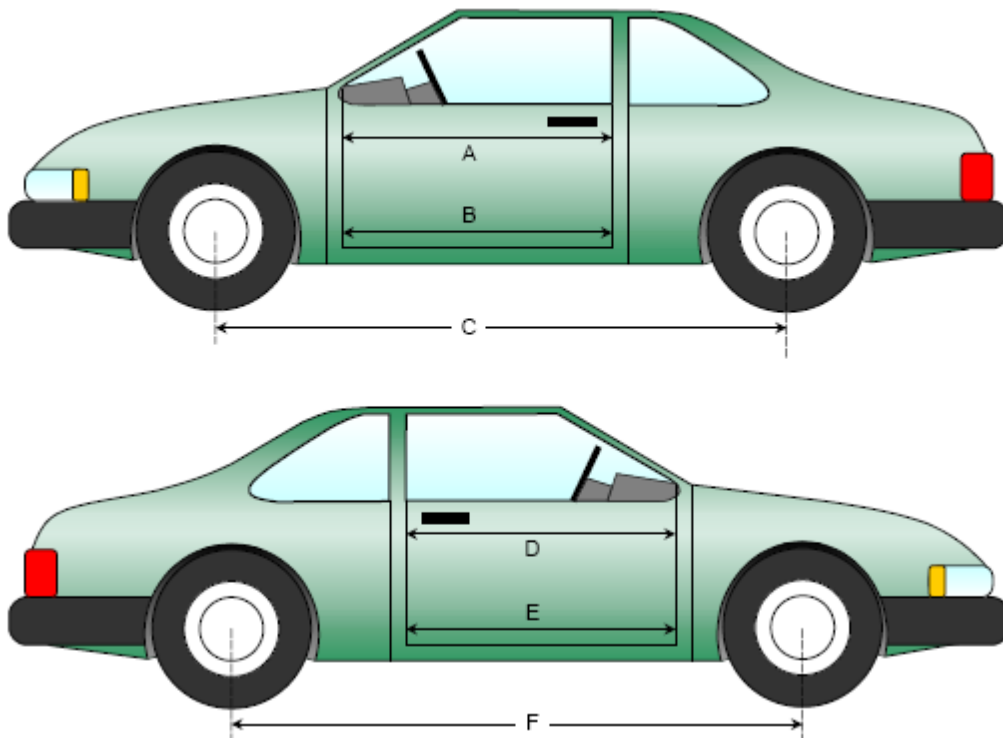
Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
 Test Program: Frontal NCAP Test Date: 9/22/2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	984	984	0
B	Left Side Lower	mm	983	981	1
D	Right Side Upper	mm	1000	1002	-2
E	Right Side Lower	mm	975	976	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3026	NA	NA
F	Right Side Wheelbase	mm	3020	2940	80



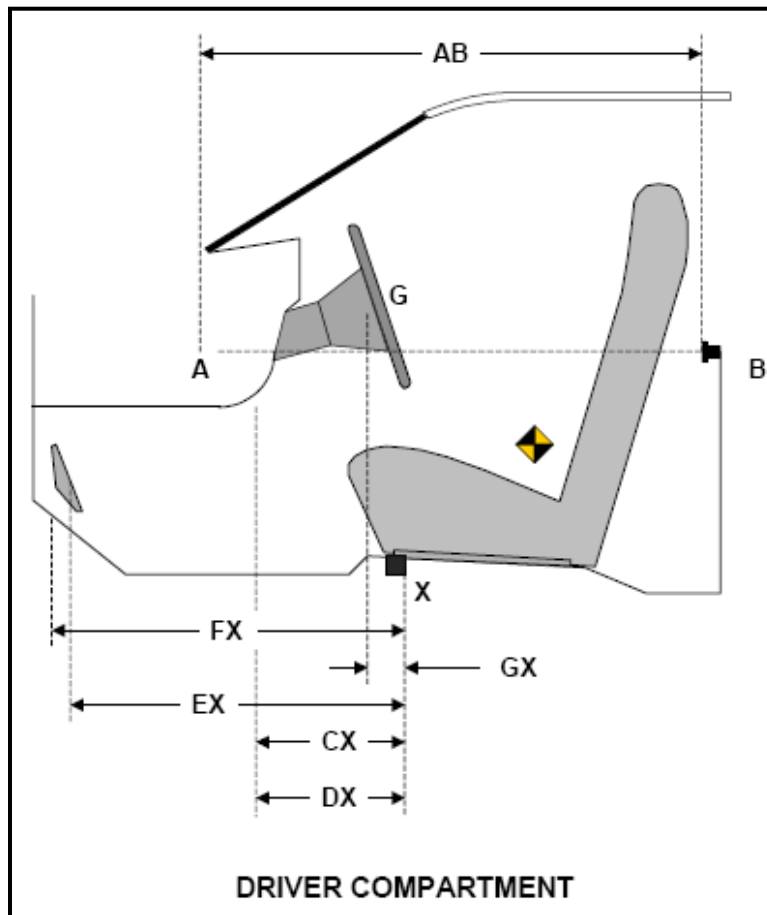
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
 Test Program: Frontal NCAP Test Date: 9/22/2010

DRIVER COMPARTMENT INTRUSION

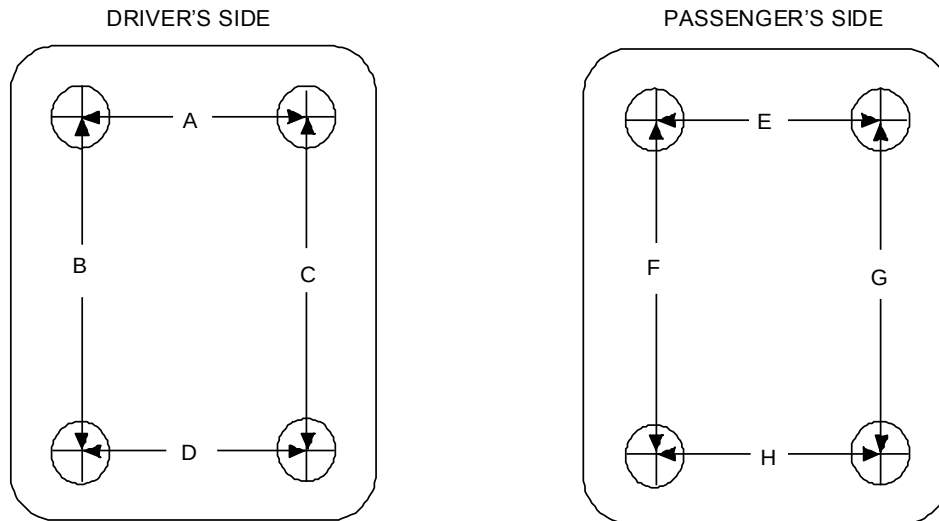
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	835	836	-1
CX	Left Knee Bolster to X	mm	297	296	1
DX	Right Knee Bolster to X	mm	351	350	1
EX	Brake Pedal to X	mm	585	573	12
FX	Foot Rest to X	mm	NA	NA	NA
GX	Center of Steering Column Wheel Hub to X	mm	95	157	-62

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
 Test Program: Frontal NCAP Test Date 9/22/2010



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	545	542	-3
B	320	321	1
C	297	301	4
D	572	572	0
E	482	484	2
F	337	336	-1
G	345	347	2
H	550	549	-1

All units in millimeters

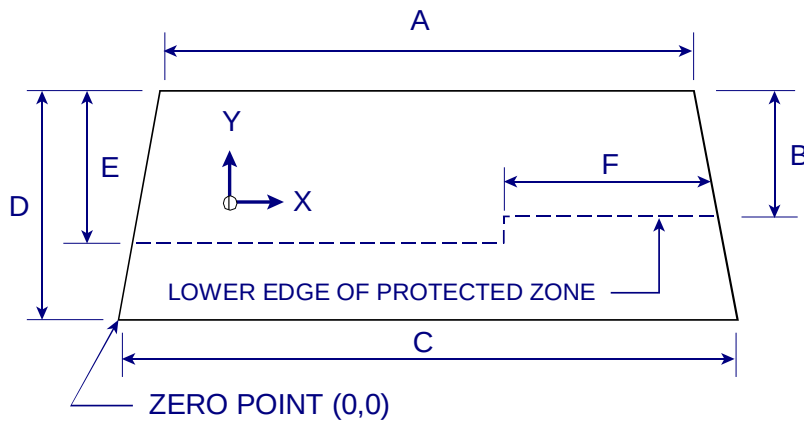
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2011 Chevrolet Traverse 1LT NHTSA No: MB0124
 Test Program: Frontal NCAP Test Date: 9/22/2010

A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.
 The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles not equipped with occupant passive restraints and 50% for each side of the windshield for vehicles which are equipped with occupant passive restraints.
 Temperature of windshield molding during test: 21.3°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	882	882	100.0%
Right Side	882	882	100.0%
Total	1764	1764	100.0%



Item	Units	Value
A	mm	
B	mm	570
C	mm	
D	mm	882
E	mm	563
F	mm	515

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y
-	-
-	-
-	-
-	-

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y
-	-
-	-
-	-
-	-

DATA SHEET NO. 15 (CONTINUED)
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	<u>2011 Chevrolet Traverse 1LT</u>	NHTSA No:	<u>MB0124</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>9/22/2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

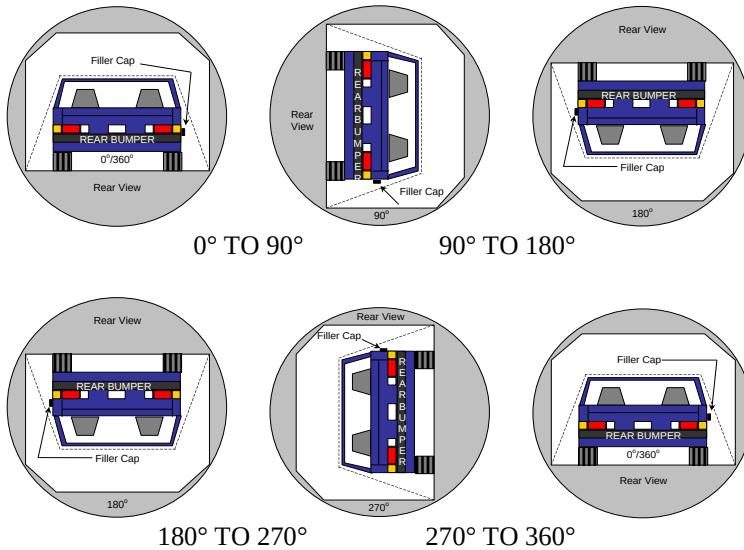
Temperature at Time of Impact: 22 °C Test Time: 4:00pm

Stoddard Solvent Spillage Measurements

A.	From impact until vehicle motion ceases: (Maximum allowable = 1 oz.)	<u>0</u>	oz
B.	For the 5-minute period after motion ceases: (Maximum allowable = 5 oz.	<u>0</u>	oz
C.	For the following 25 minutes: (Maximum allowable = 1 oz./minute	<u>0</u>	oz
D.	Spillage	<u>0</u>	oz

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
2. Details of Stoddard Solvent spillage:
None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	1:07	5:00	6:07
90° to 180°	1:03	5:00	6:03
180° to 270°	1:03	5:00	6:03
270° to 360°	1:10	5:00	6:10

FMVSS 301 SPILLAGE TABLE

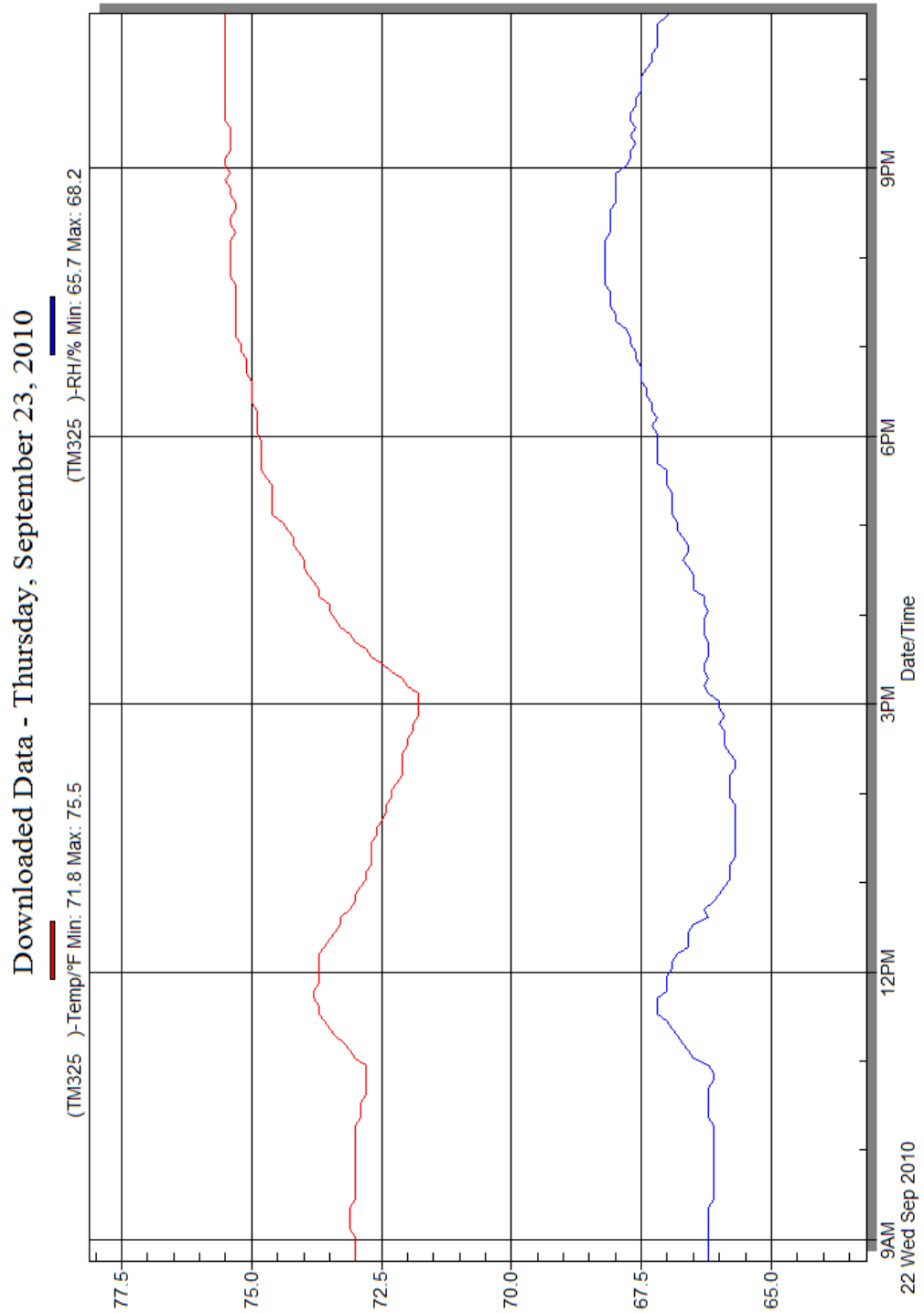
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	NA	NA	NA
90° to 180°	0	NA	NA	NA
180° to 270°	0	NA	NA	NA
270° to 360°	0	NA	NA	NA

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle:	2011 Chevrolet Traverse 1LT	NHTSA No:	MB0124
Test Program:	Frontal NCAP	Test Date	9/22/2010



APPENDIX A
PHOTOGRAPHS

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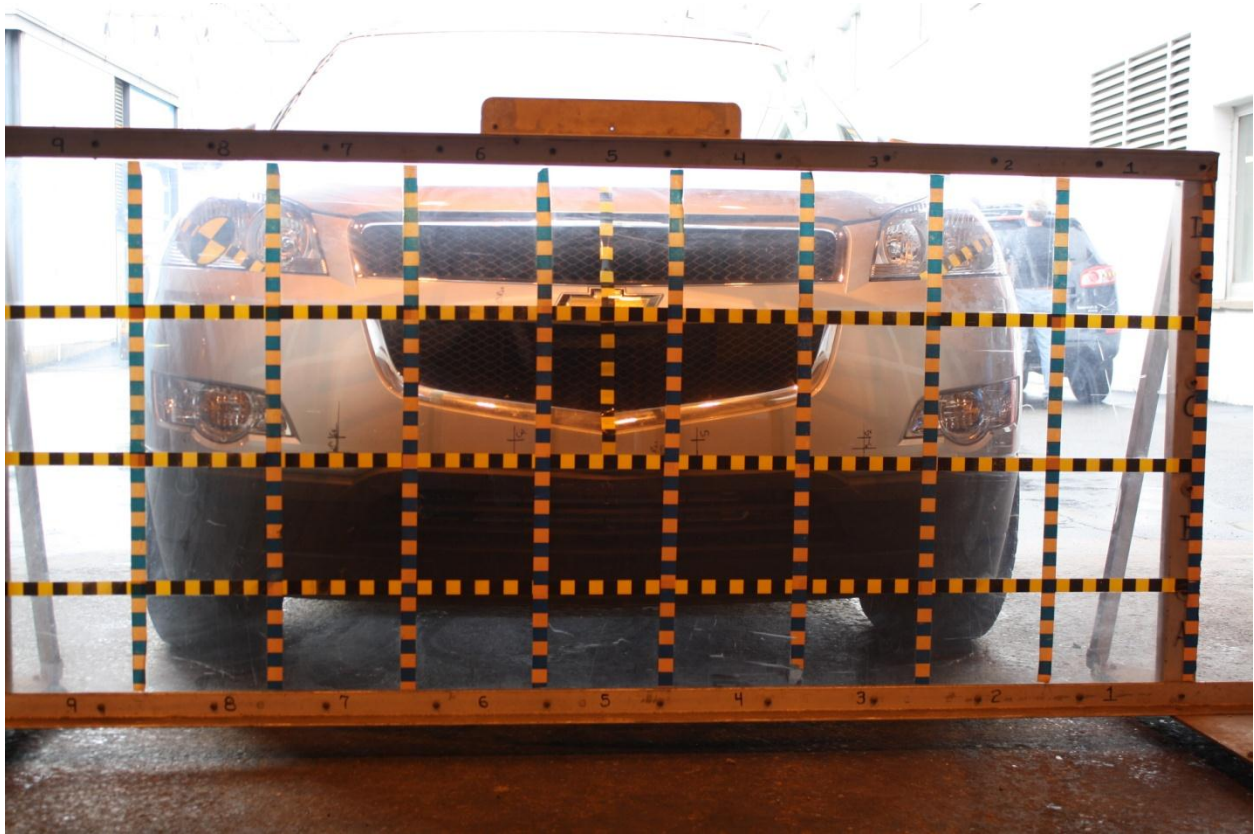


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall

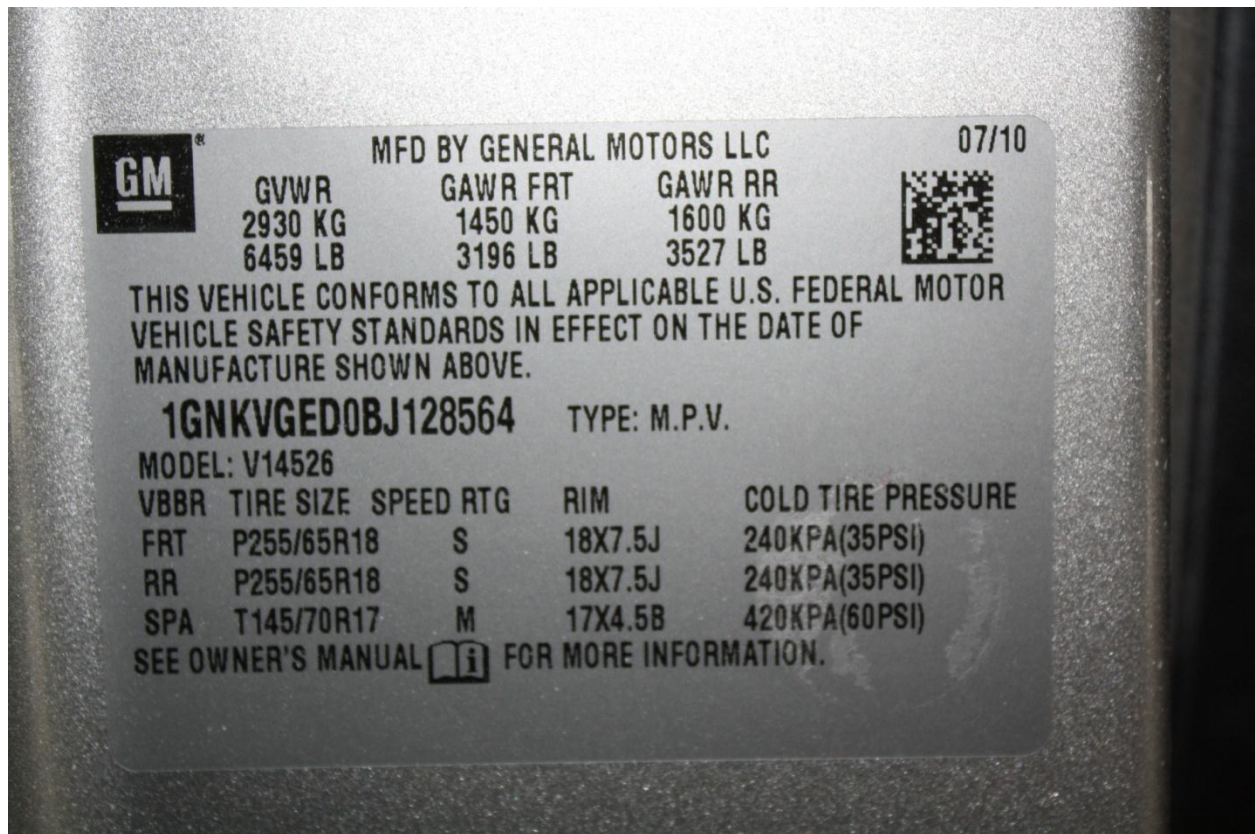


Figure A-3: Manufacturer Label



Figure A-4: Tire Placard



Figure A-5: Right Front 3/4 View, as Received



Figure A-6: Left Rear $\frac{3}{4}$ View, as Received



Figure A-7: Pre-Test Front View of Test Vehicle



Figure A-8: Post-Test Front View of Test Vehicle



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



Figure A-10 – Post-Test Left View of Vehicle



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



Figure A-12: Post-Test Right View of Test Vehicle



Figure A-13: Pre-Test Right $\frac{3}{4}$ View



Figure A-14: Post-Test Right $\frac{3}{4}$ View



Figure A-15: Pre-Test Left Rear $\frac{3}{4}$ View



Figure A-16: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View



Figure A-21: Pre-Test Fuel Filler Cap View



Figure A-22: Post-Test Fuel Filler Cap View

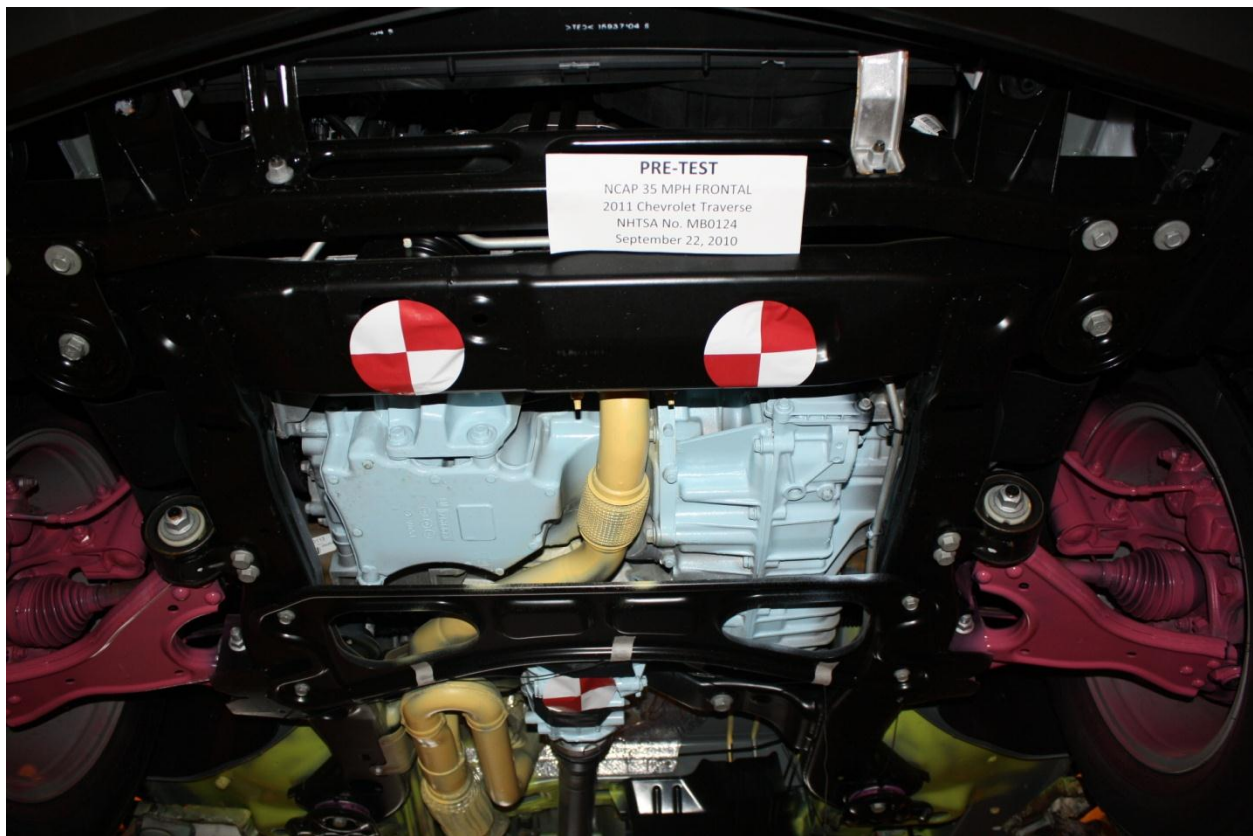


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View

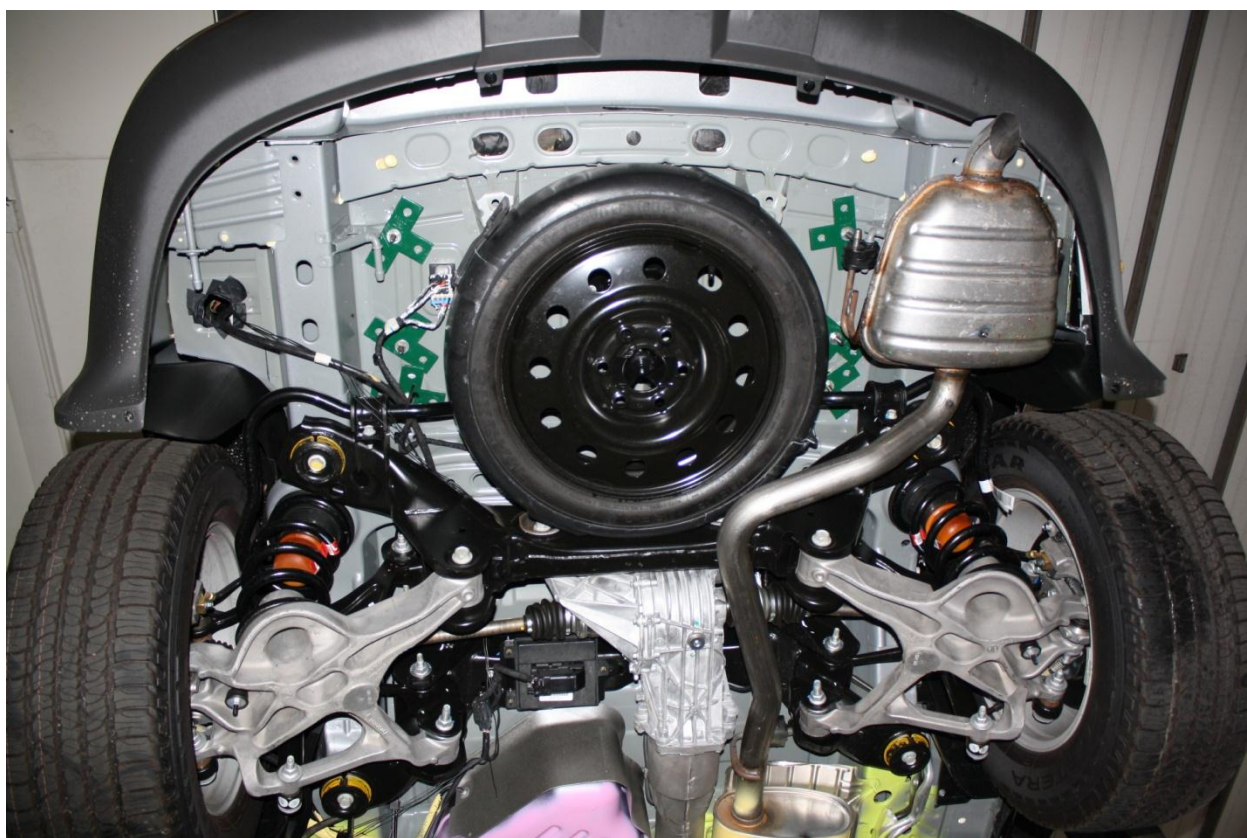


Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing



Figure A-29: Pre-Test Driver Dummy Front View



Figure A-30: Post-Test Driver Dummy Front View



Figure A-31: Pre-Test Driver Dummy Window View



Figure A-32: Post-Test Driver Dummy Window View



Figure A-33: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-34: Post-Test Driver Dummy and Vehicle Interior View

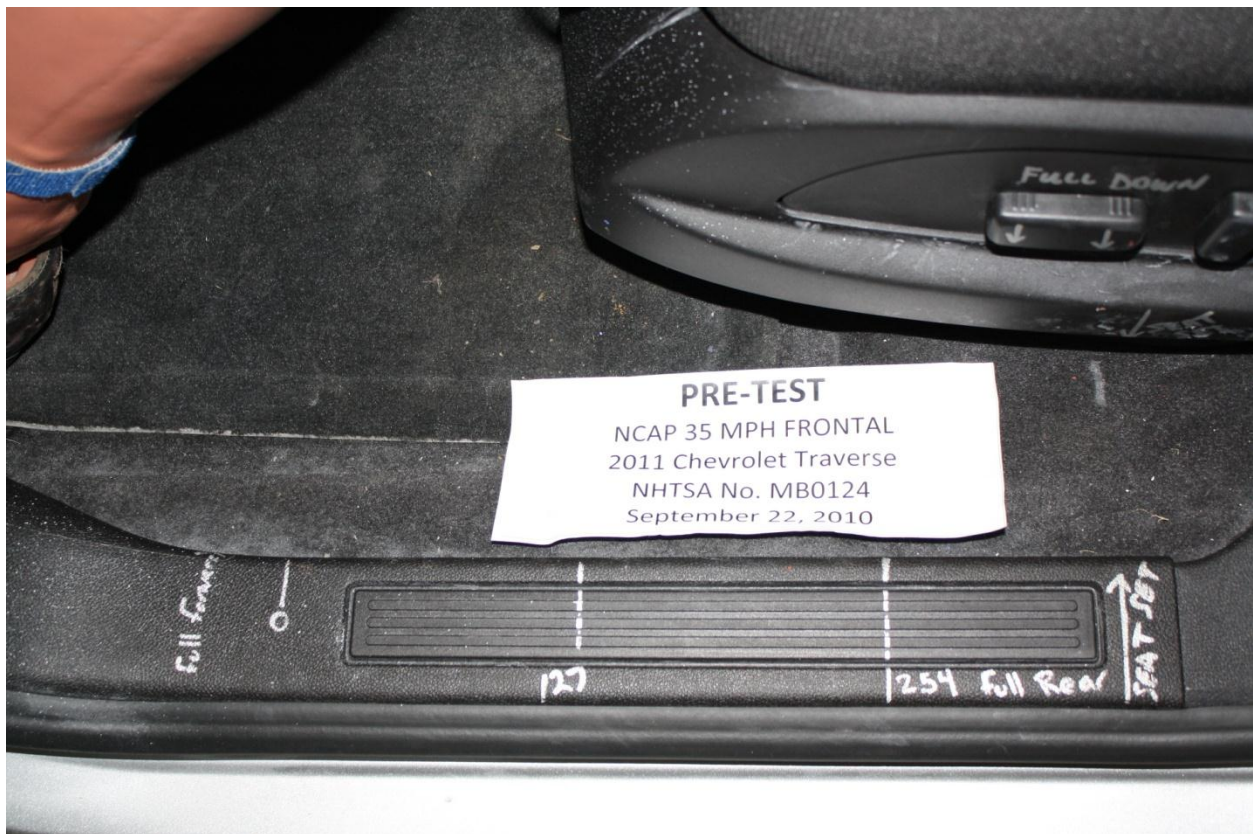


Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

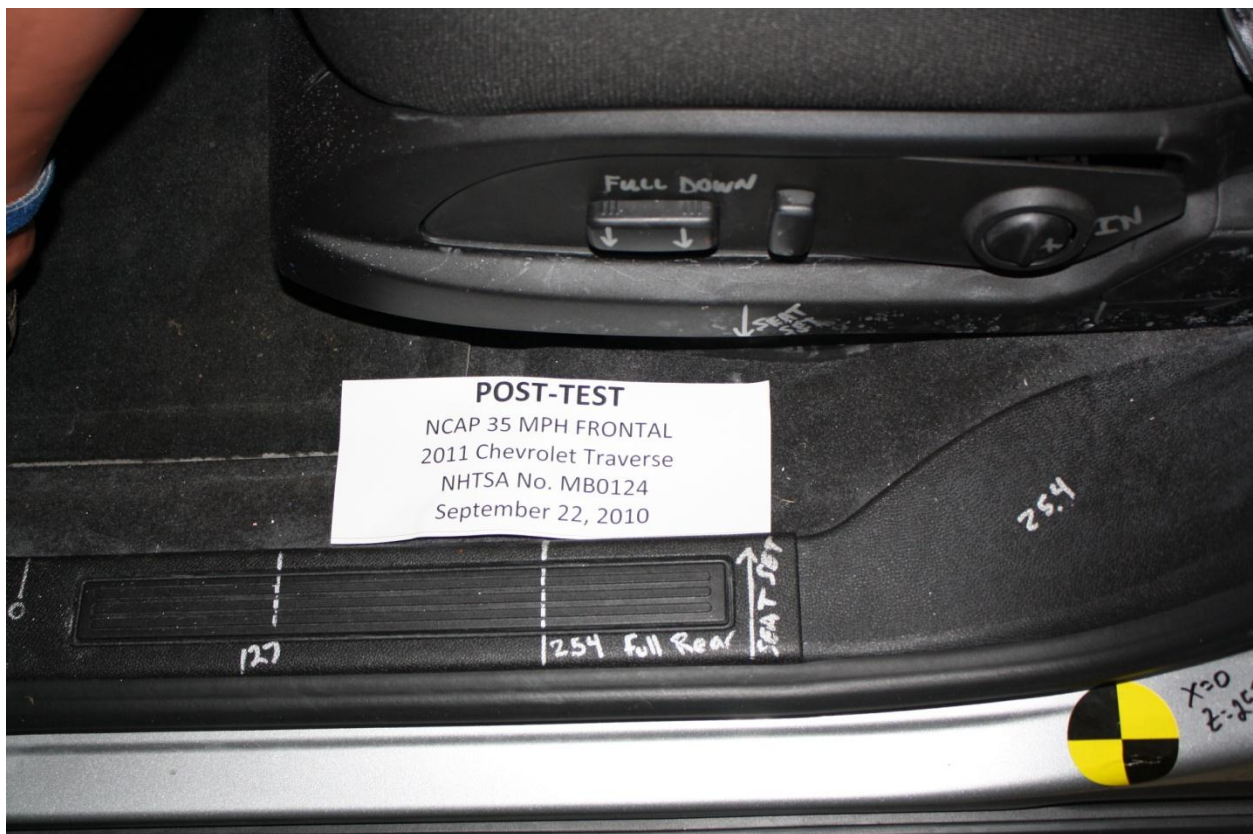


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



Figure A-37: Pre-Test Driver Dummy Feet



Figure A-38: Post-Test Driver Dummy Feet

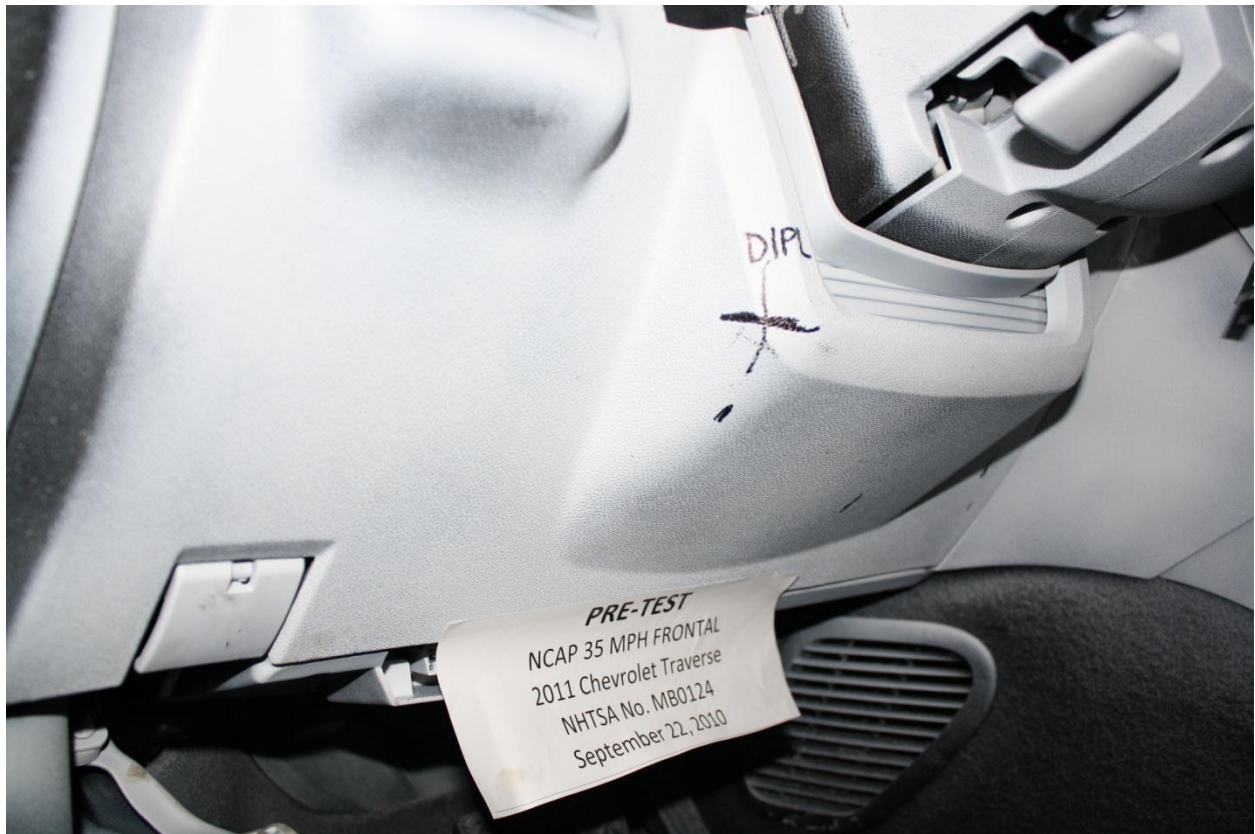


Figure A-39: Pre-Test Driver's Side Knee Bolster



Figure A-40: Post-Test Driver's Side Knee Bolster

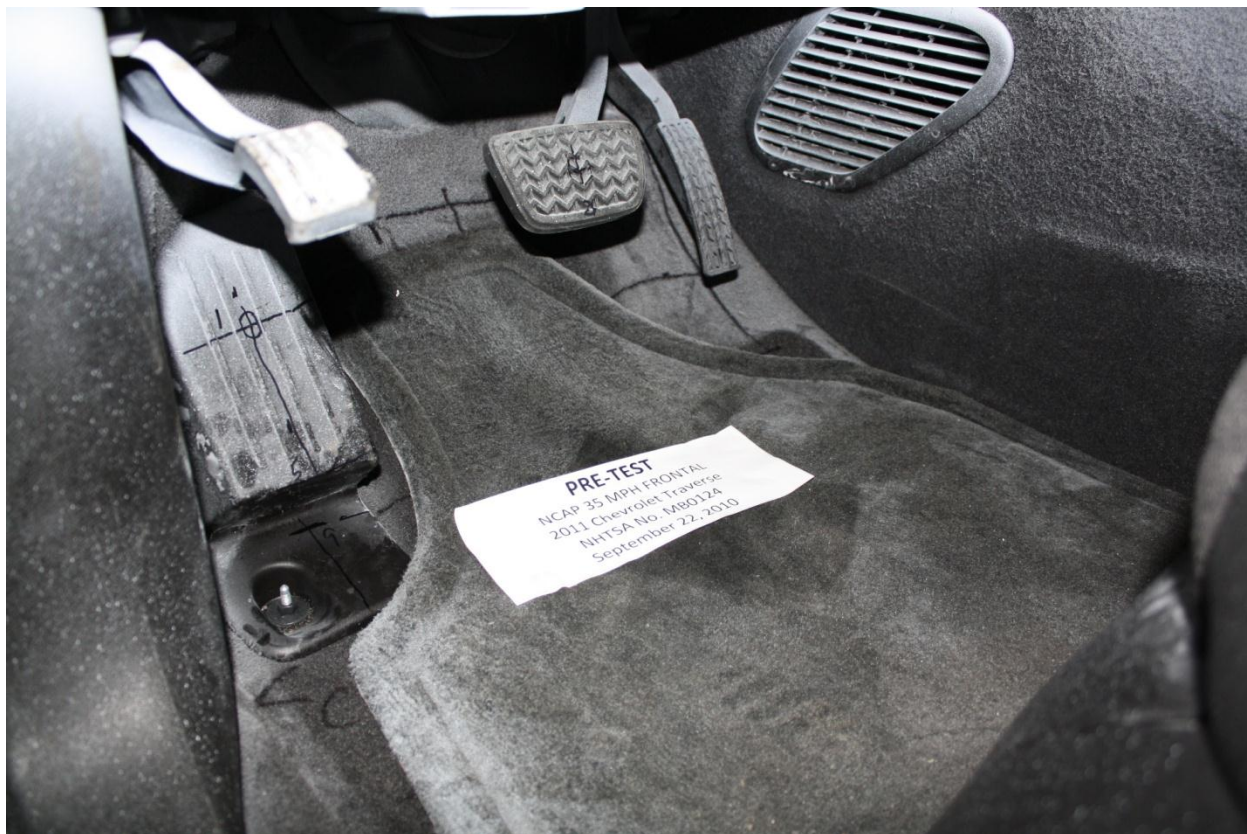


Figure A-41: Pre-Test Driver's Side Floorplan



Figure A-42: Post-Test Driver's Side Floorplan



Figure A-43a: Post-Test Driver Dummy Contact with Airbag



Figure A-43b: Post-Test Driver Dummy Contact with Head Restraint

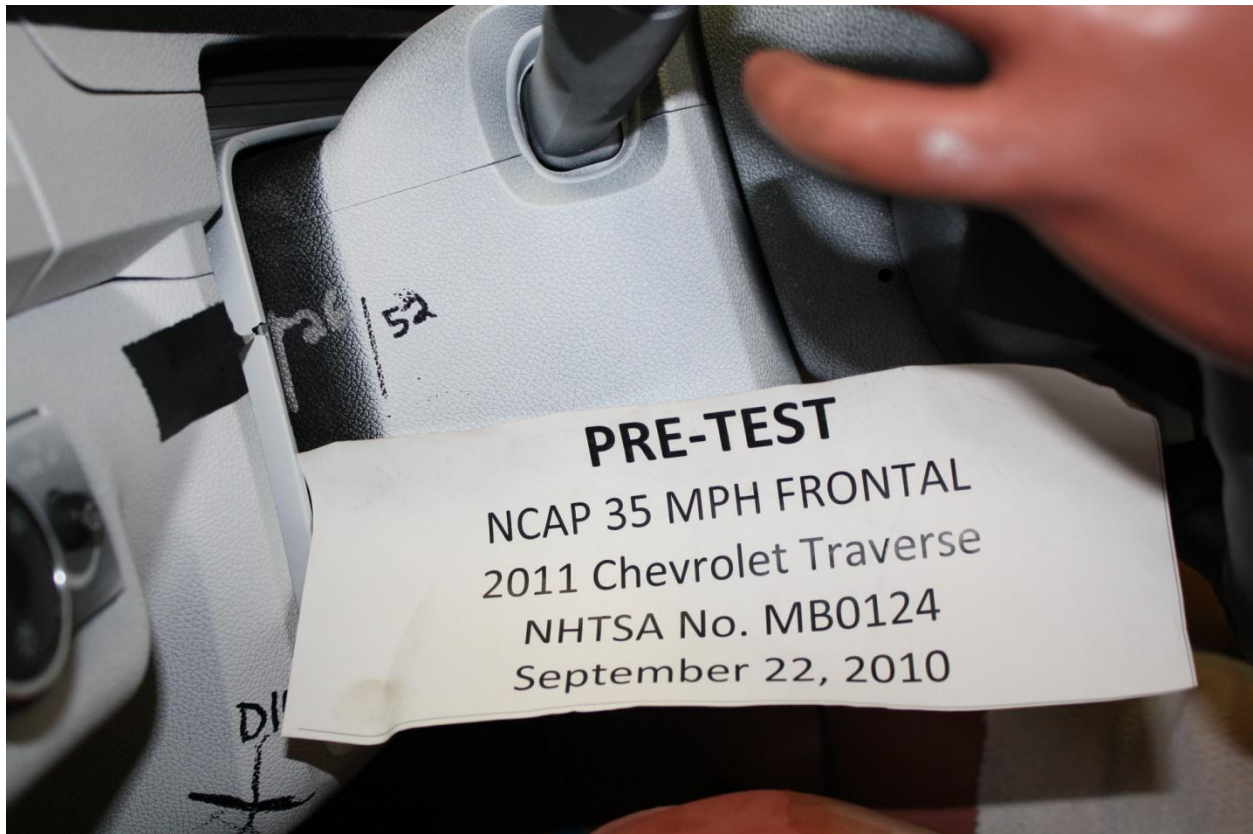


Figure A-44: Pre-Test View of the Steering Column Shear Capsule



Figure A-45: Post-Test View of the Steering Column Shear Capsule



Figure A-46: Pre-Test Passenger Dummy Front View



Figure A-47: Post-Test Passenger Dummy Front View



Figure A-48: Pre-Test Passenger Dummy Window View



Figure A-49: Post-Test Passenger Dummy Window View



Figure A-50: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-51: Post-Test Passenger Dummy and Vehicle Interior View



Figure A-52: Pre-Test Passenger's Seat Fore-Aft Markings



Figure A-53: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-54: Pre-Test Passenger Dummy Feet



Figure A-55: Post-Test Passenger Dummy Feet

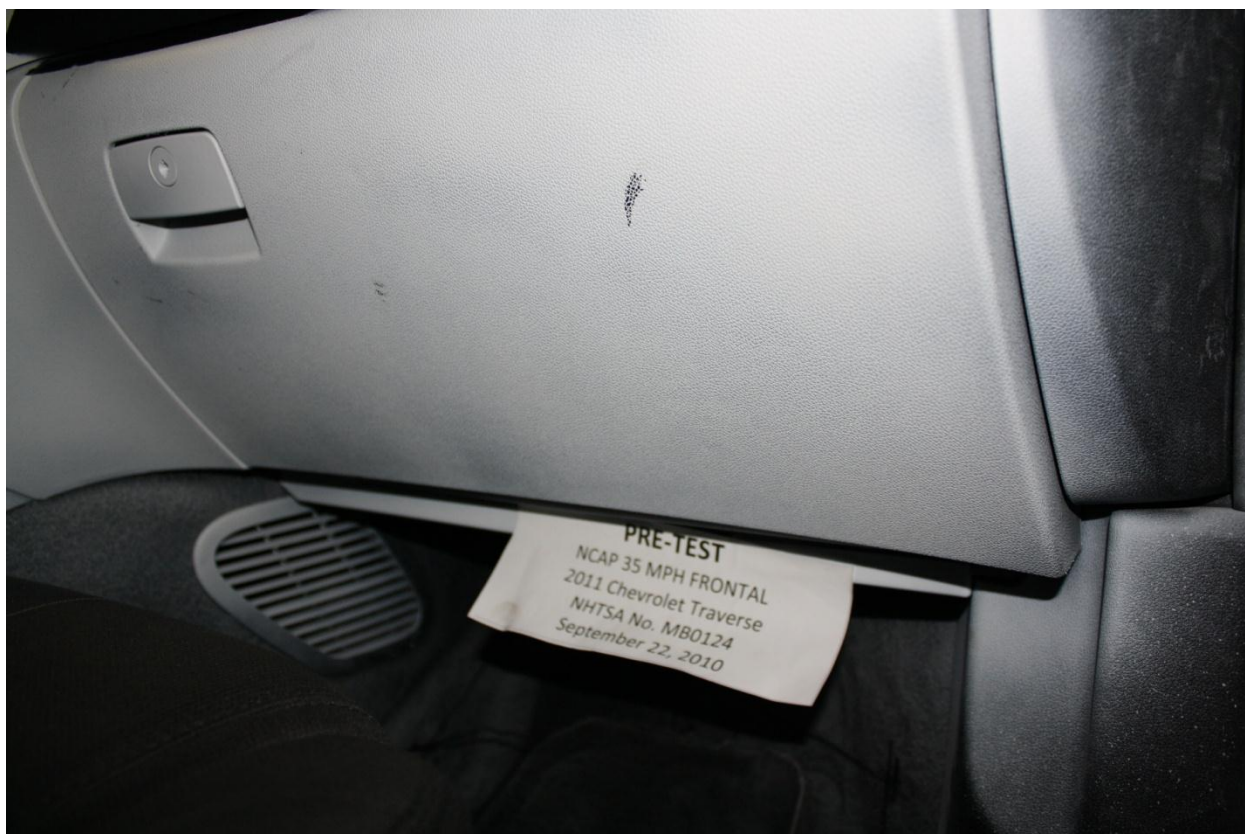


Figure A-56: Pre-Test Passenger's Side Knee Bolster

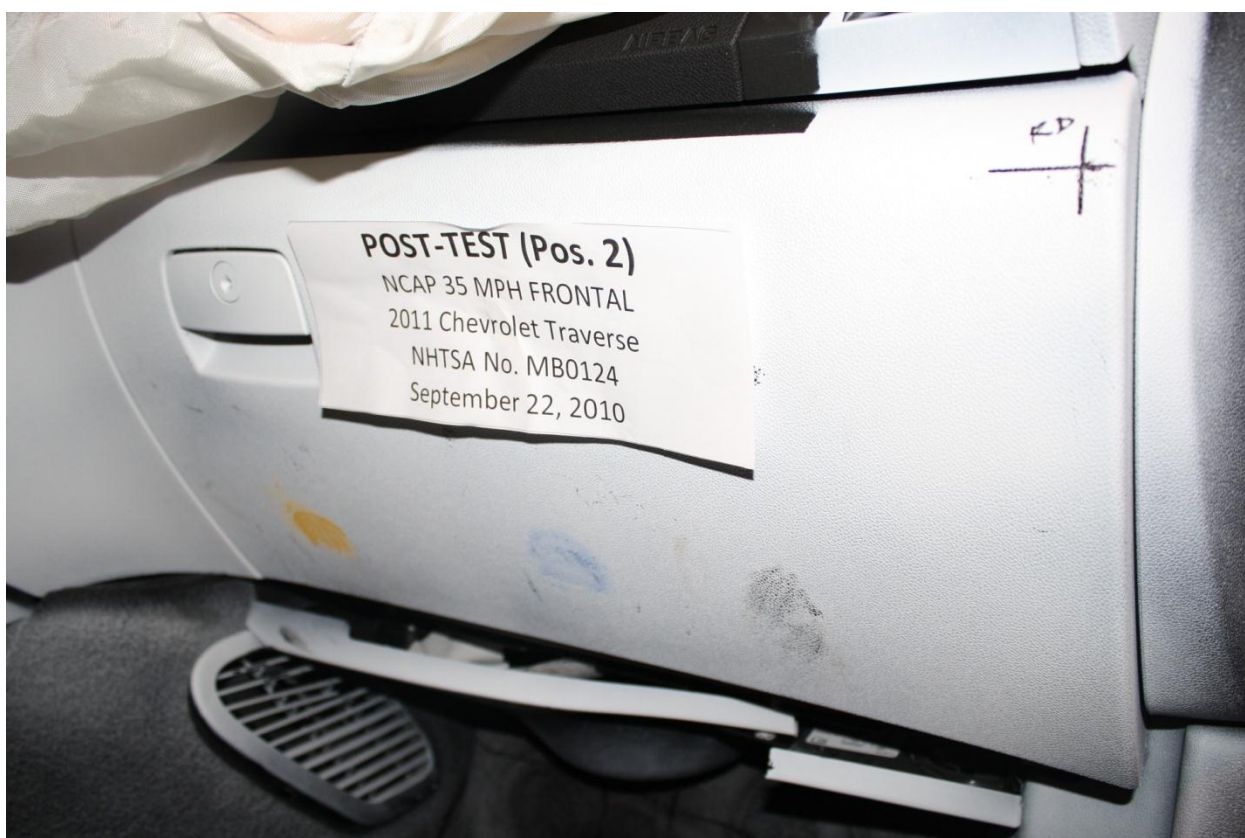


Figure A-57: Post-Test Passenger's Side Knee Bolster



Figure A-58: Pre-Test Passenger's Side Floorplan

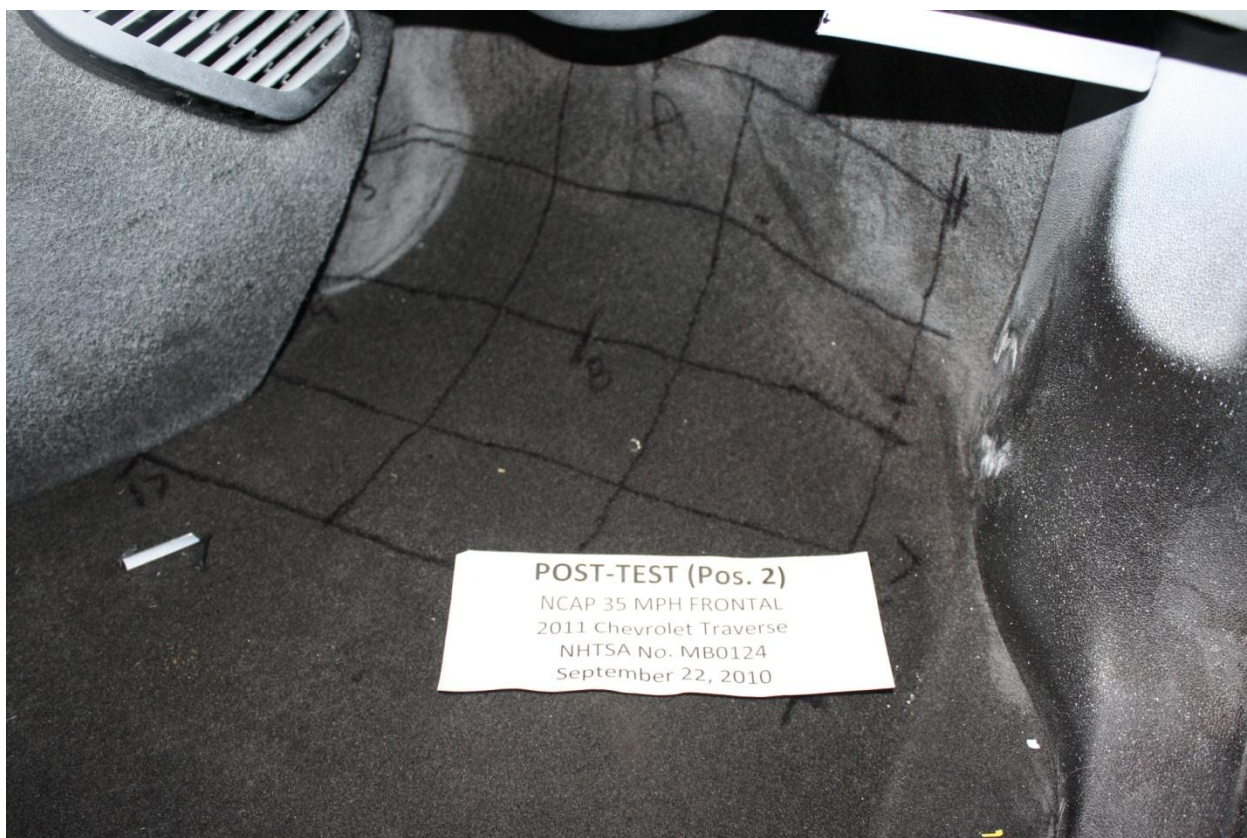


Figure A-59: Post-Test Passenger's Floorplan

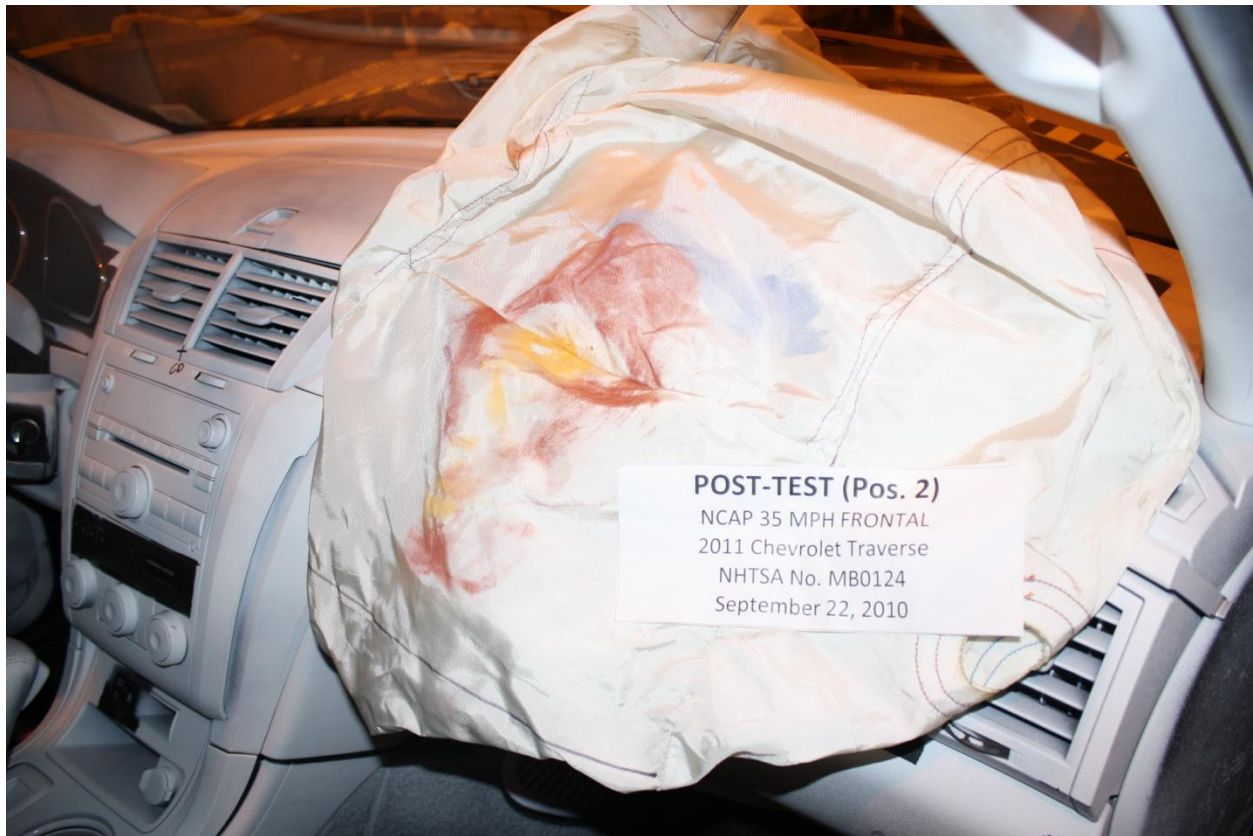


Figure A-60a: Post-Test Passenger Dummy Contact with Airbag



Figure A-60b: Post-Test Passenger Dummy Contact with Head Restraint

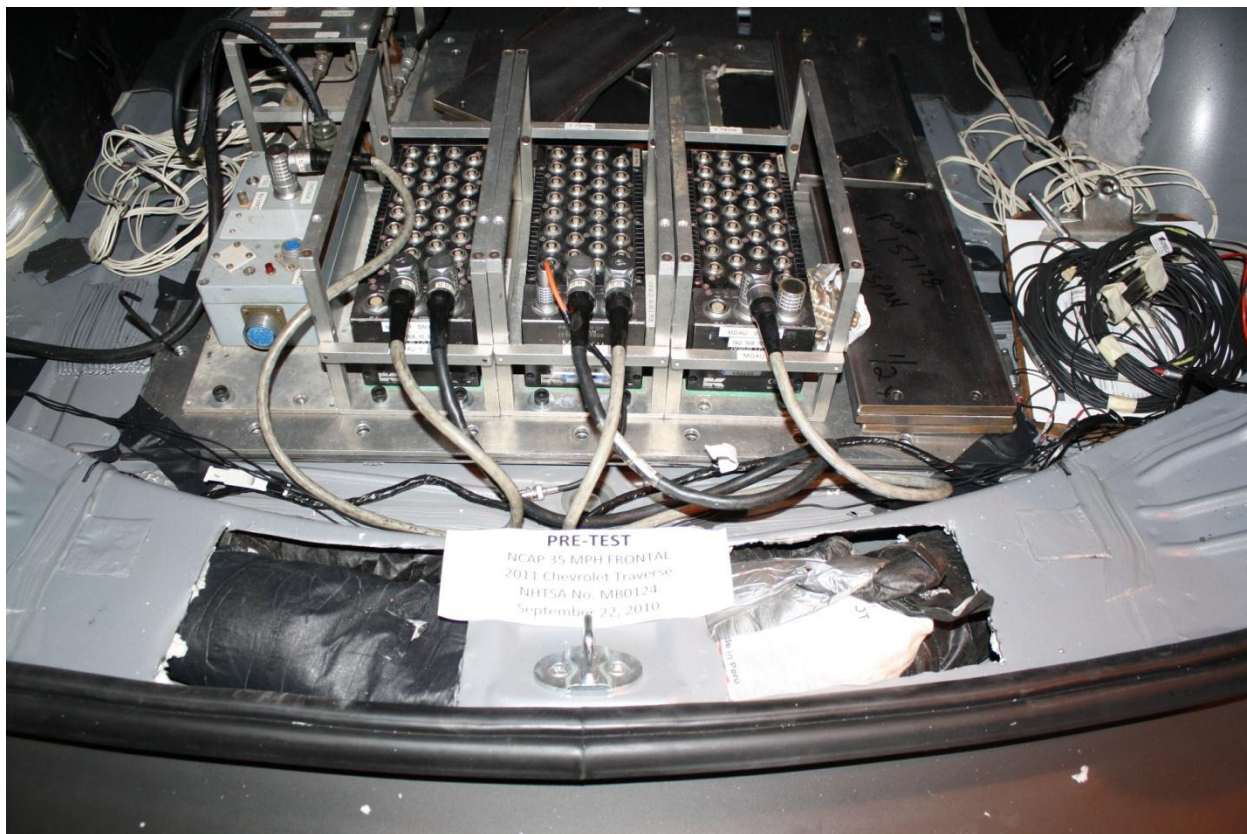


Figure A-61: Photograph of Ballast Installed Vehicle

Photo Not Applicable

Figure A-62: Post-Test Stoddard Solvent Spillage Location View



Figure A-63: Post-Test Speed Trap Read Out



Figure A-64: Vehicle at 0° on Static Rollover Device

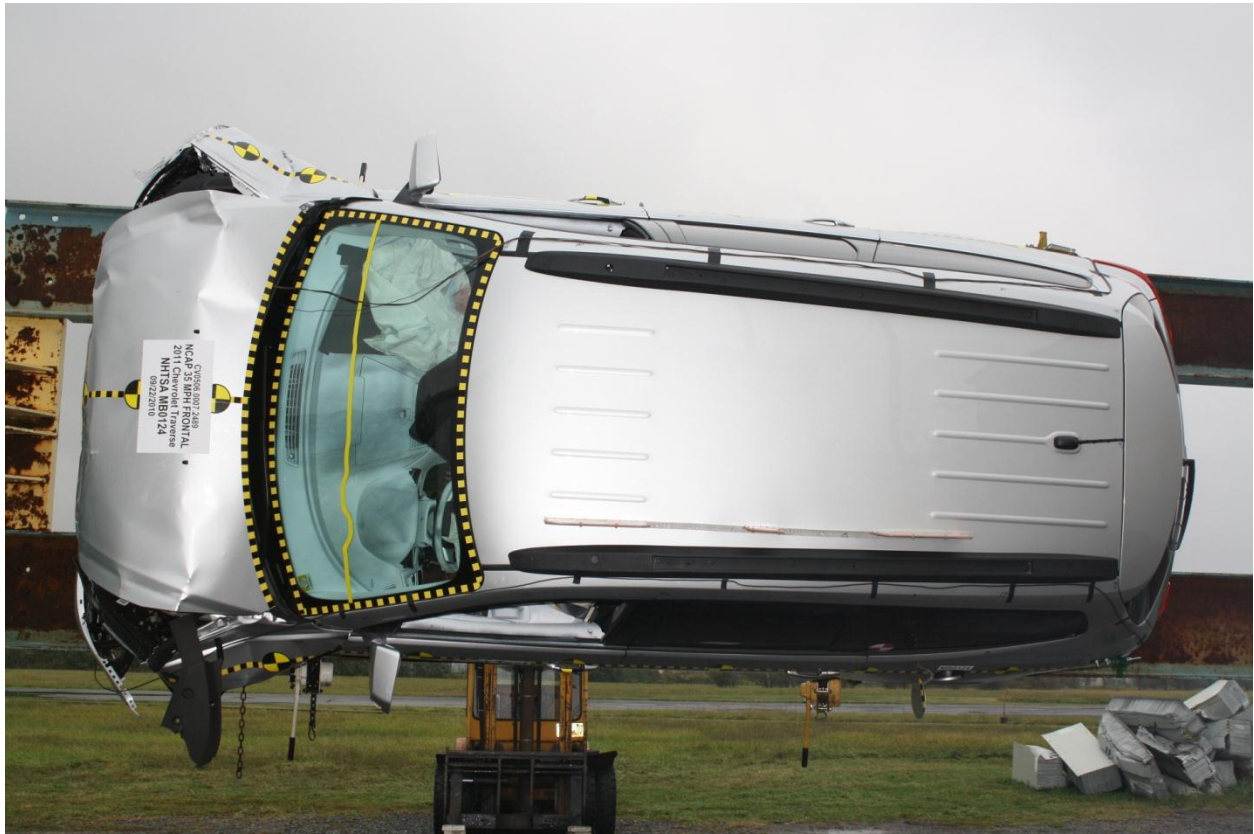


Figure A-65: Vehicle at 90° on Static Rollover Device



Figure A-66: Vehicle at 180° on Static Rollover Device

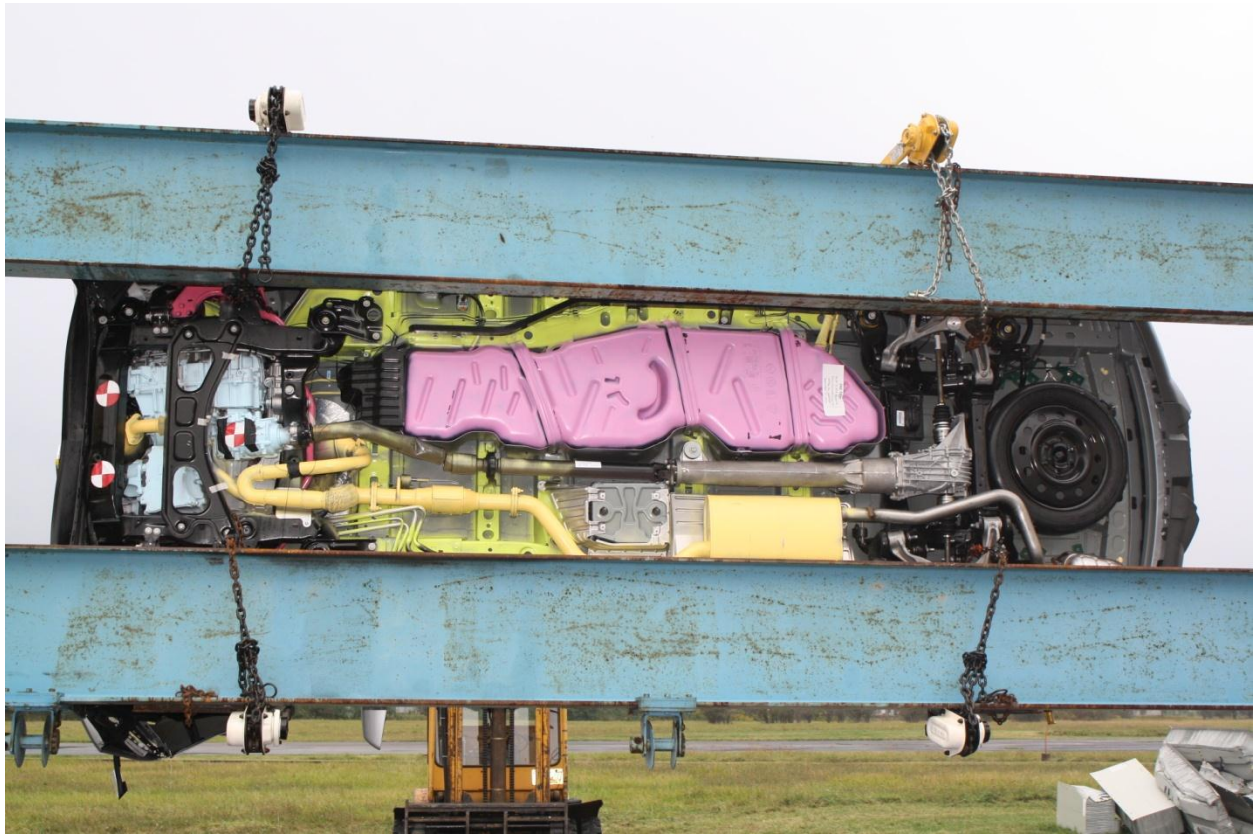


Figure A-67: Vehicle at 270° on Static Rollover Device



Figure A-68: Vehicle at 360° on Static Rollover Device



Figure A-69: Impact Photograph


CHEVROLET.

2011 TRAVERSE AWD 1LT

EXTERIOR: SILVER ICE METALLIC
INTERIOR: EBONY

ENGINE: 3.6L SIDI V6
TRANSMISSION 6-SPEED AUTO

Visit us at www.chevy.com

STANDARD EQUIPMENT		MECHANICAL		SAFETY & SECURITY		EXTERIOR		INTERIOR		OPTIONS & PRICING	
5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY (SEE DEALER FOR DETAILS)		- ENGINE, 3.6L SIDI V6 - TRANSMISSION 6-SPEED AUTO AWD - STEERING, VARIABLE ASSIST - OIL LIFE MONITORING SYSTEM		- ANTILOCK BRAKE SYSTEM - STABILITRAK-STABILITY CONTROL SYSTEM W/ TRACTION CONTROL - TIRE PRESSURE MONITORING SYS - AIR BAGS, DUAL FRONTAL - FRONT SIDE IMPACT AIR BAGS - ALL ROWS - PASSENGER SENSING SYSTEM - CHILD SAFETY LATCH SYSTEM		- REAR LIFTGATE, MANUAL - OUTSIDE MIRRORS, HEATED, BODY COLORED, TURN SIGNAL, MANUAL FOLDING - INTEGRAL SPOTTER MIRROR - BODYSIDE MOLDING, BODY COLOR 18" MACHINED ALUMINUM WHEELS		- REMOTE KEYLESS ENTRY - THEFT DETECTION SYSTEM 6 MTHS ONSTAR DIRECTIONS & CONNECTIONS WITH AUTOMATIC CRASH RESPONSE AND TURN-BY-TURN NAVIGATION (ASK DEALER GEOGRAPHIC COVERAGE) - ULTRASONIC REAR PARKING ASST		- SMART SLIDE 2ND ROW FEATURE - FRONT & REAR AIR CONDITIONING - REAR CARGO STORAGE - STEERING, TILT & TELESCOPING - LEATHER WRAPPED STEERING WHEEL, W/ AUDIO AND CRUISE CONTROLS - AM/FM STEREO CD PLAYER - XM RADIO - SERVICE SUBSCRIPTION SOLD SEPARATELY BY SUBSUN AFTER 3 MONTHS	
STANDARD VEHICLE PRICE \$33,865.00						MANUFACTURER'S SUGGESTED RETAIL PRICE STANDARD EQUIPMENT SHOWN					
REARVIEW CAMERA SYSTEM W/ AUTO-DIMMING INSIDE REARVIEW MIRROR 450.00						TOTAL OPTIONS \$945.00 TOTAL VEHICLE & OPTIONS \$34,810.00 DESTINATION CHARGE 775.00 TOTAL VEHICLE PRICE* \$35,585.00					

EPA Fuel Economy Estimates

CITY MPG

16

Expected range for most drivers
13 to 19 MPG

Estimated Annual Fuel Cost
\$2,051

based on 15,000 miles at \$2.60 per gallon

HIGHWAY MPG

23

Expected range for most drivers
19 to 27 MPG

Combined Fuel Economy

This Vehicle **19**

All SUVs 10 to 32

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

GOVERNMENT SAFETY RATINGS

Crash Type	Driver Passenger	Not Rated
Frontal Crash	Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.	Not Rated
Side Crash	Star ratings based on the risk of injury in a side impact.	Not Rated
Rollover	Star ratings based on the risk of rollover in a single vehicle crash.	★★★★★

Star rating range from 1 to 5 stars (★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 75%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

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

© 2010 General Motors LLC
SALES PRICE 2010-0001-0000

ORDER NO. N200P01 SALES CODE E
 SALES MODEL CODE CY-420
 DEALER NO. 12006
 VIN: 1GKYGED0B128564
 (SALES TO WHOLESALE DEalers)
 JOE BASIL CHEVROLET, INC.
 5111 TRANSIT RD
 DEEREN, NY 14043-4466

DV
1QA0603113

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

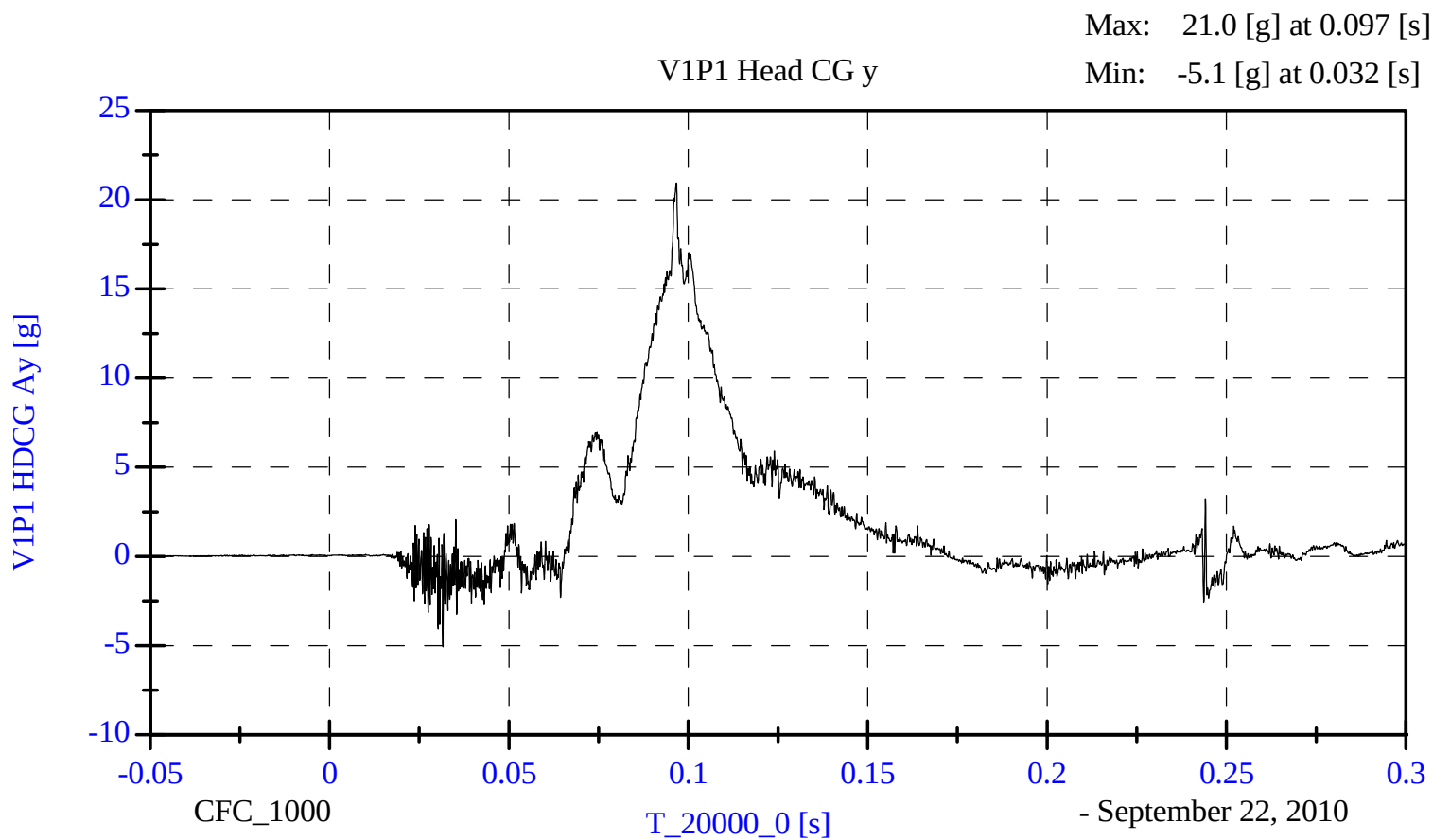
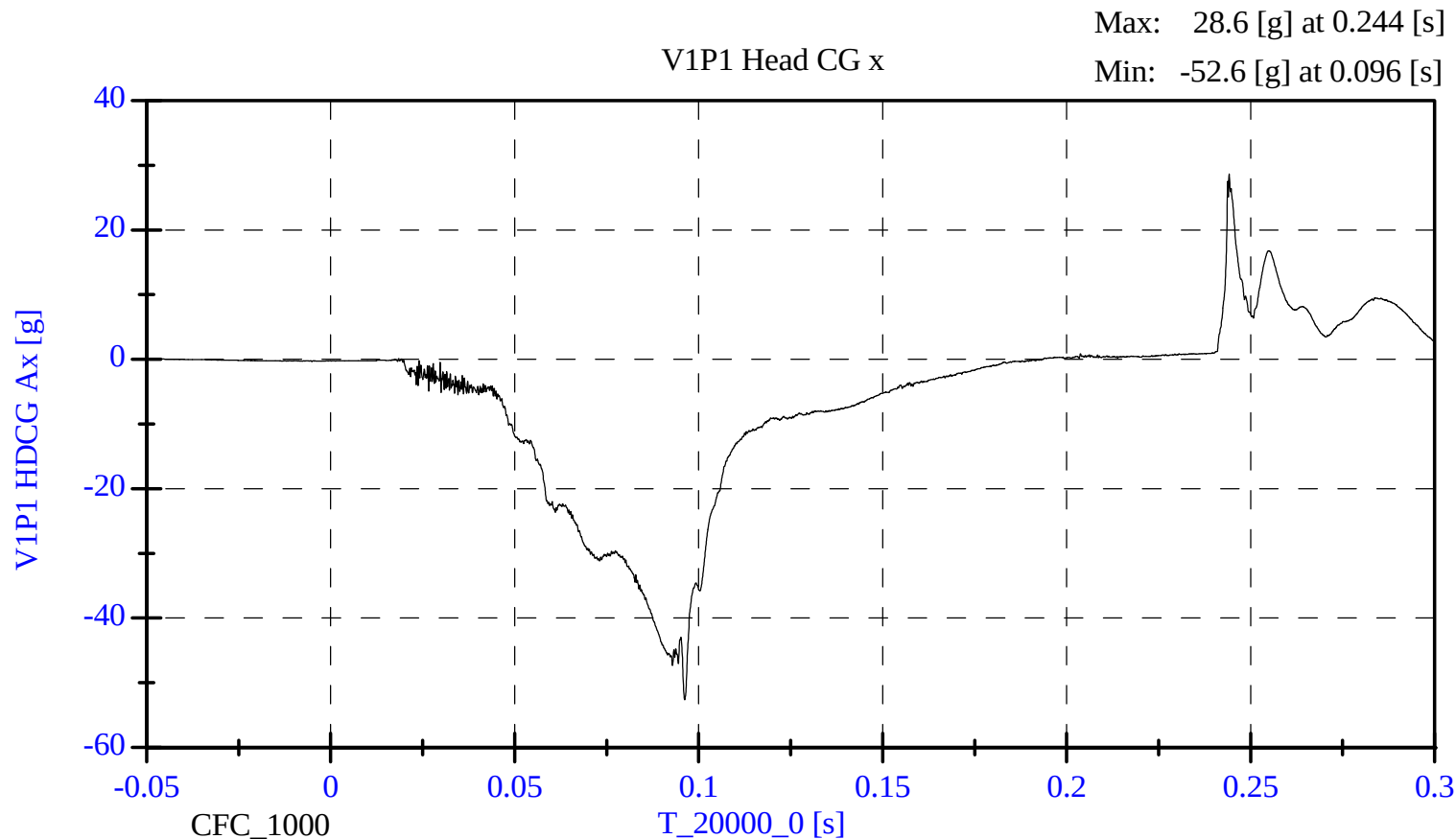
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary	B-8
8	Driver Chest Z Acceleration vs. Time Primary	B-8
9	Driver Chest Resultant Acceleration vs. Time Primary	B-9
10	Driver Upper Neck Force X vs. Time Primary	B-9
11	Driver Upper Neck Force Z vs. Time Primary	B-10
12	Driver Upper Neck Moment Y vs. Time Primary	B-10
13	Driver Nij vs. Time Primary	B-11
14	Driver Left Femur Force vs. Time	B-11
15	Driver Right Femur Force vs. Time	B-12
16	Passenger Head X Acceleration vs. Time Primary	B-12
17	Passenger Head Y Acceleration vs. Time Primary	B-13
18	Passenger Head Z Acceleration vs. Time Primary	B-13
19	Passenger Head Resultant Acceleration vs. Time Primary	B-14
20	Passenger Chest X Deflection vs. Time	B-14
21	Passenger Chest X Acceleration vs. Time Primary	B-15
22	Passenger Chest Y Acceleration vs. Time Primary	B-15
23	Passenger Chest Z Acceleration vs. Time Primary	B-16
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-16
25	Passenger Upper Neck Force X vs. Time Primary	B-17
26	Passenger Upper Neck Force Z vs. Time Primary	B-17
27	Passenger Upper Neck Moment Y vs. Time Primary	B-18
28	Passenger Nij vs. Time Primary	B-18

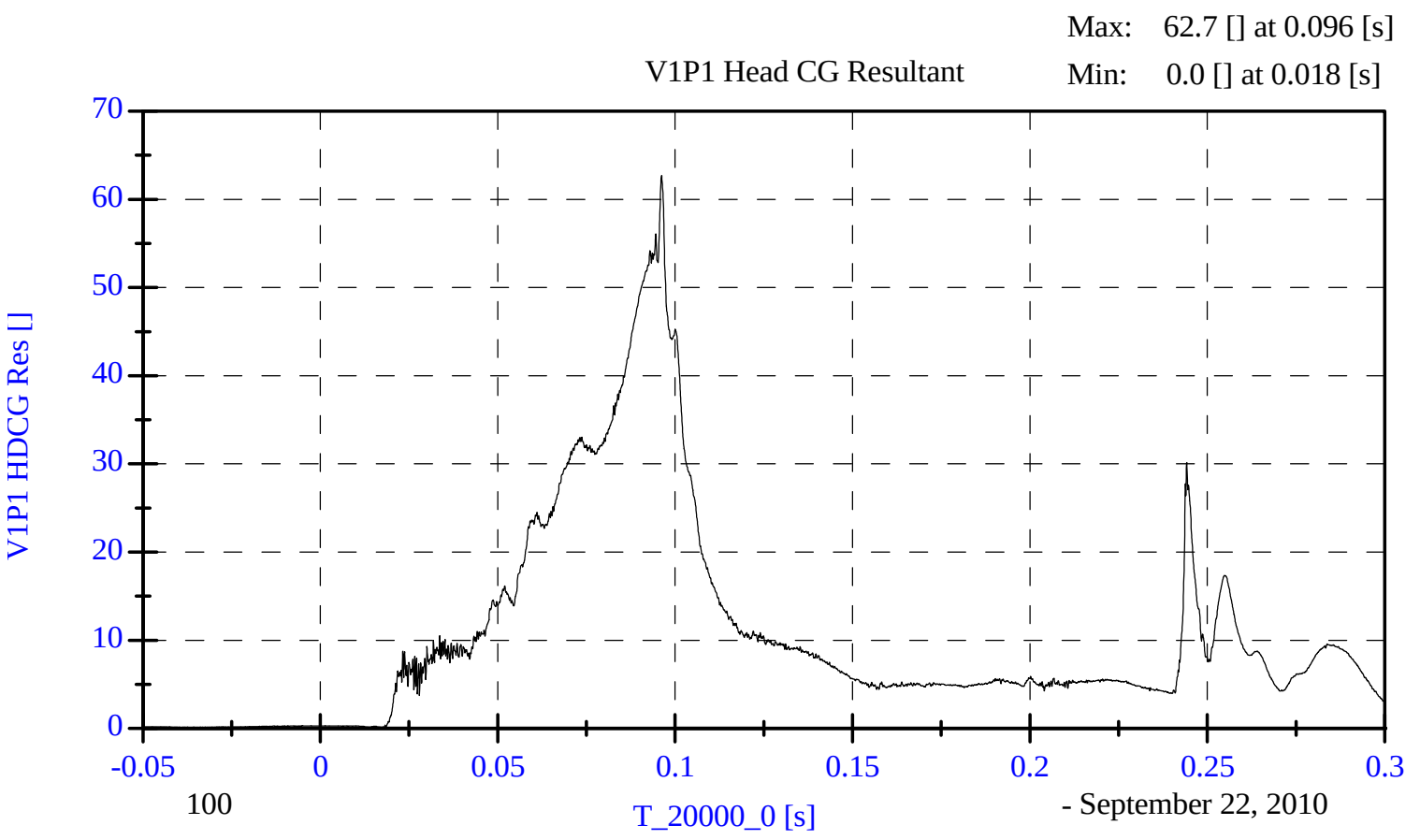
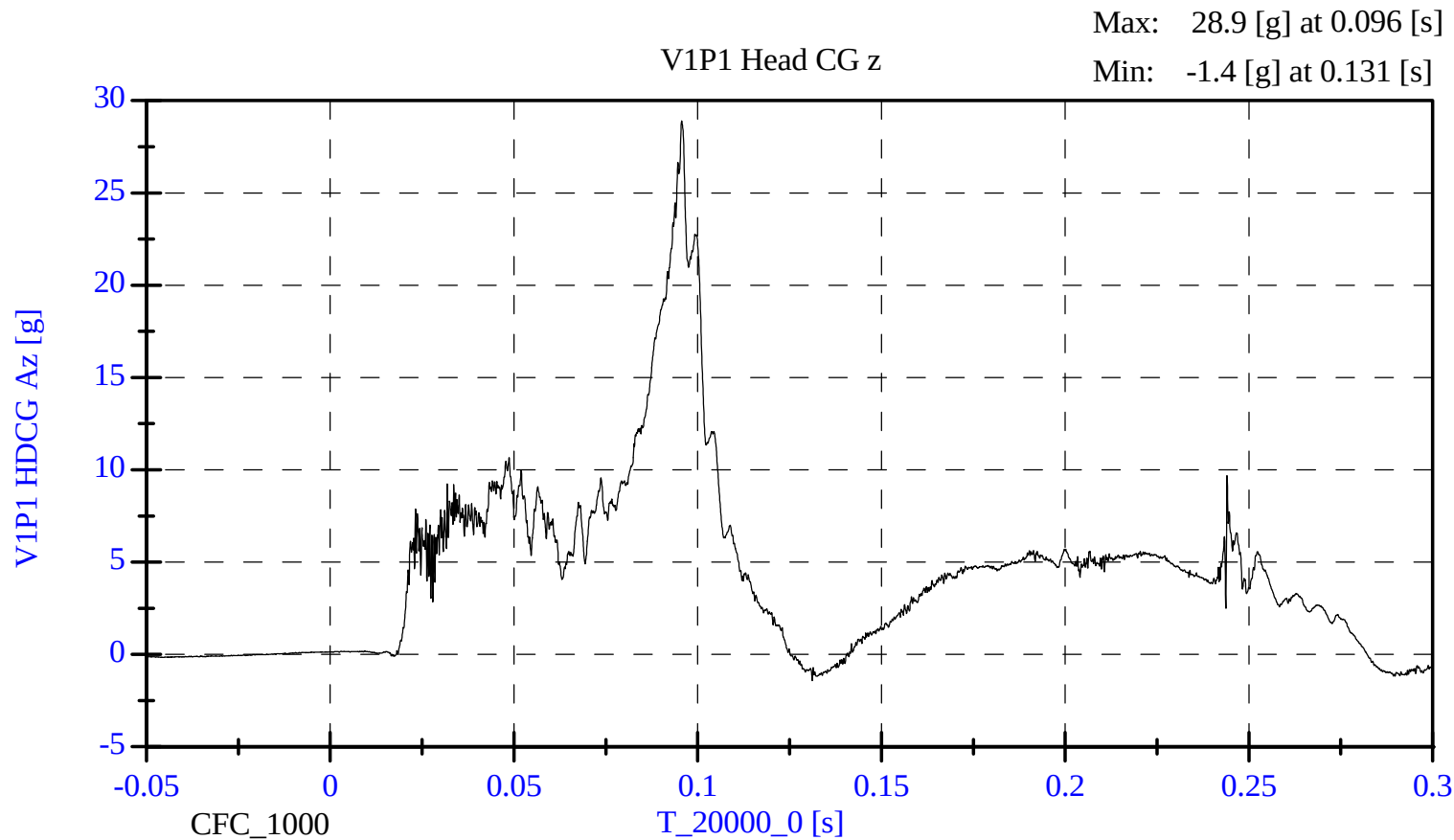
29	Passenger Left Femur Force vs. Time	B-19
30	Passenger Right Femur Force vs. Time	B-19

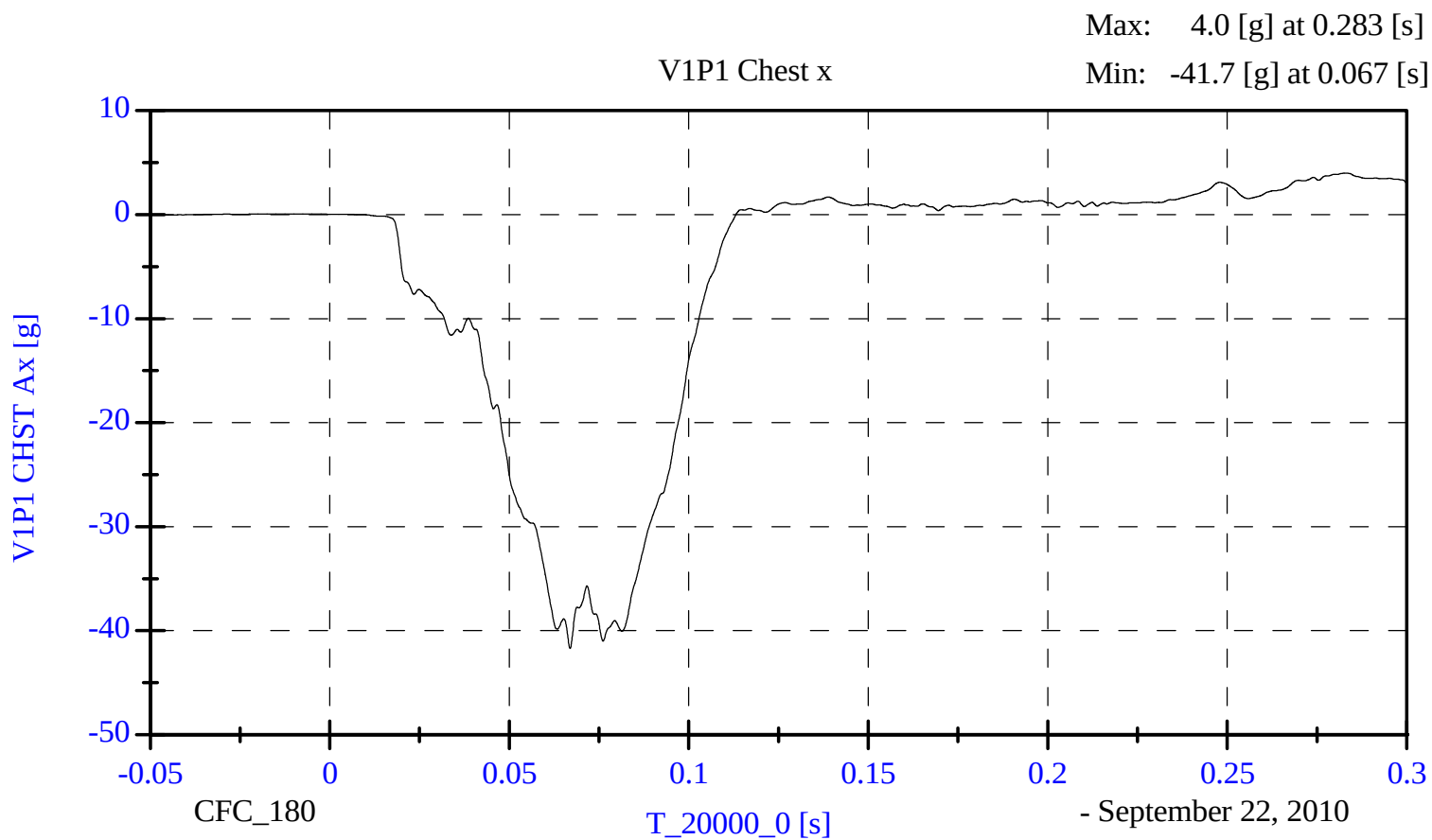
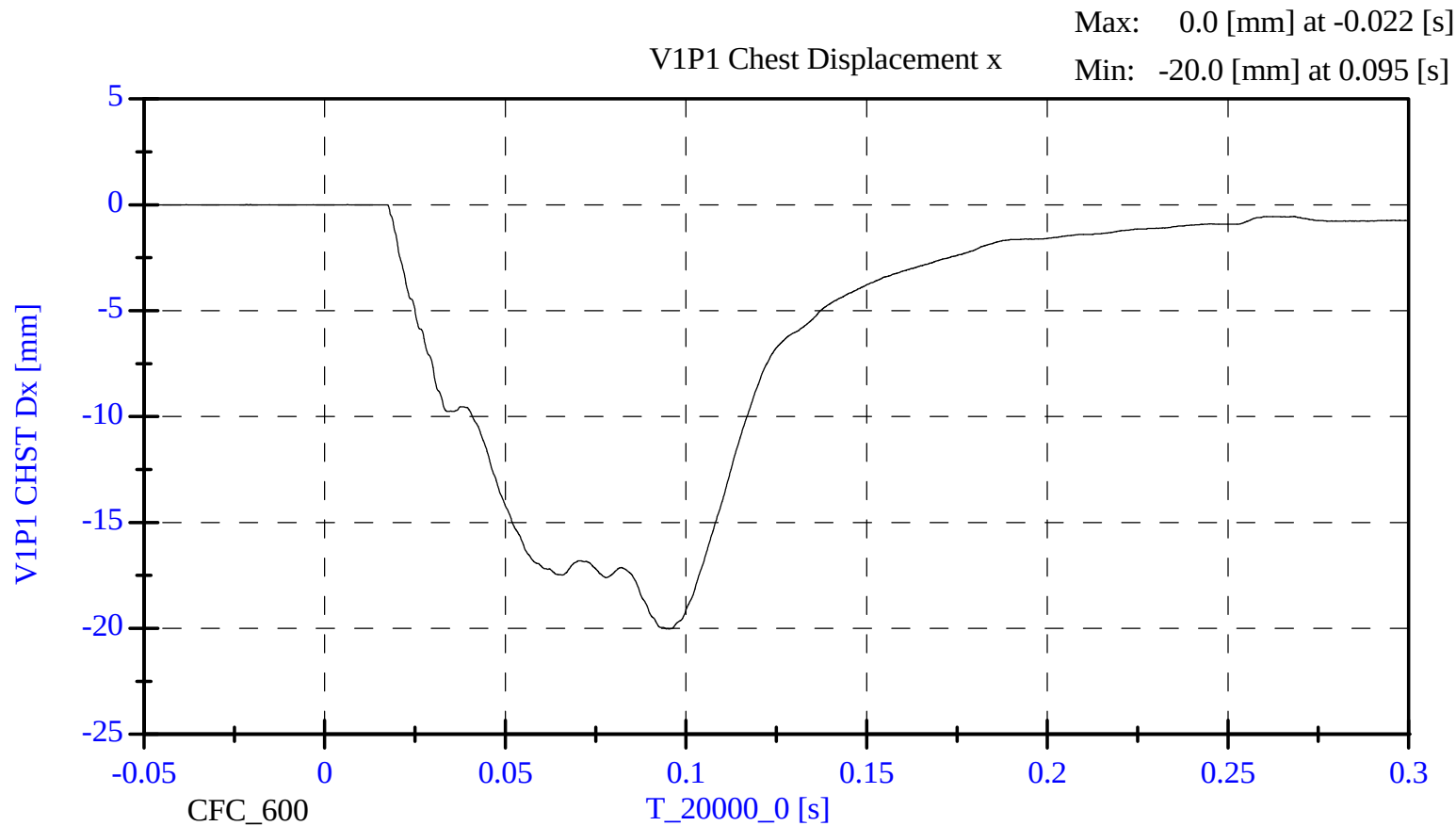
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head X Acceleration Redundant
 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest Z Acceleration Redundant
 Driver Pelvis X
 Driver Pelvis Y
 Driver Pelvis Z
 Driver Shoulder Belt Force
 Driver Lap Belt Force
 Driver Left Upper Tibia Moment X
 Driver Left Upper Tibia Moment Y
 Driver Left Upper Tibia Force Z
 Driver Left Lower Tibia Moment X
 Driver Left Lower Tibia Moment Y
 Driver Left Lower Tibia Force Z
 Driver Right Upper Tibia Moment X
 Driver Right Upper Tibia Moment Y
 Driver Right Upper Tibia Force Z
 Driver Right Lower Tibia Moment X
 Driver Right Lower Tibia Moment Y
 Driver Right Lower Tibia Force Z
 Driver Left Foot Fore Z
 Driver Left Foot Aft X
 Driver Left Foot Aft Z
 Driver Right Foot Fore Z
 Driver Right Foot Aft X
 Driver Right Foot Aft Z
 Passenger Head X Acceleration Redundant
 Passenger Head Y Acceleration Redundant
 Passenger Head Z Acceleration Redundant
 Passenger Upper Neck Force X
 Passenger Upper Neck Force Z
 Passenger Upper Neck Moment Y
 Passenger Chest X Acceleration Redundant
 Passenger Chest Y Acceleration Redundant
 Passenger Chest Z Acceleration Redundant
 Passenger Pelvis X
 Passenger Pelvis Y
 Passenger Pelvis Z
 Passenger Shoulder Belt Force
 Passenger Lap Belt Force
 Passenger Left Upper Tibia Moment X
 Passenger Left Upper Tibia Moment Y
 Passenger Left Upper Tibia Force Z
 Passenger Left Lower Tibia Moment X
 Passenger Left Lower Tibia Moment Y

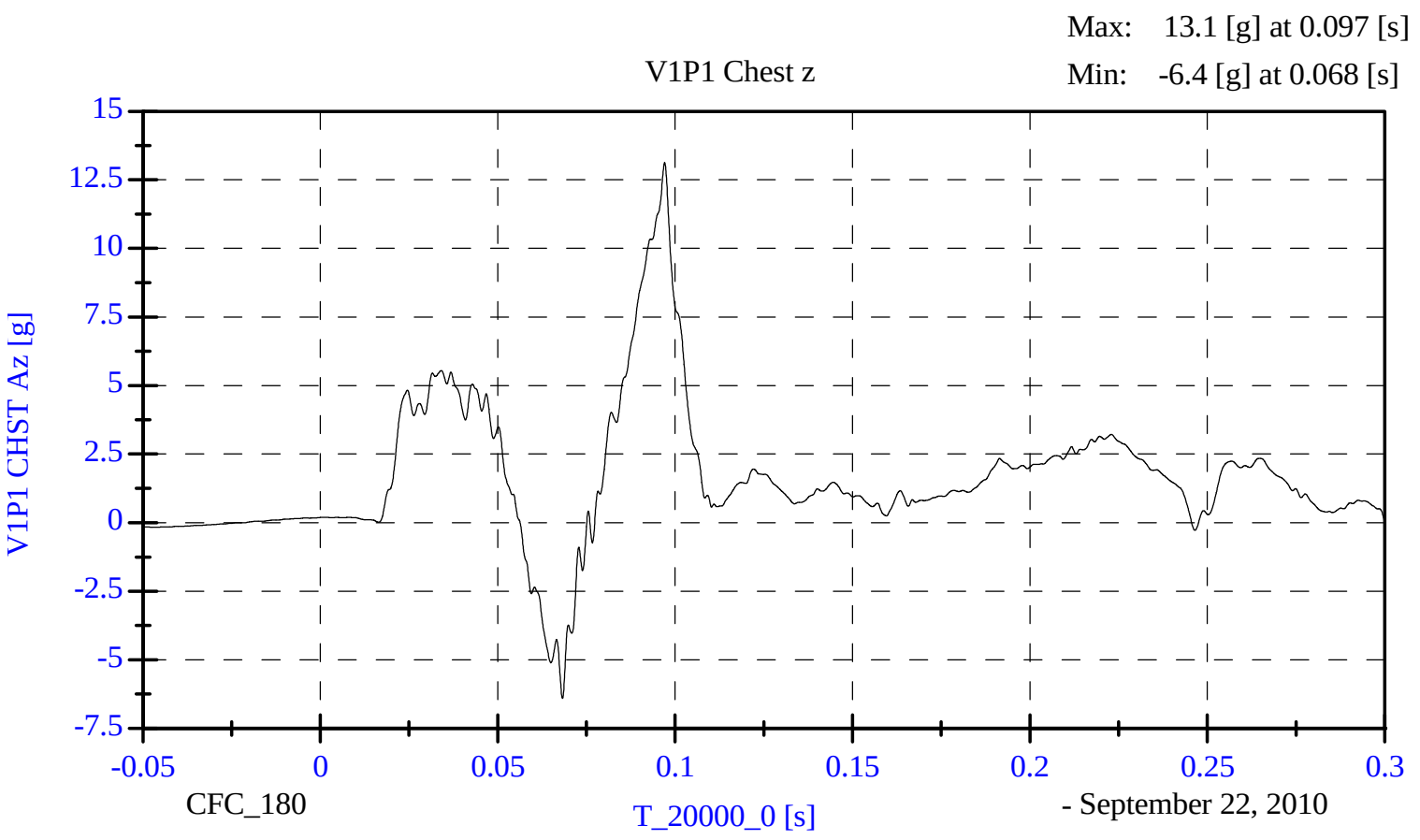
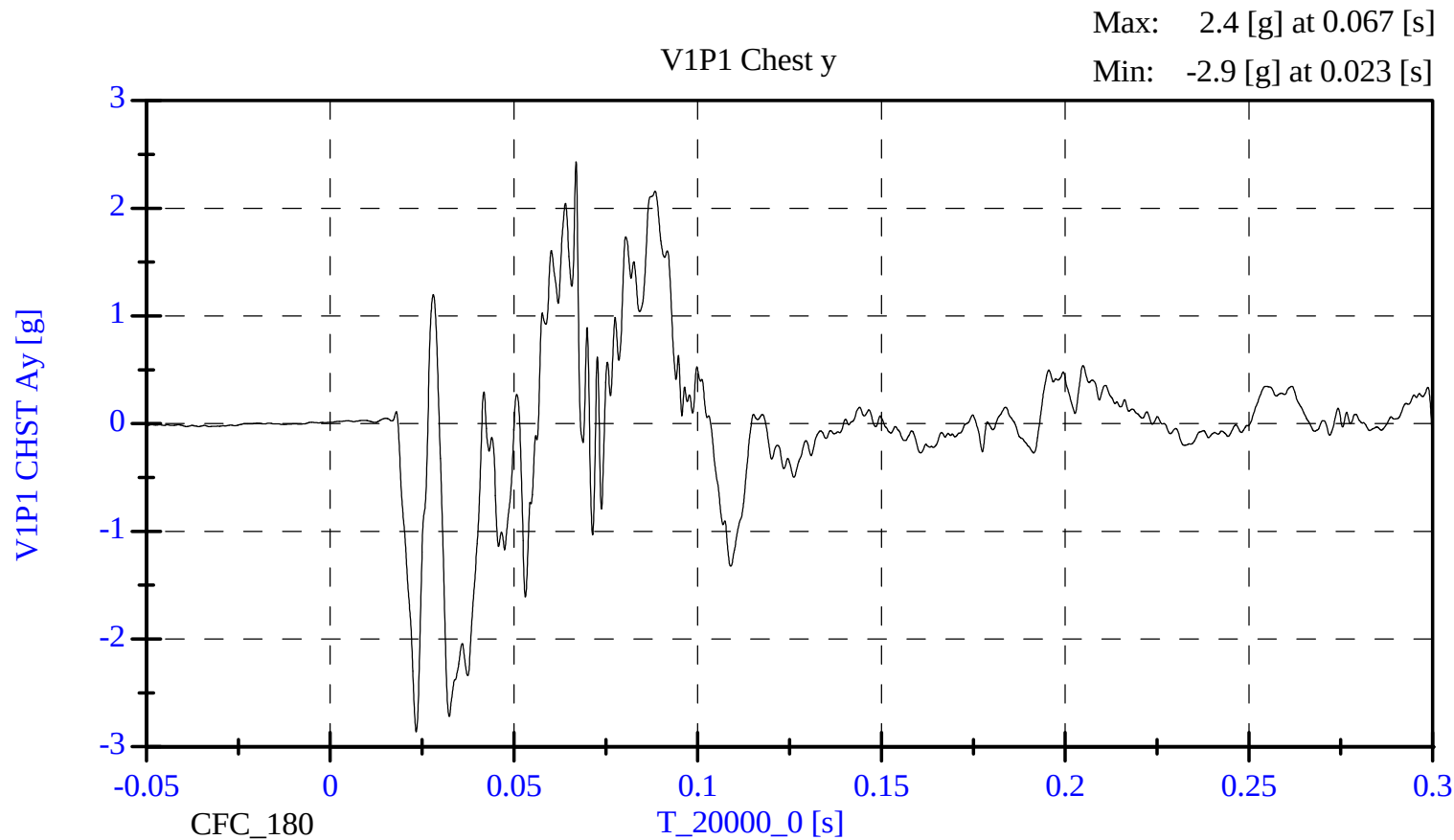
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-A9
Load Cell Barrier C1-A9
Load Cell Barrier D1-A9

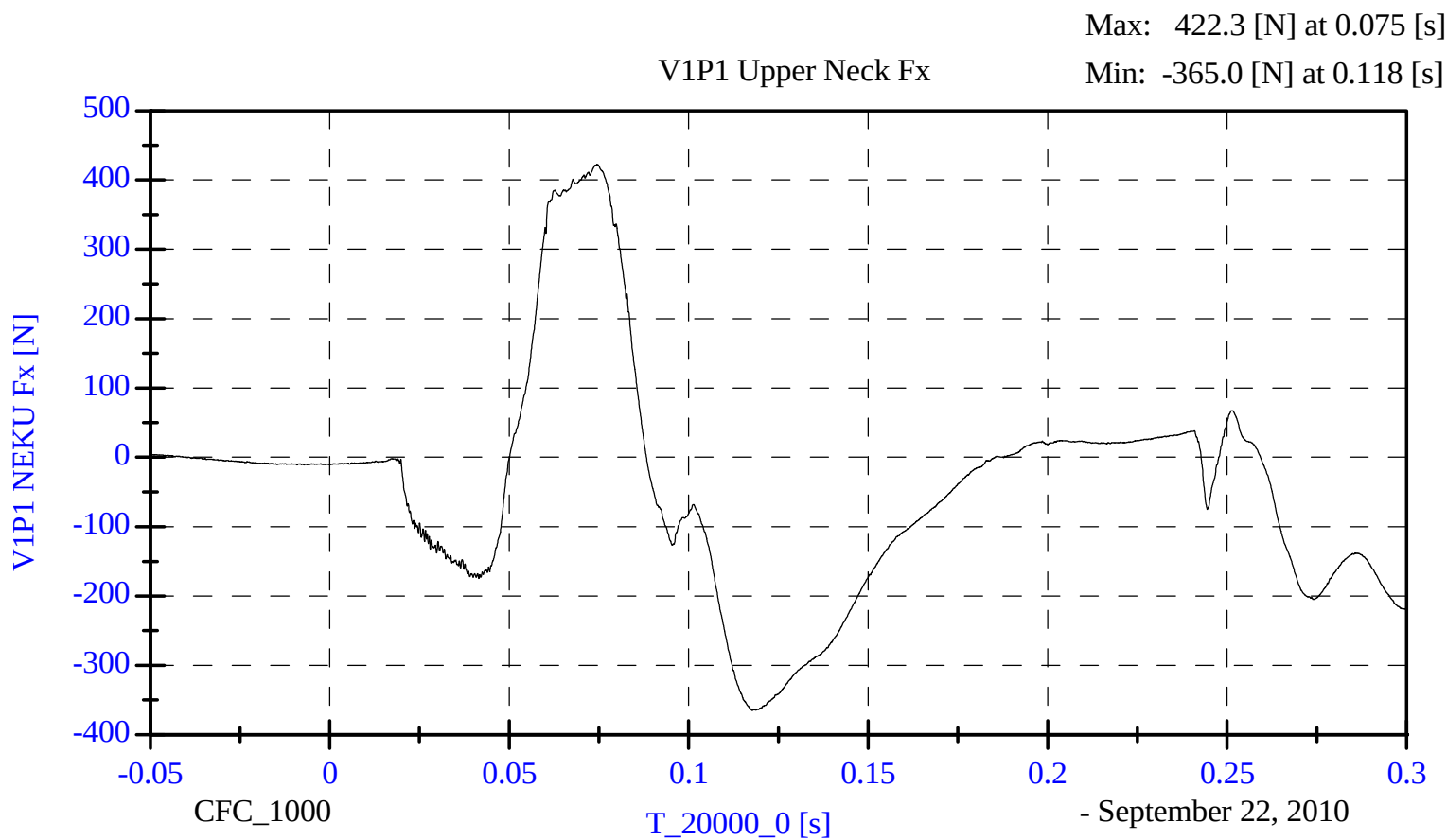
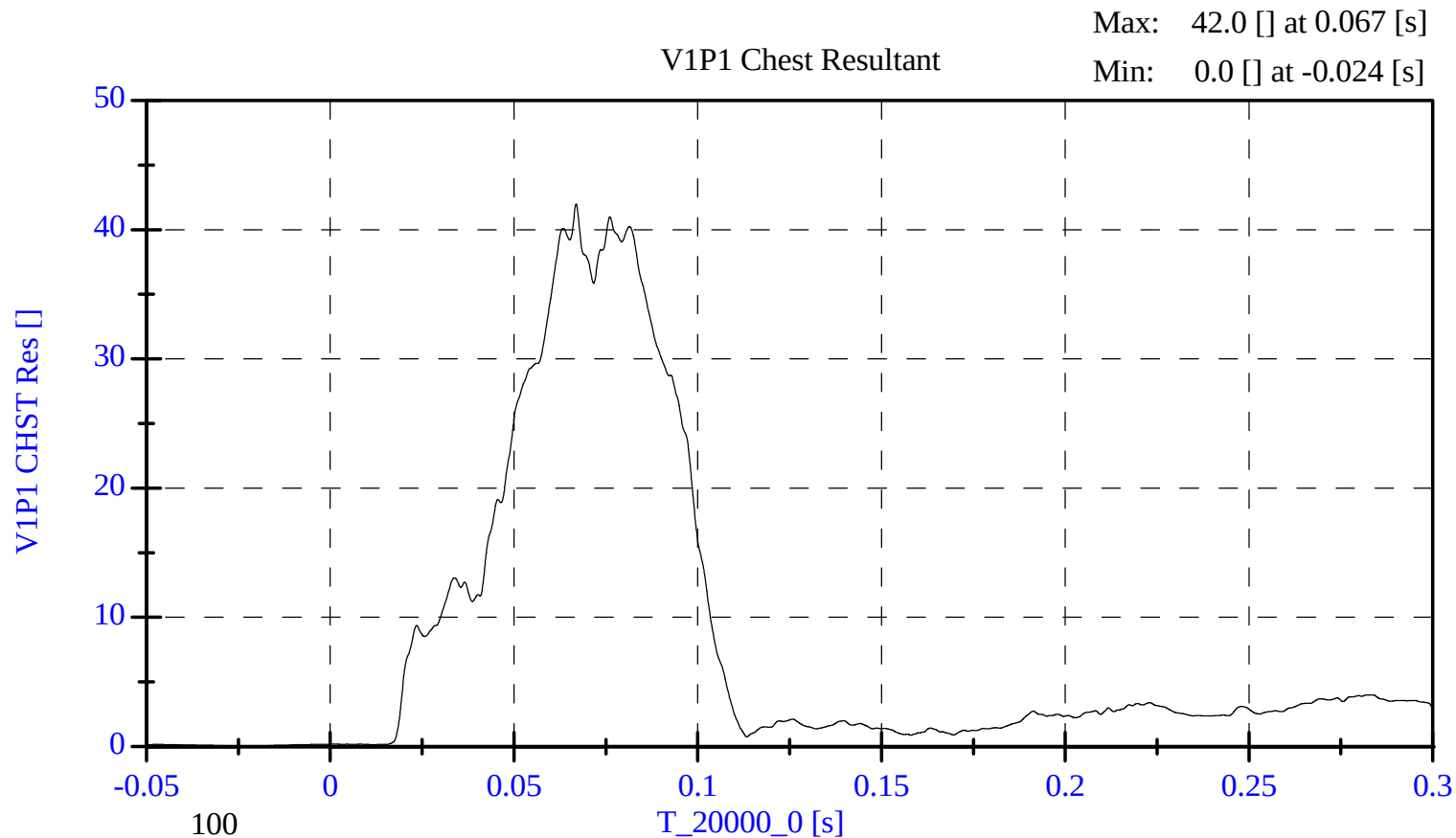


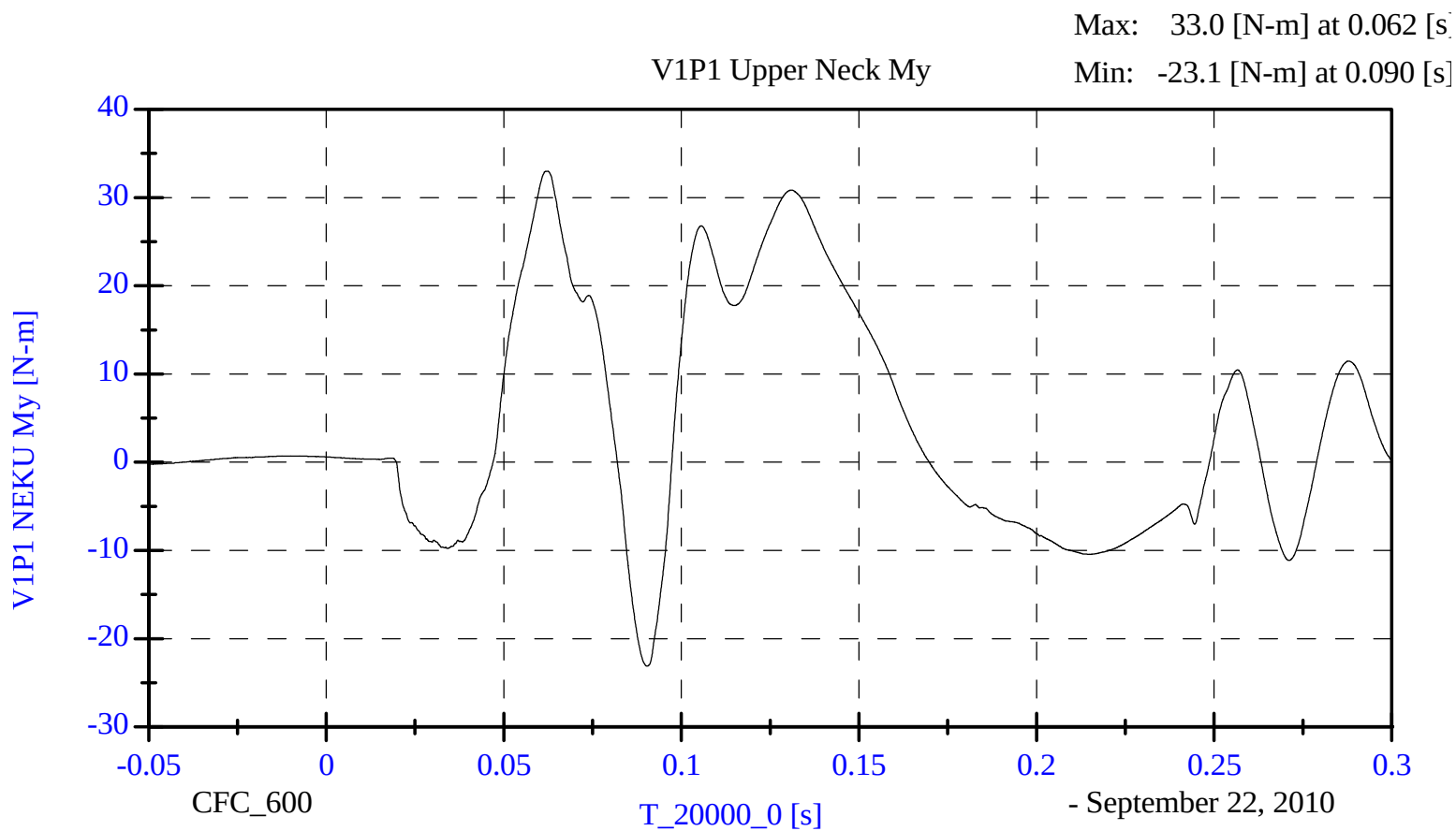
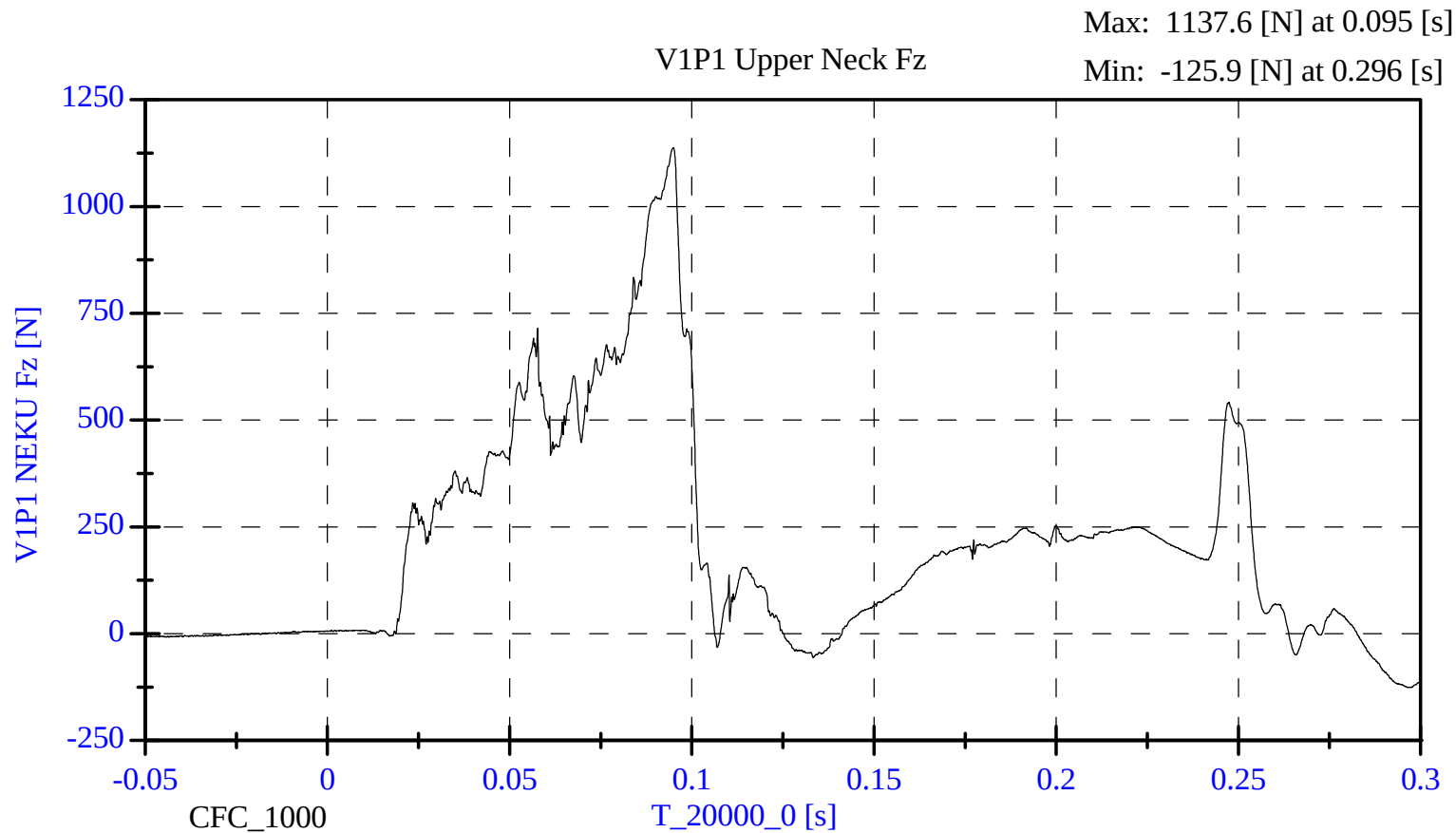


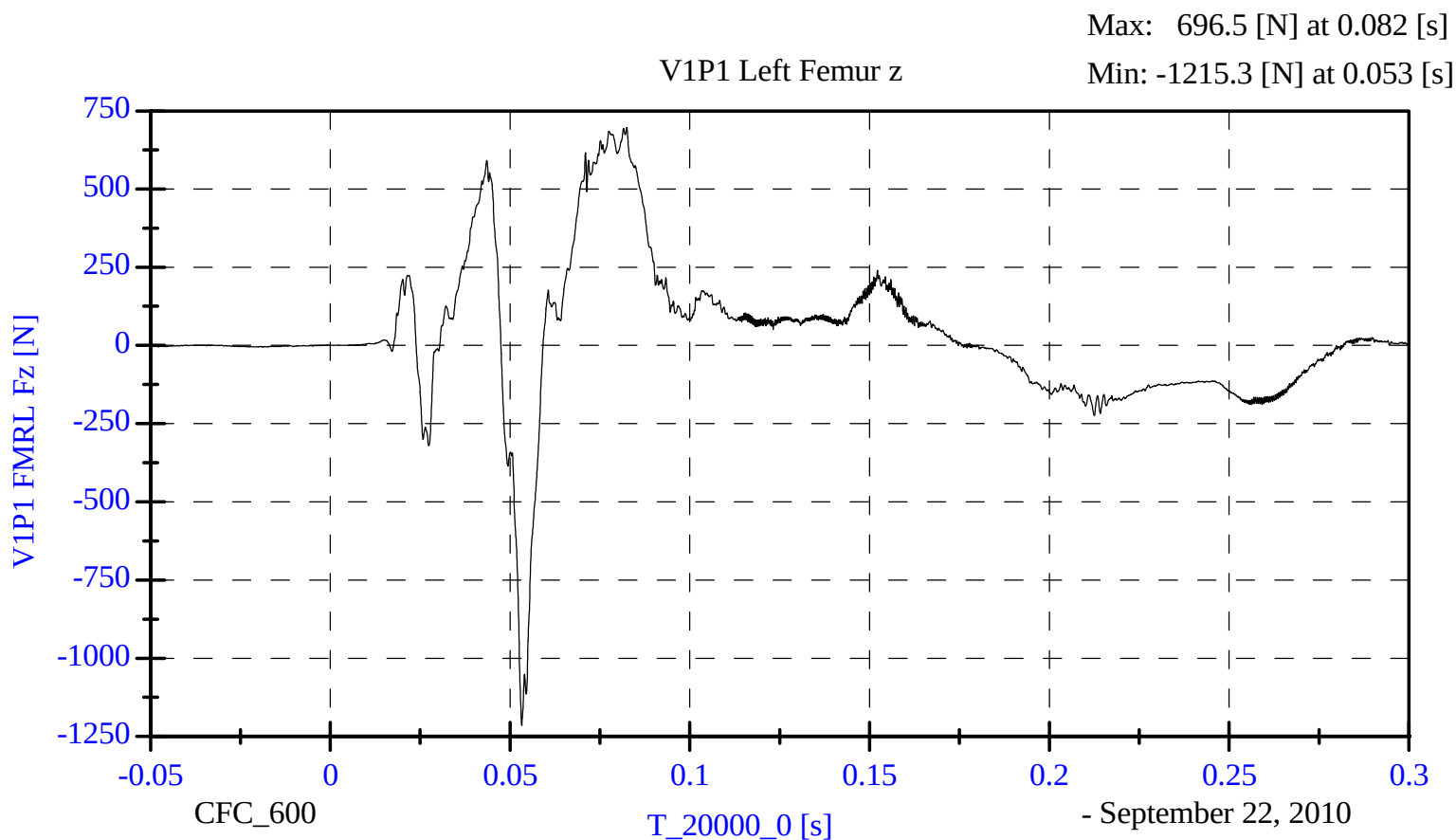
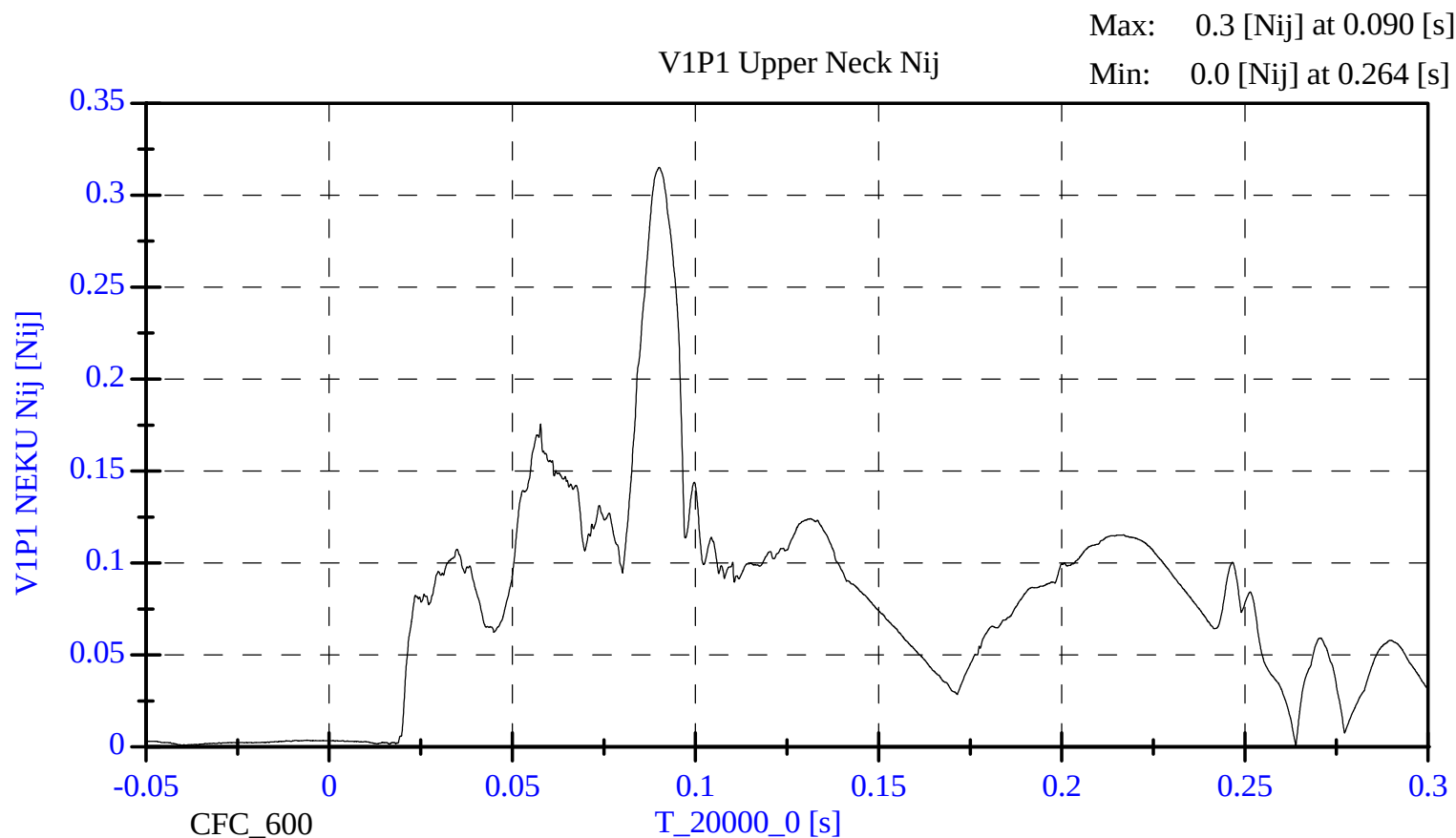


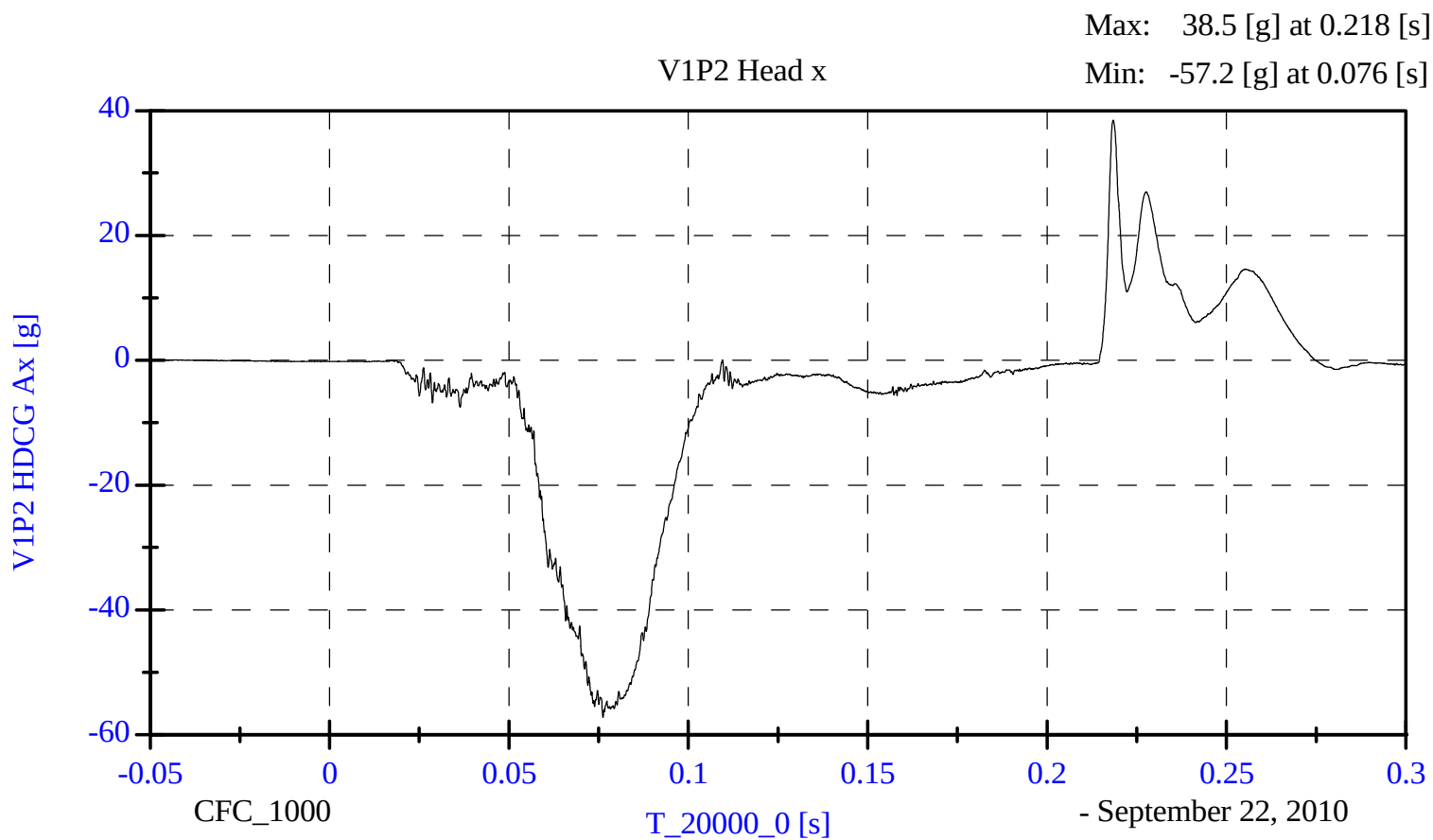
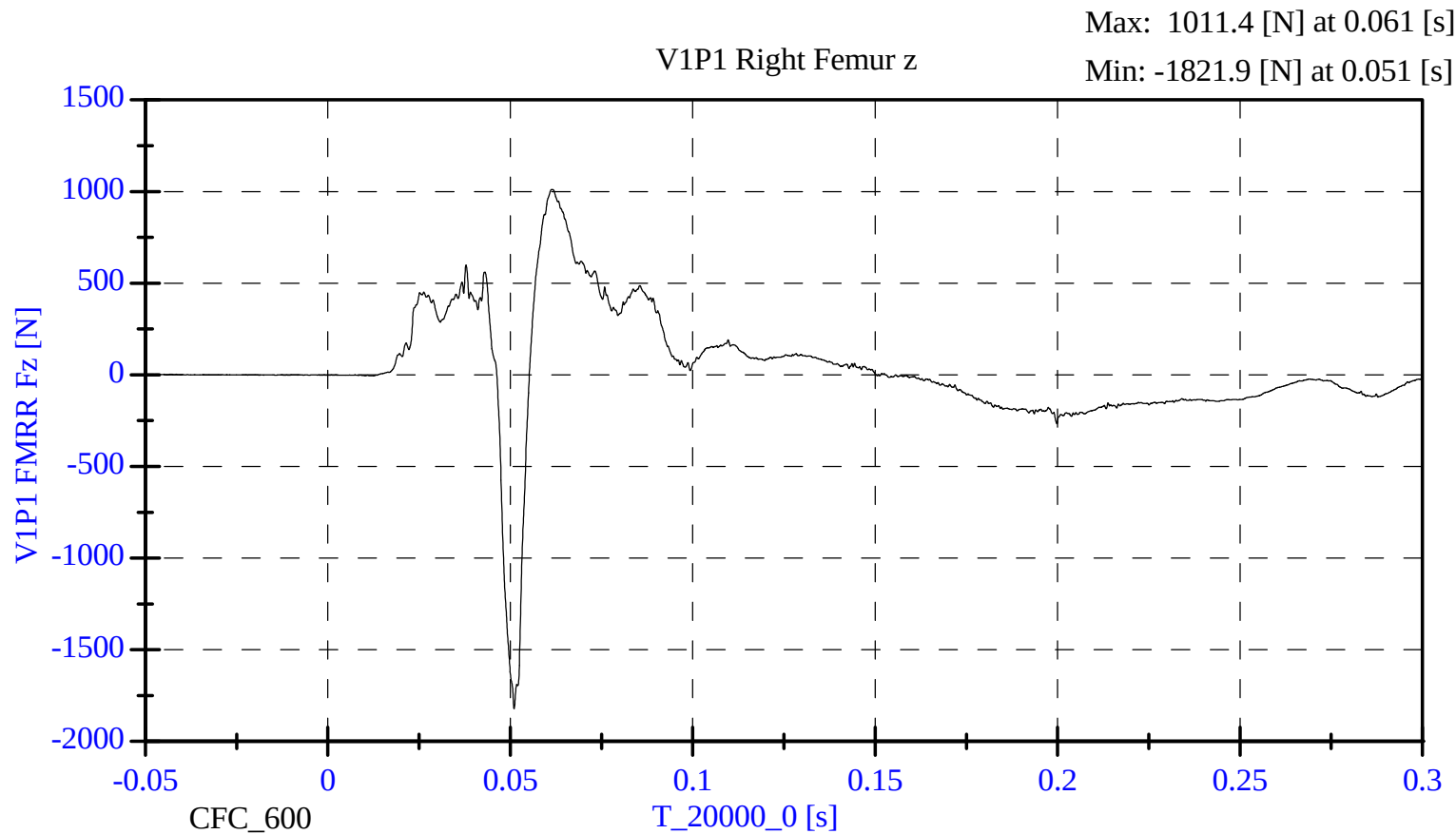
- September 22, 2010

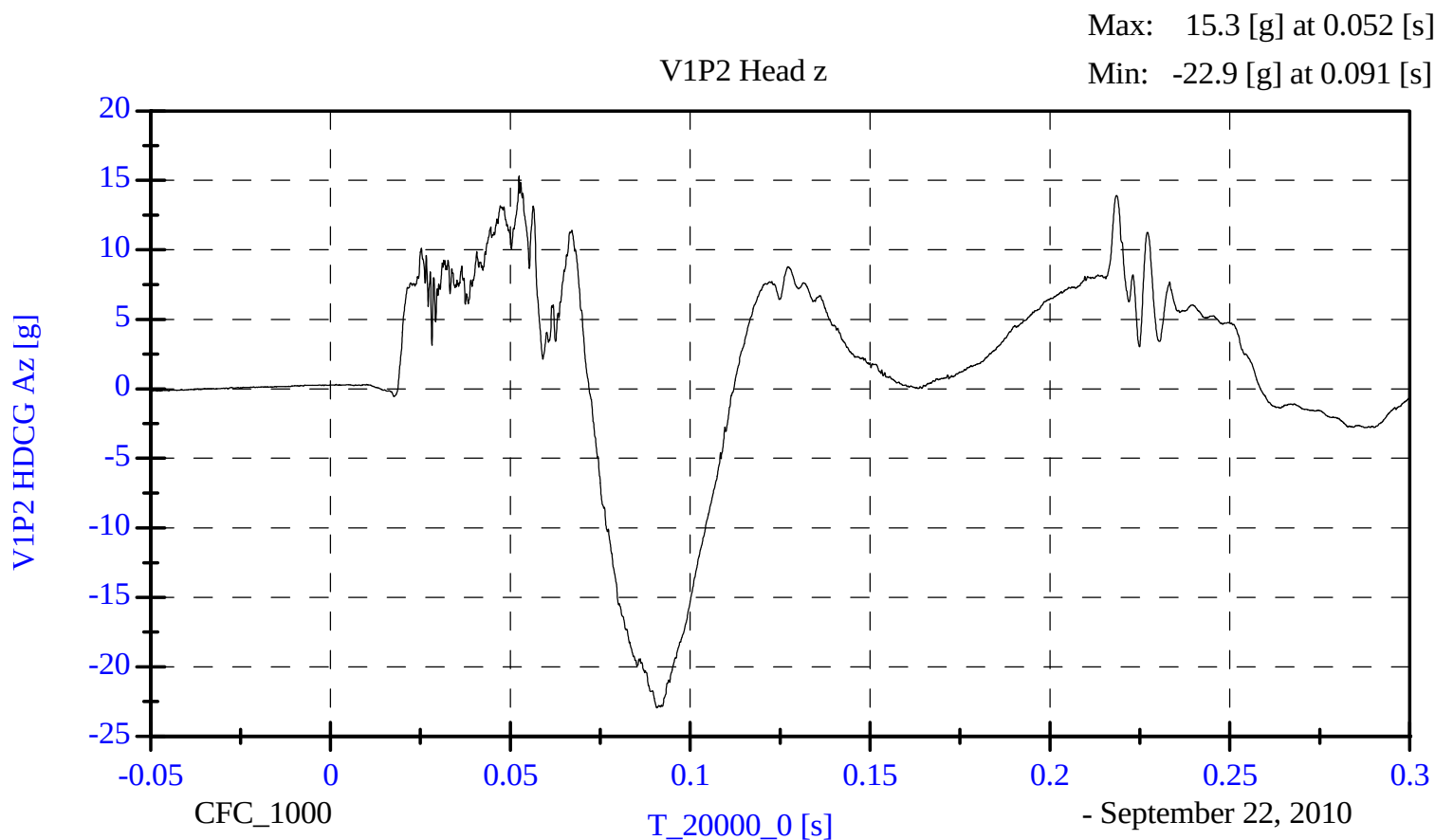
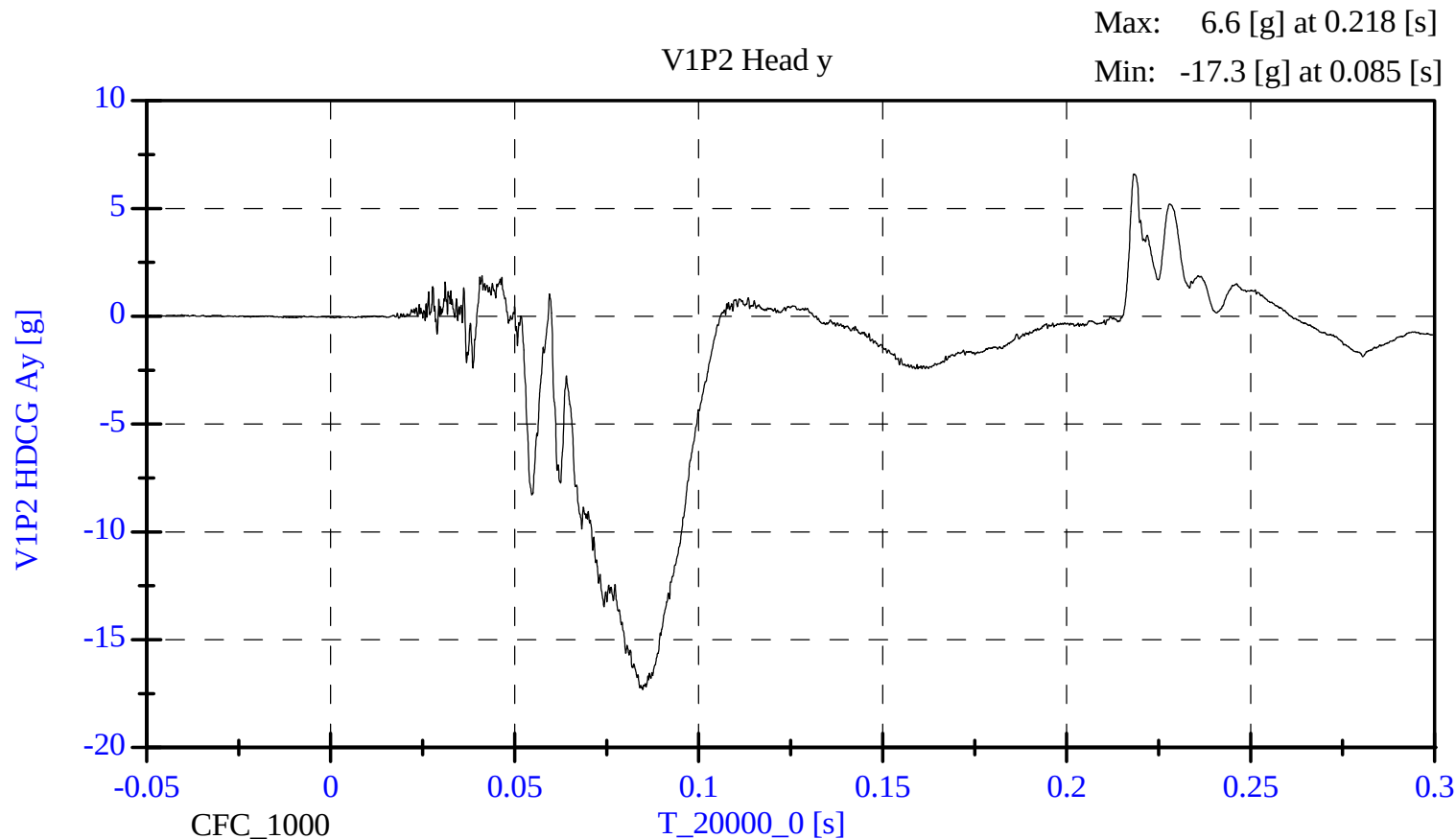


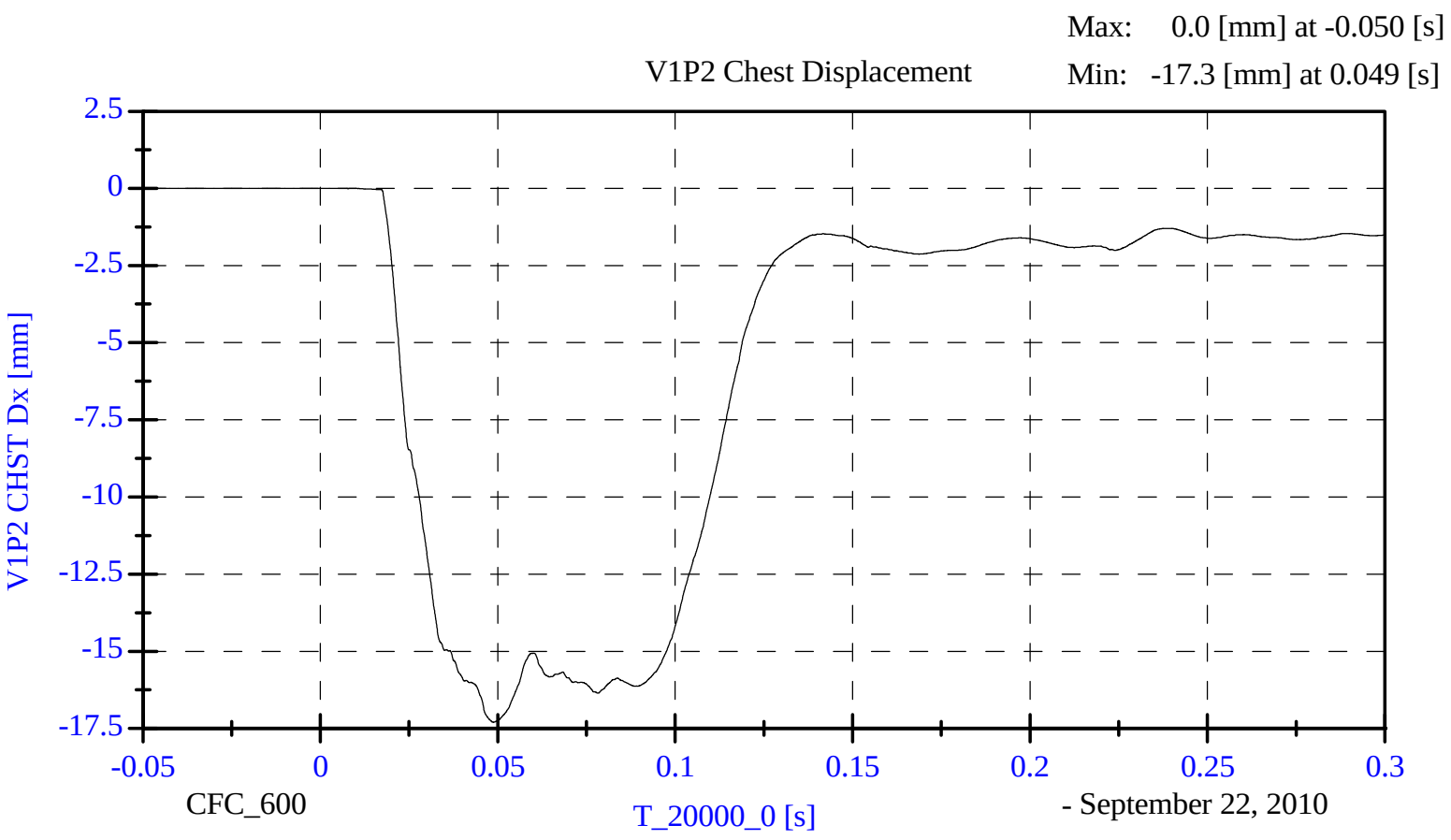
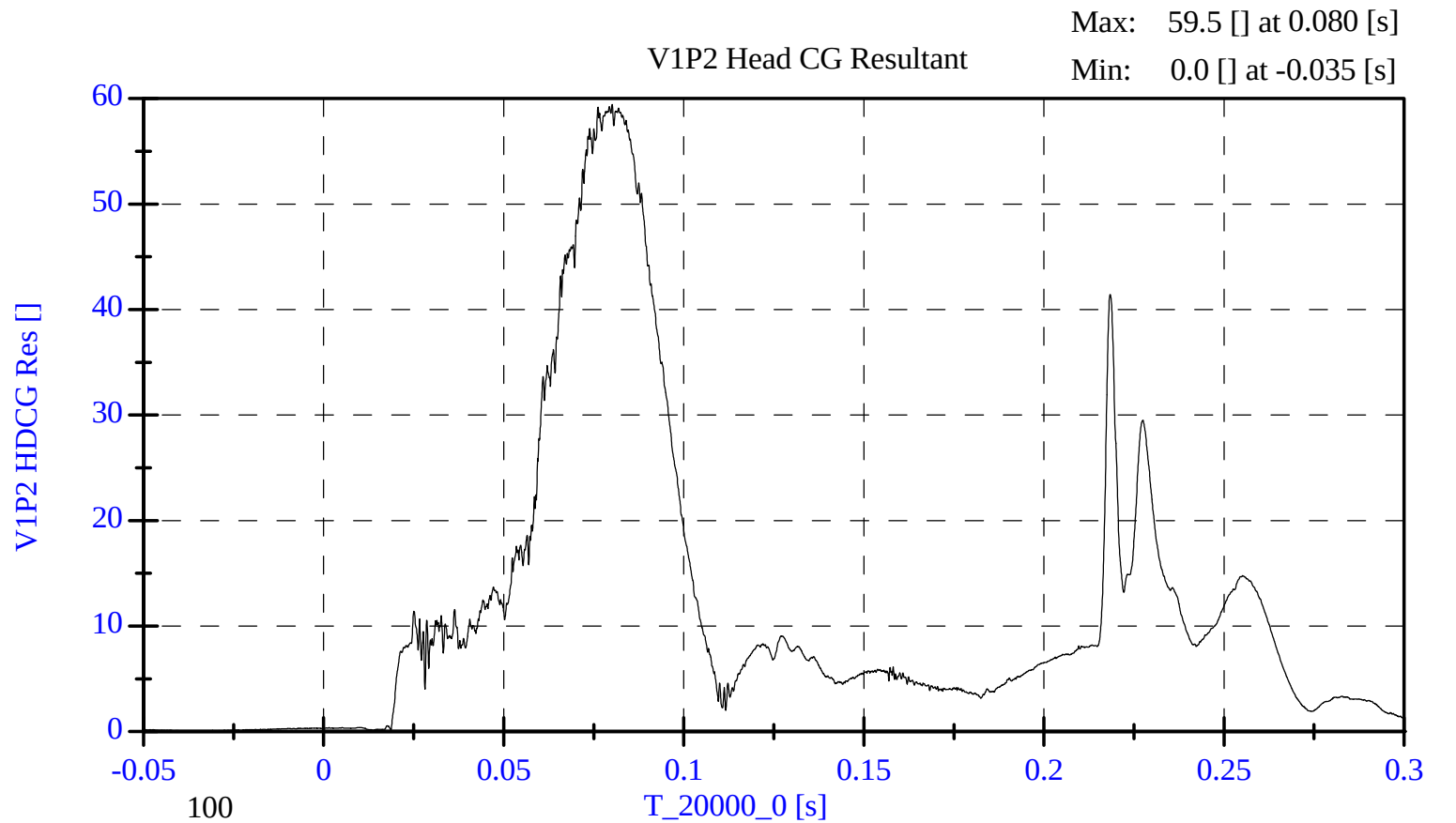


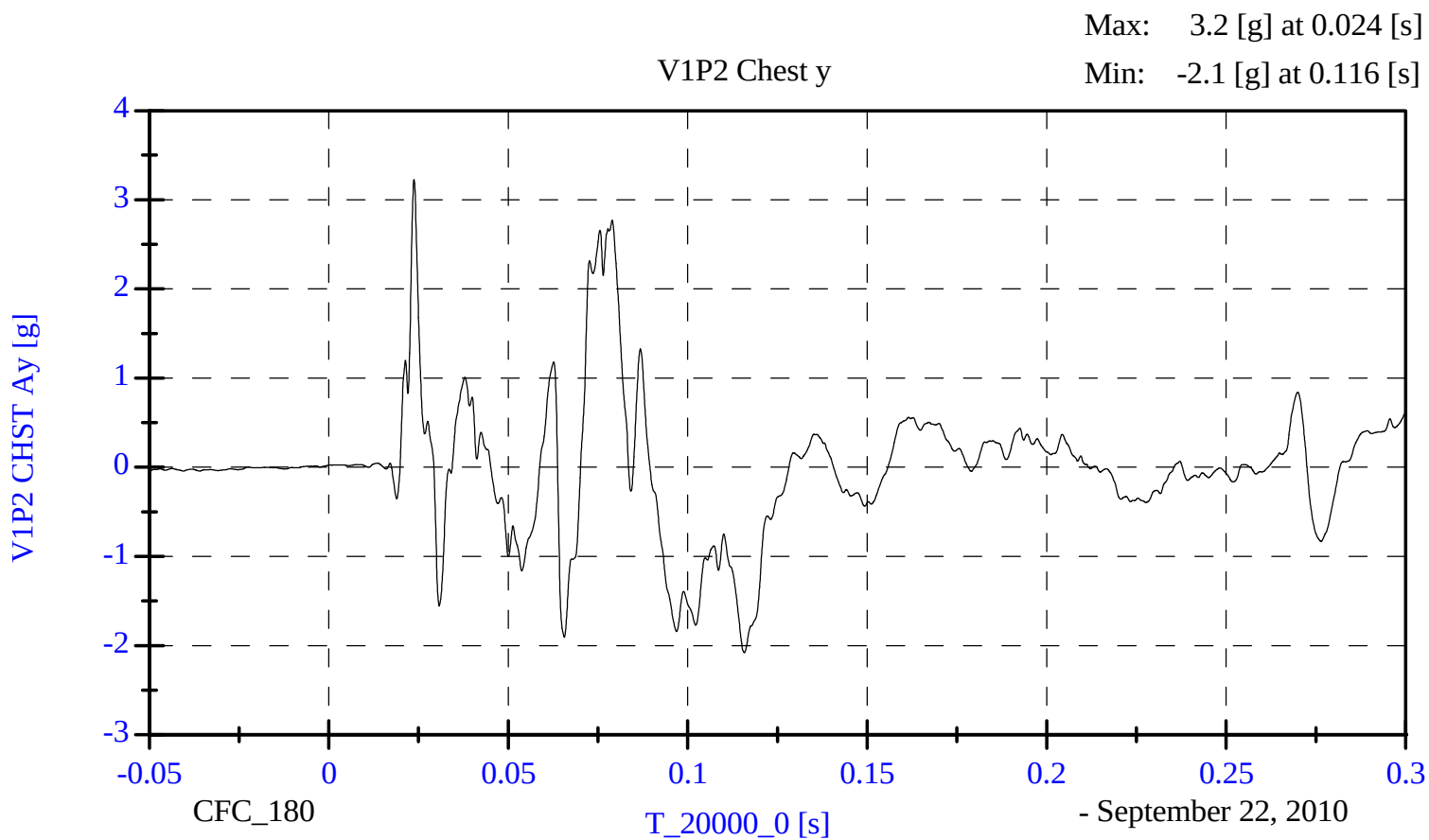
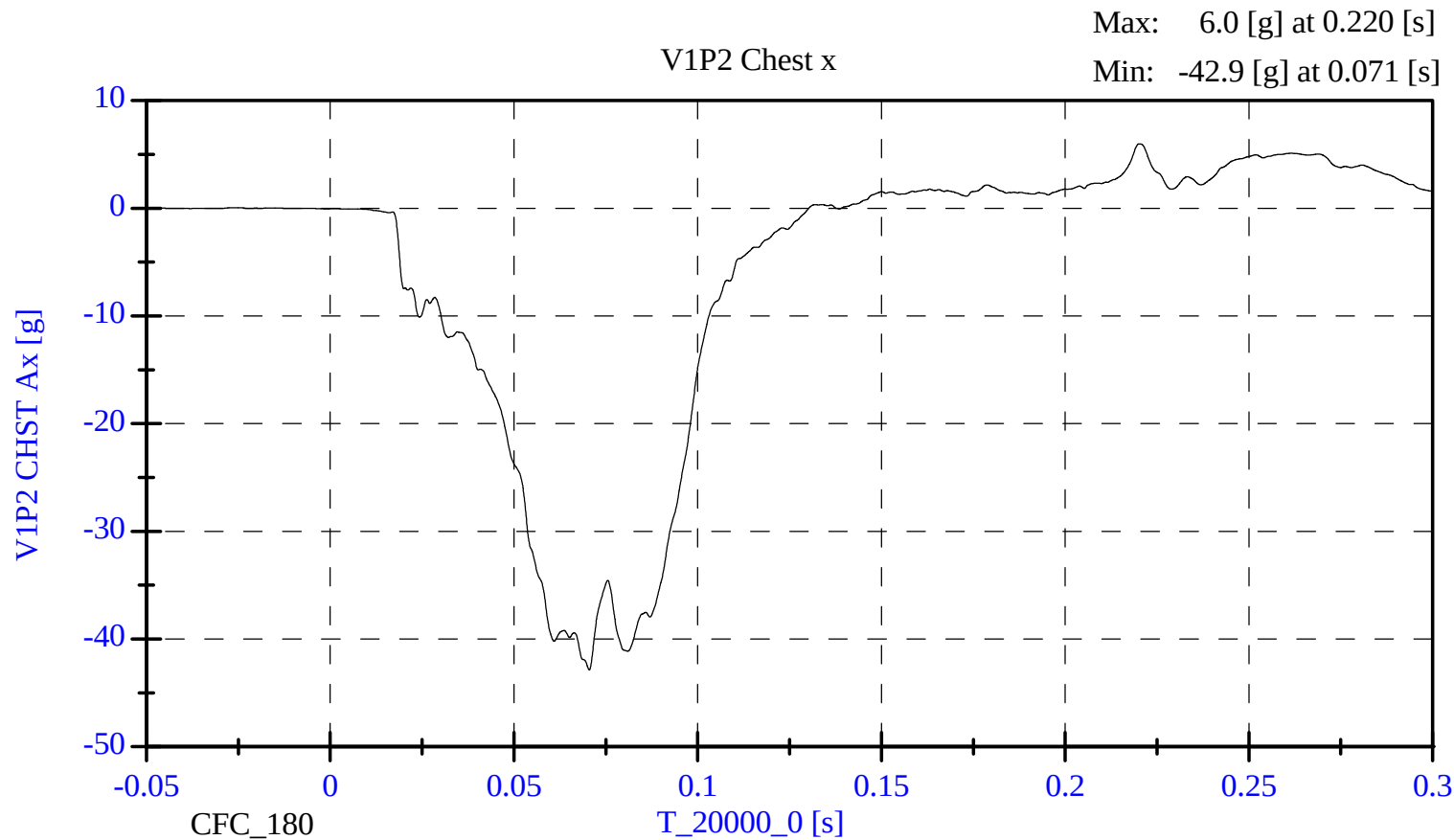


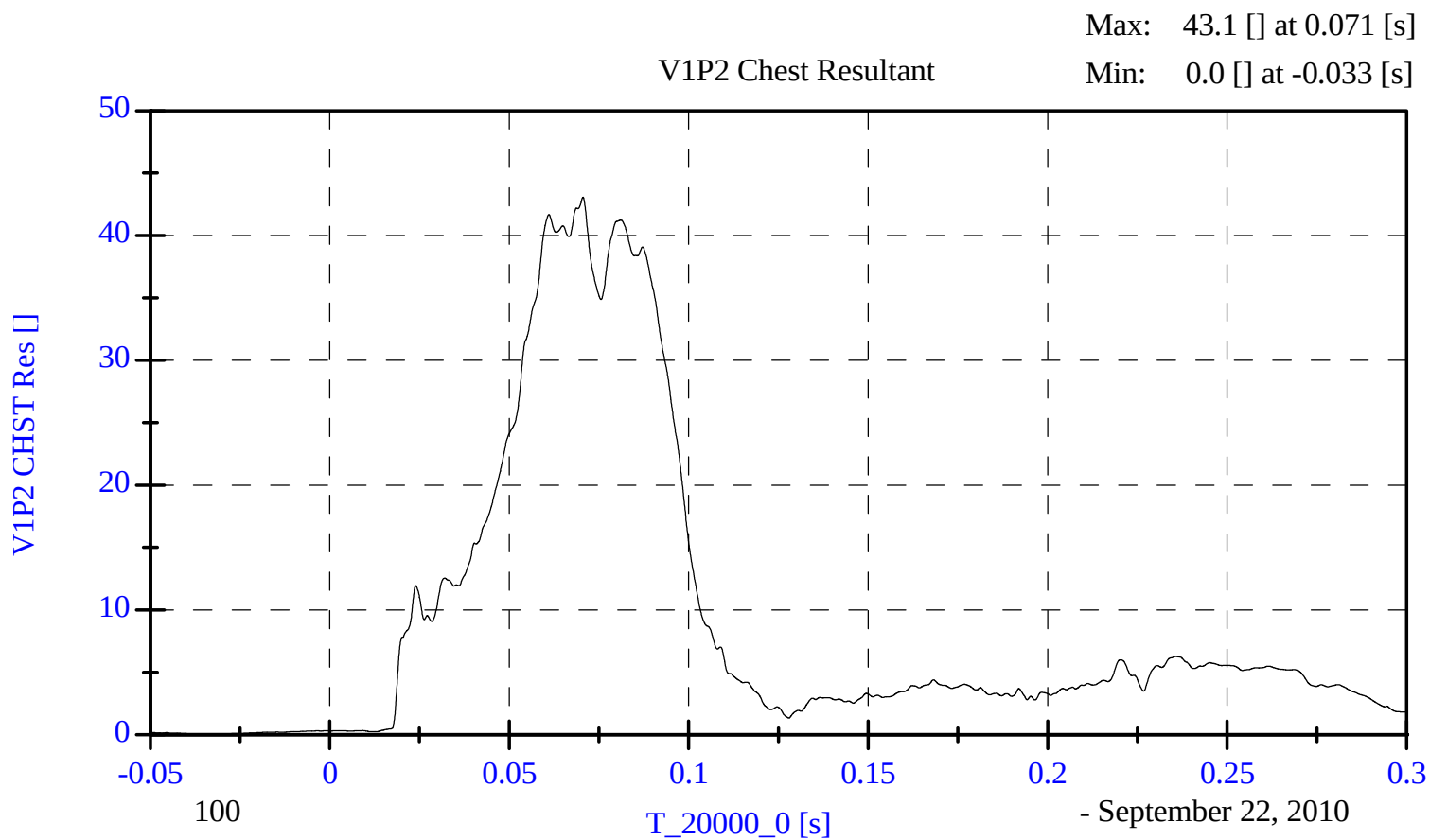
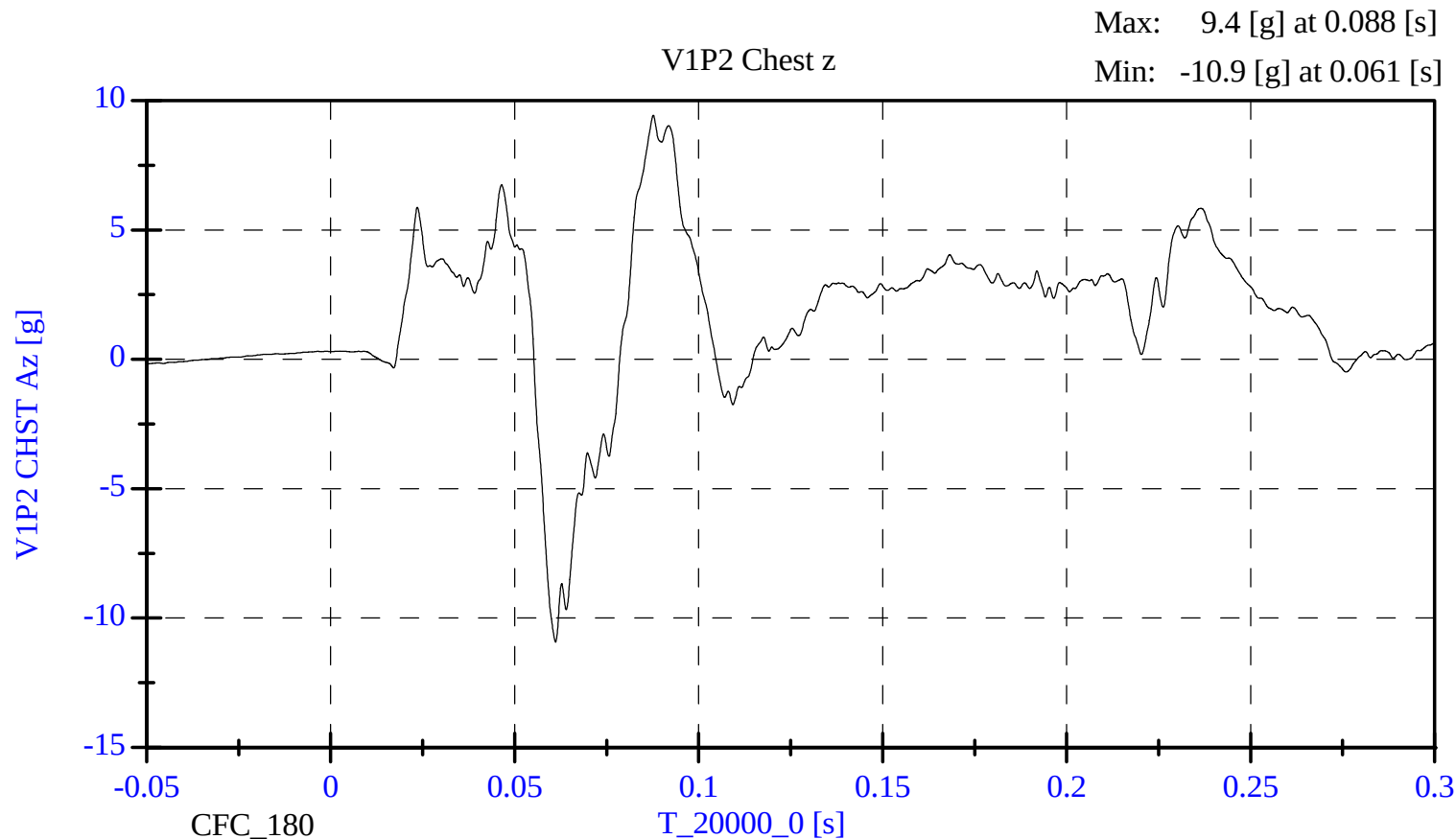


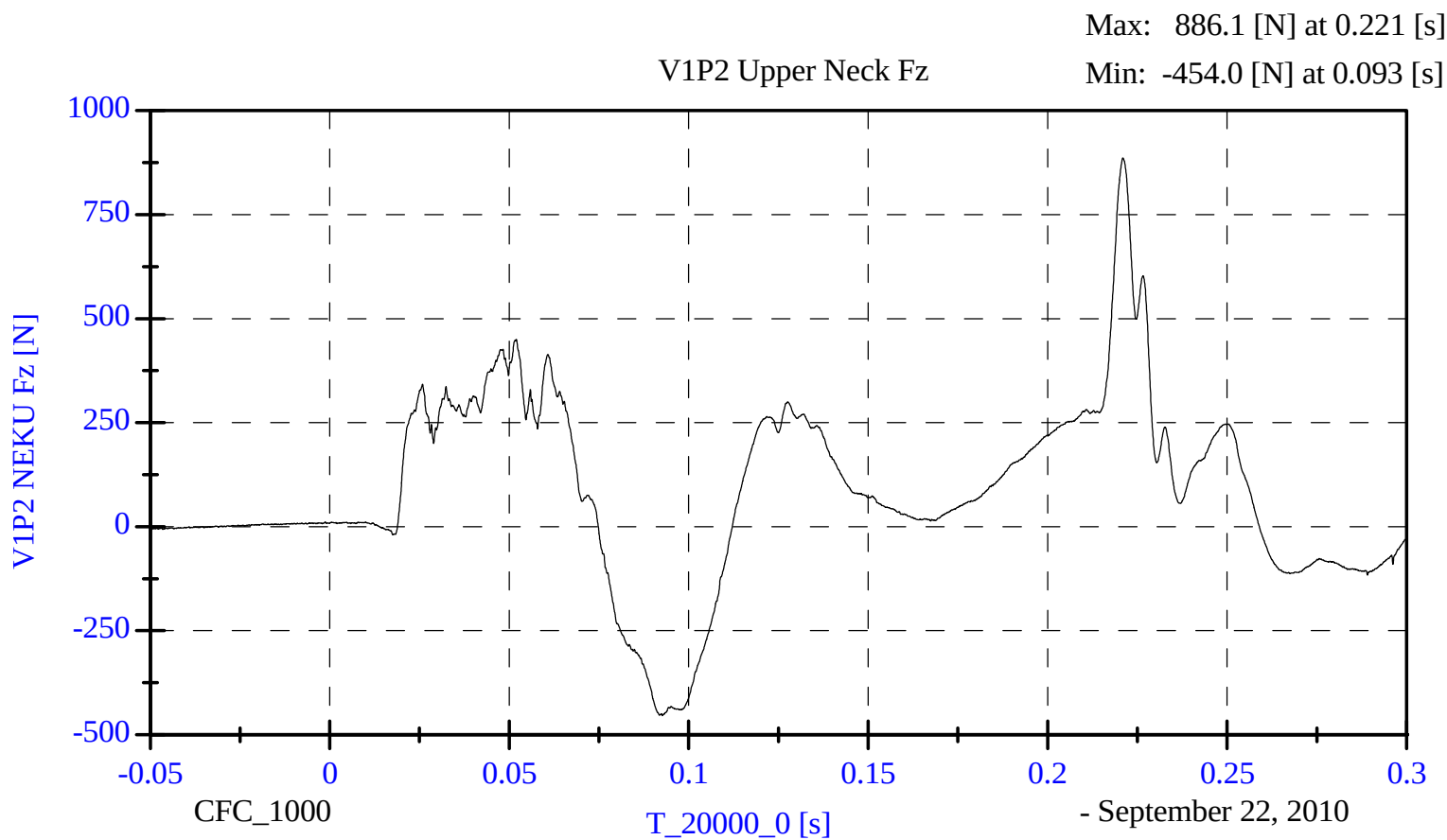
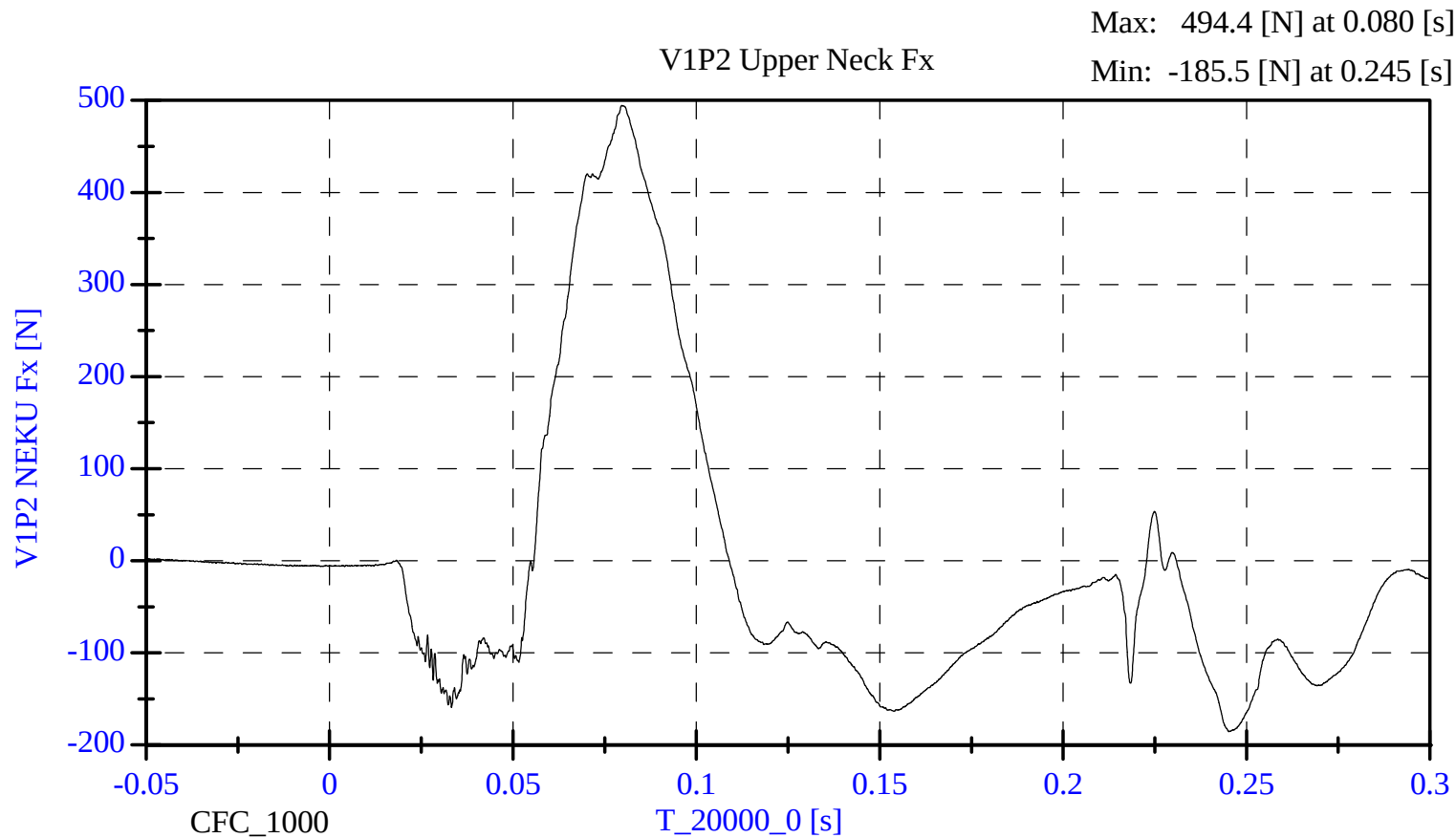




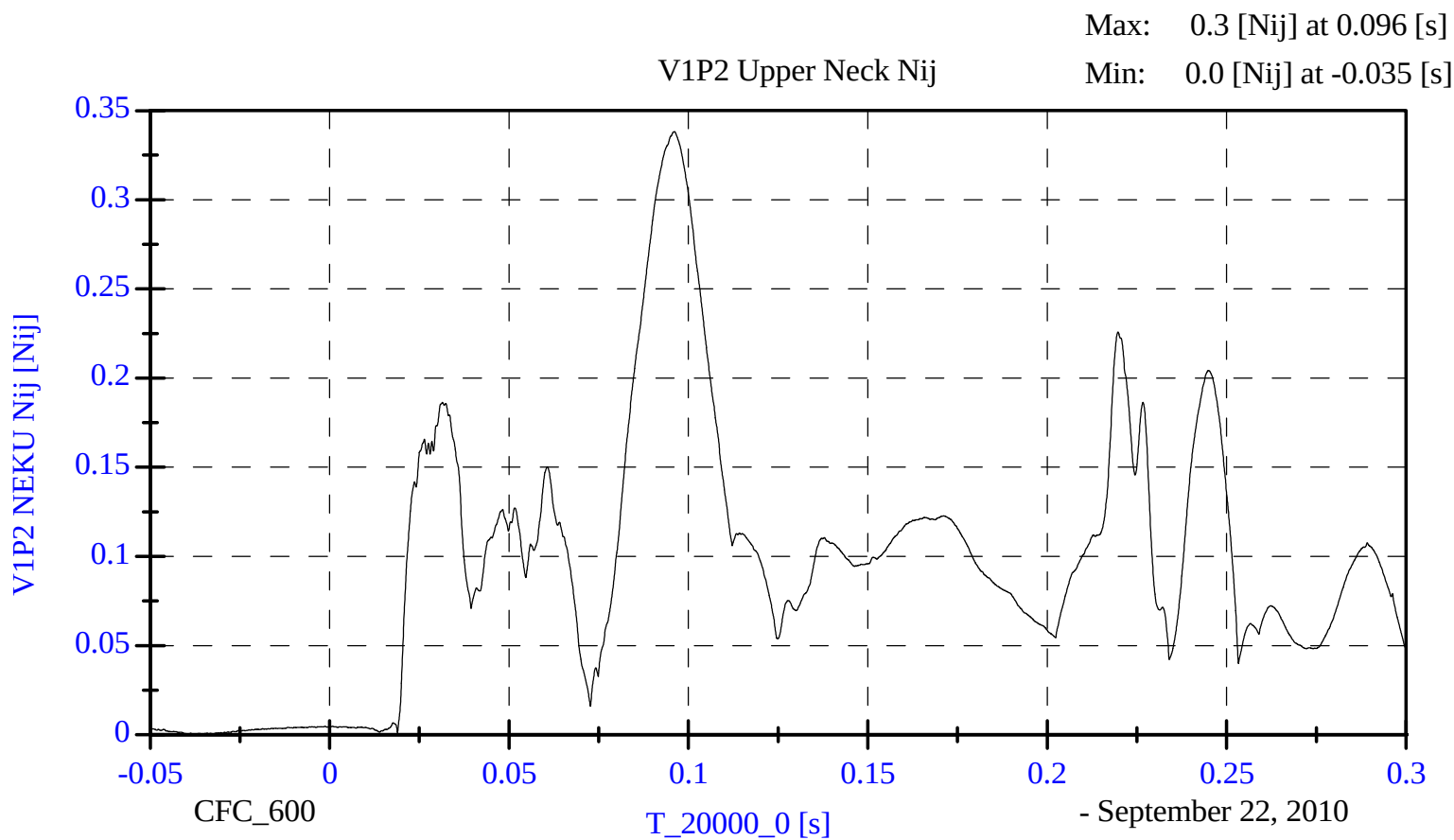
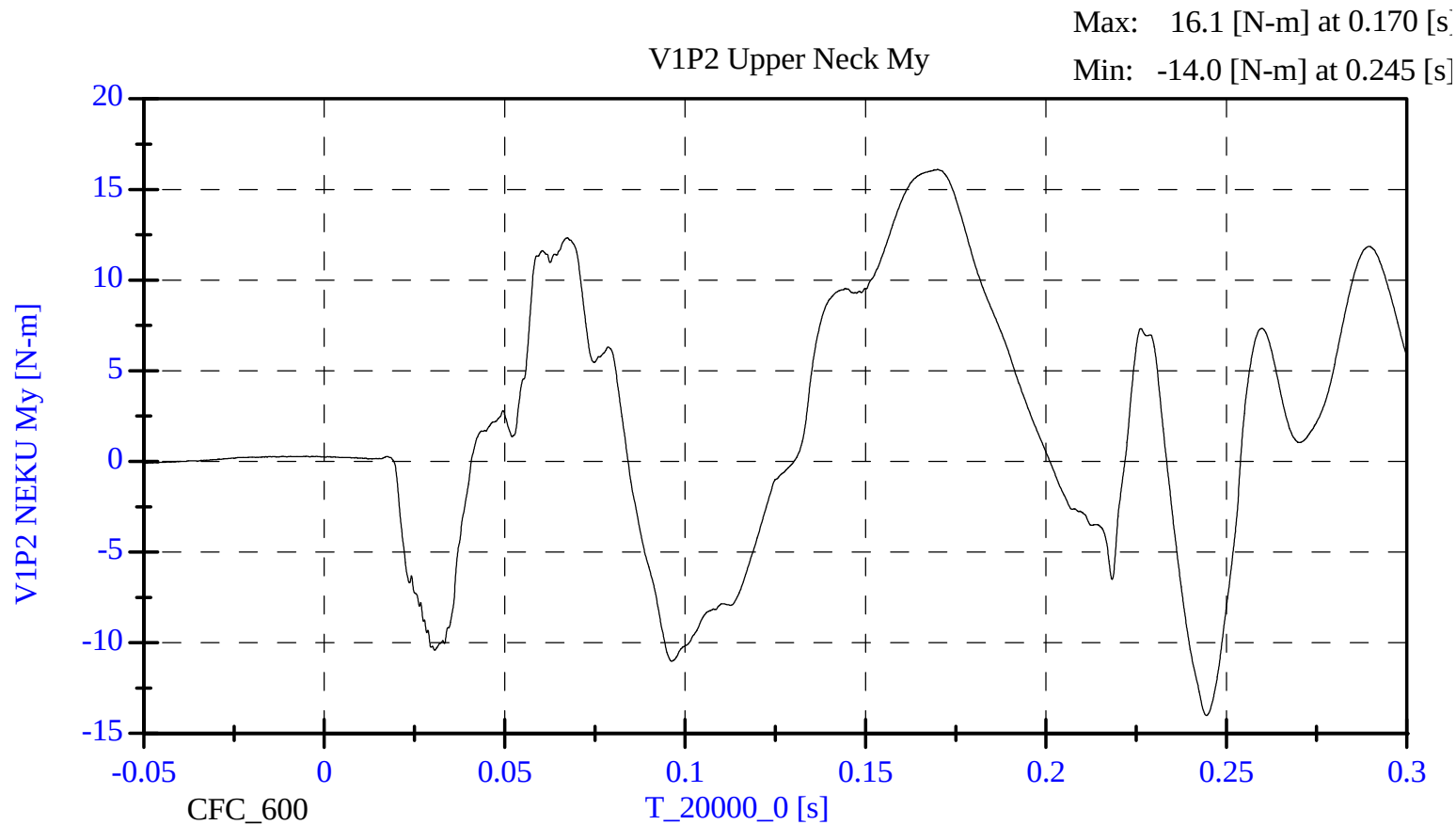


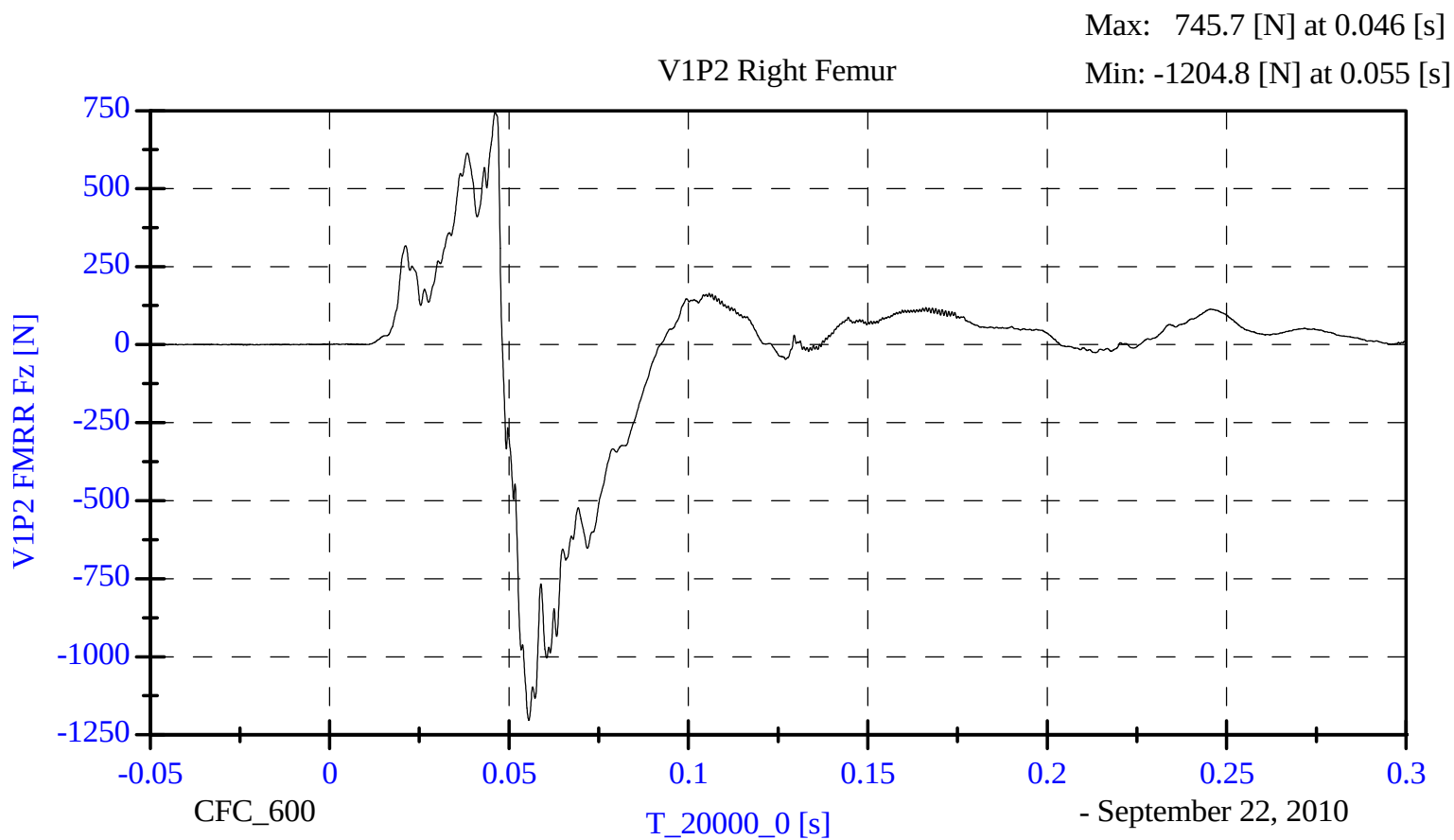
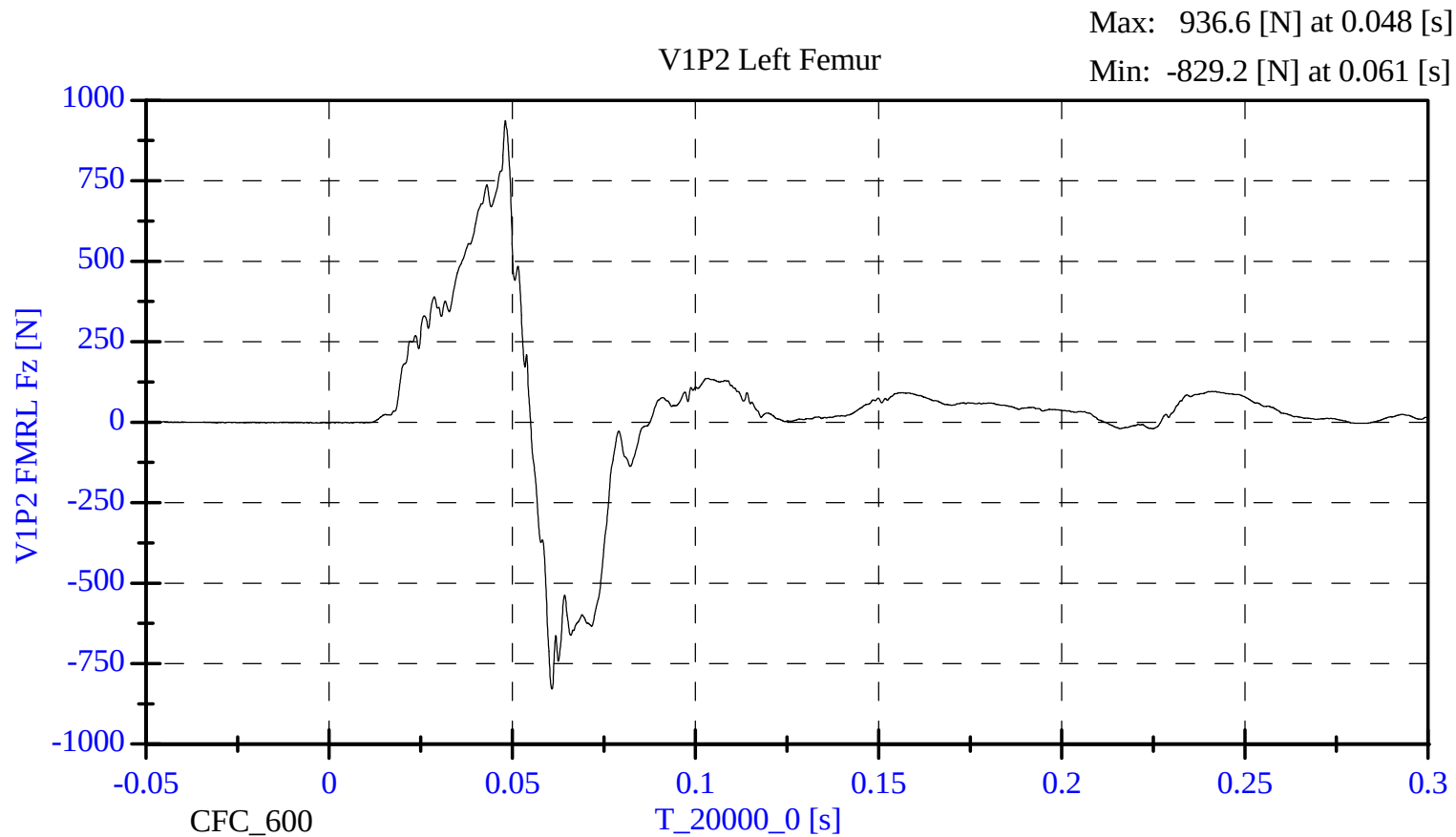






- September 22, 2010





APPENDIX C

PART 572 E/O DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

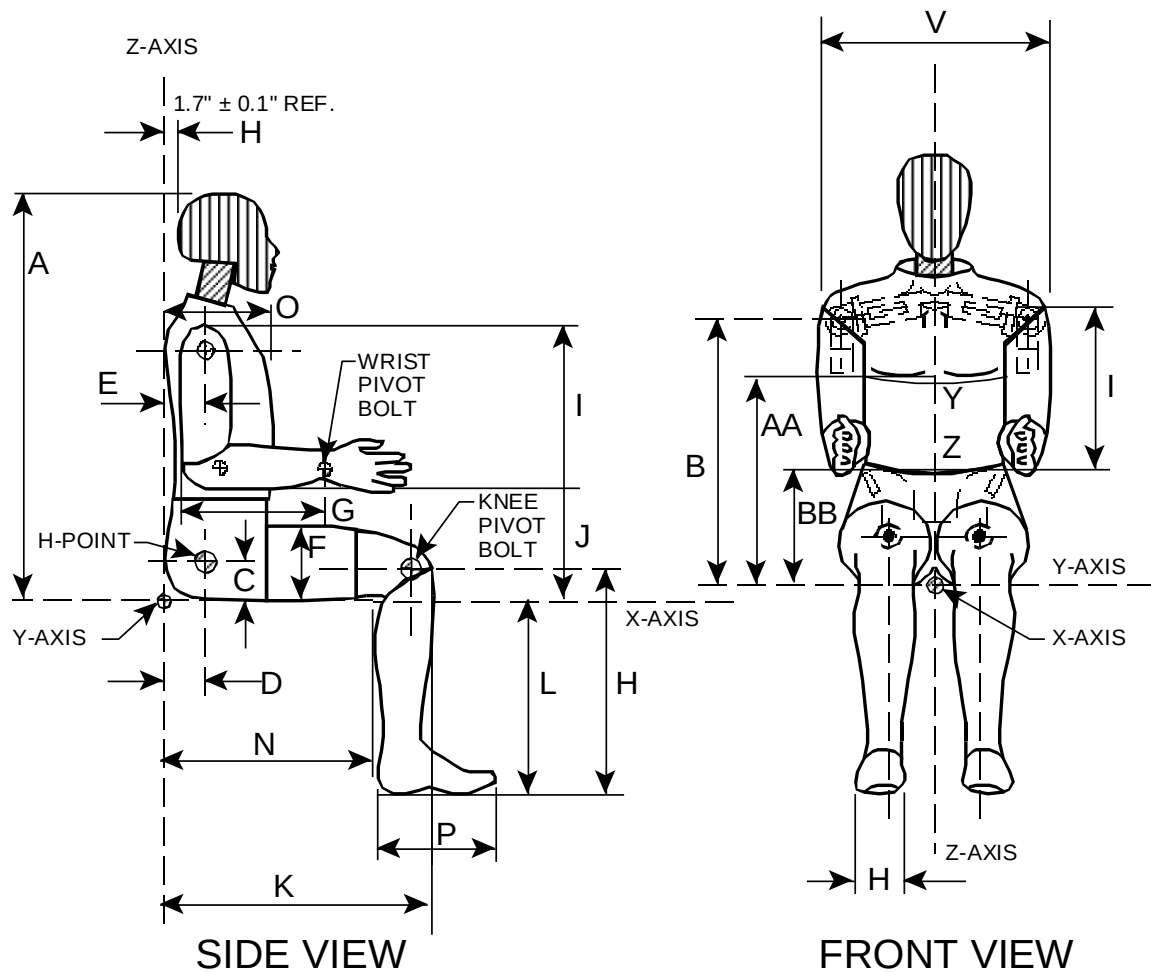
The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	10/15/2010
#2/Right Front Passenger	273	10/15/2010

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

CALIBRATION TEST RESULTS

PRE-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	2.04	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.3	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.7	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.2	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.4	Yes
L	Popliteal Height	16.9 - 17.9	17.5	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.6	Yes
P	Foot Length (right)	9.9 - 10.5	10.1	Yes
V	Shoulder Breadth	16.3 - 17.2	16.8	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: SZ

Date: 10/15/2010



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Calspan - Transportation Research Group

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

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	10/13/2010
Test Number:	1	Test Time:	2:30:34 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	243

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	33 %RH P
Resultant Acceleration	225 -- 275	248 g P
Oscillation	0.0 -- 10.0	1.2 % P
Lateral Acceleration	-15.00 -- 15.00	-10.20 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **2:30:34 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **2:30:34 PM**

Test Date: **10/13/2010**

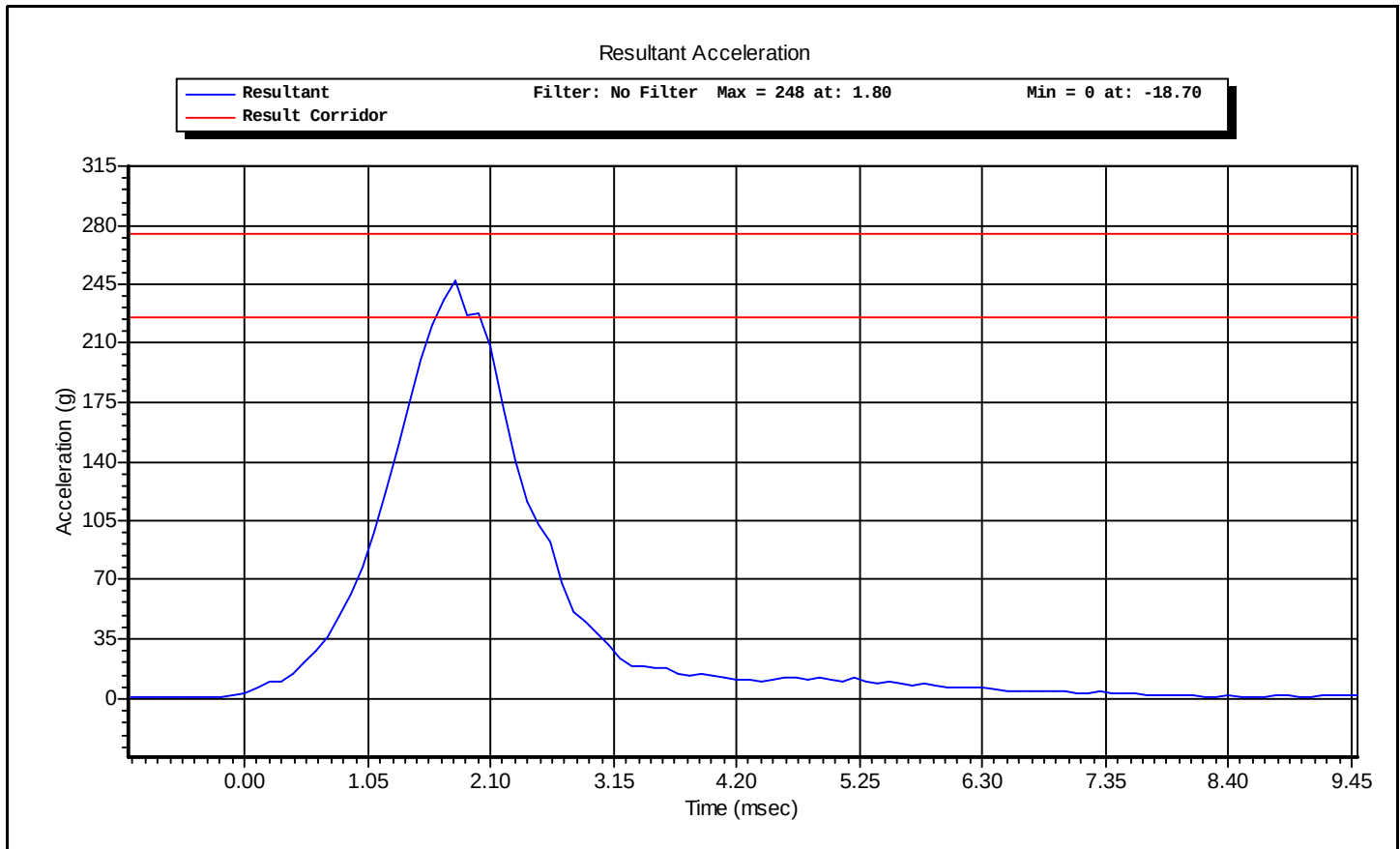


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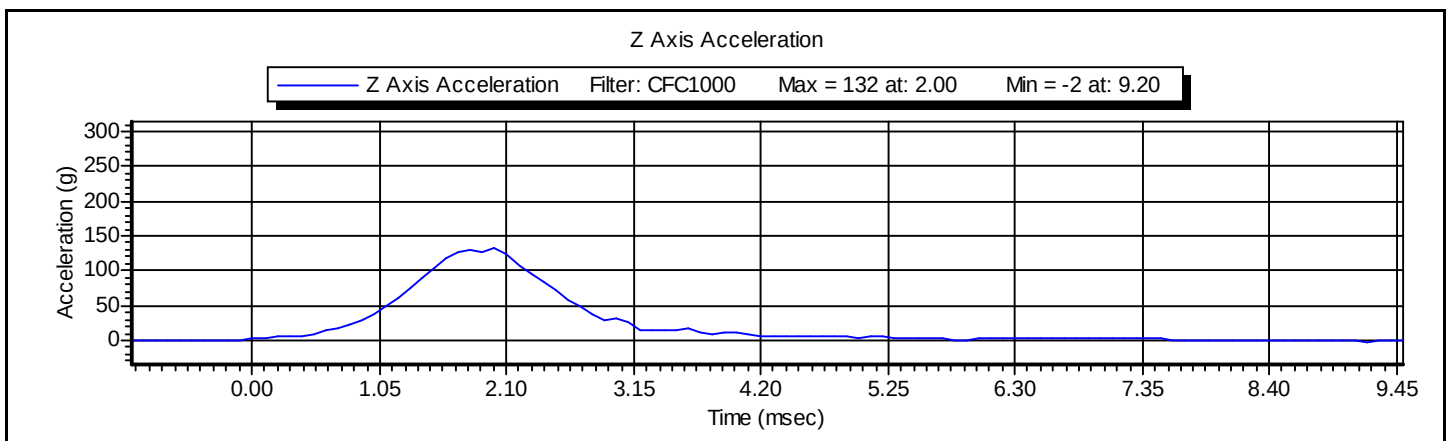
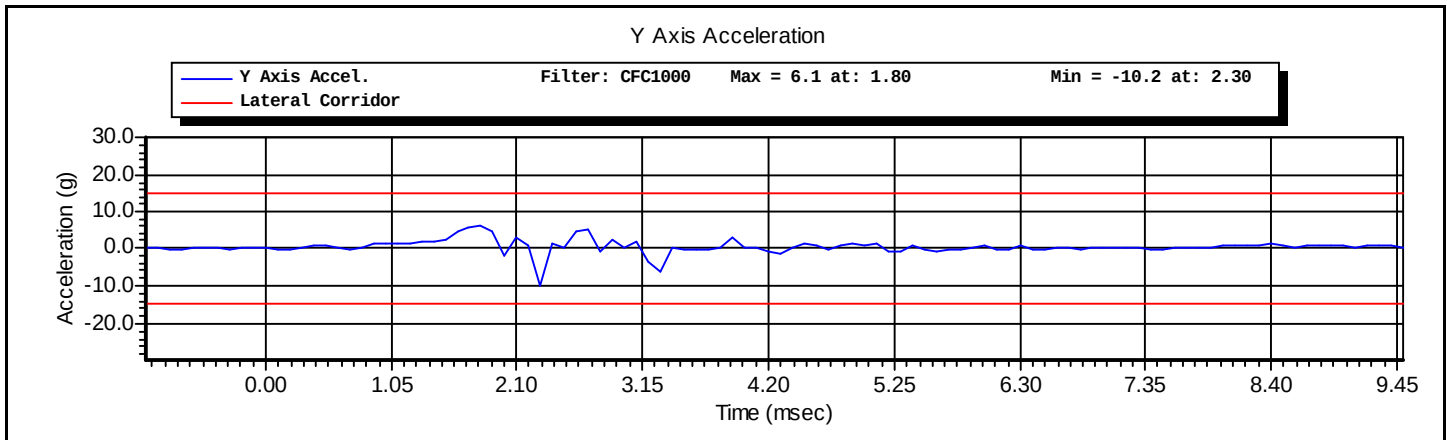
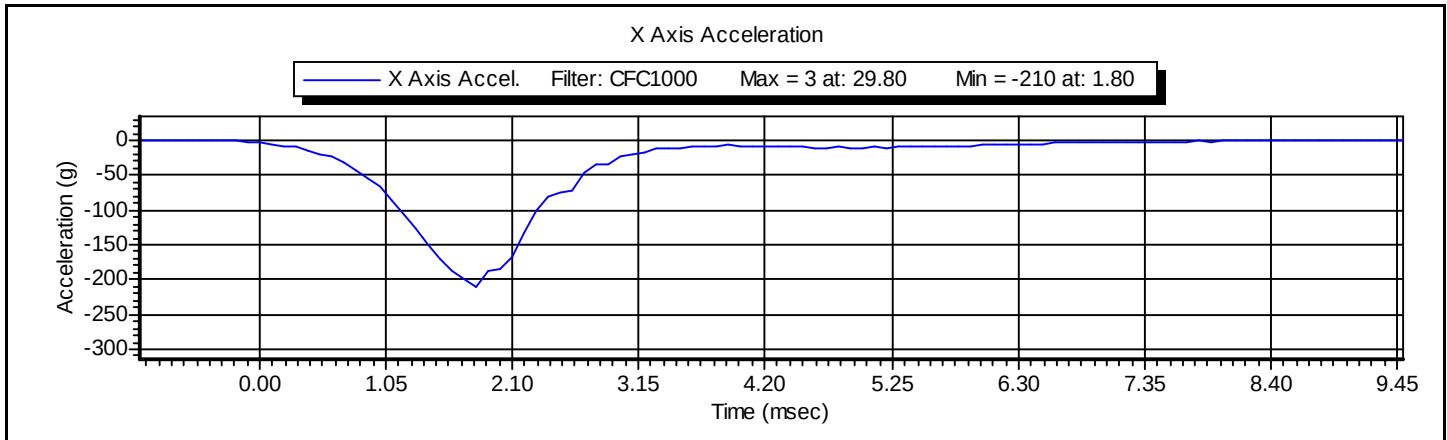
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	10/13/2010
Test Number:	1	Test Time:	2:30:34 PM



Test ID: Head Drop

Test Time: 2:30:34 PM

Test Date: 10/13/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	10/13/2010
Test Number:	1	Test Time:	1:45:29 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	33 %RH P
Velocity	5.94 -- 6.19	6.00 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	18.7 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	16.4 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	12.9 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	13.4 g P
Decel Time to 5 g	38.0 -- 46.0	42.6 ms P
D Plane Rotation	81.0 -- 106.0	90.2 degrees P
Time at Max Rotation	72.0 -- 82.0	76.9 ms P
Rotation Decay to Zero	147.0 -- 174.0	158.2 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-66.7 Nm P
Time at Max Moment	65.0 -- 79.0	72.1 ms P
Moment Decay to Zero	120.0 -- 148.0	141.4 ms P

All test parameters are within specifications

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

Test ID: **Neck Extension**

Test Time: **1:45:29 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Extension**

Test Time: **1:45:29 PM**

Test Date: **10/13/2010**

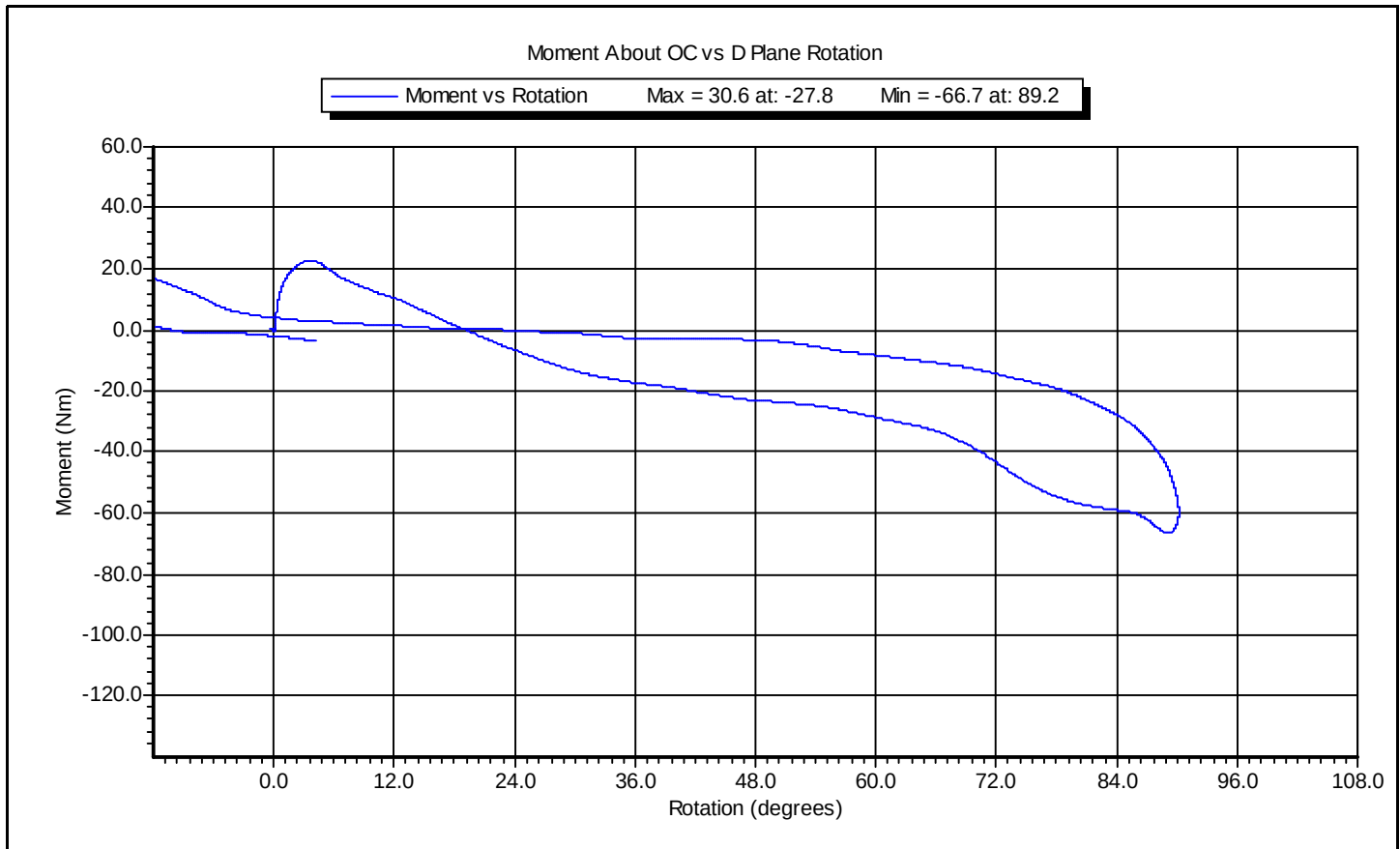


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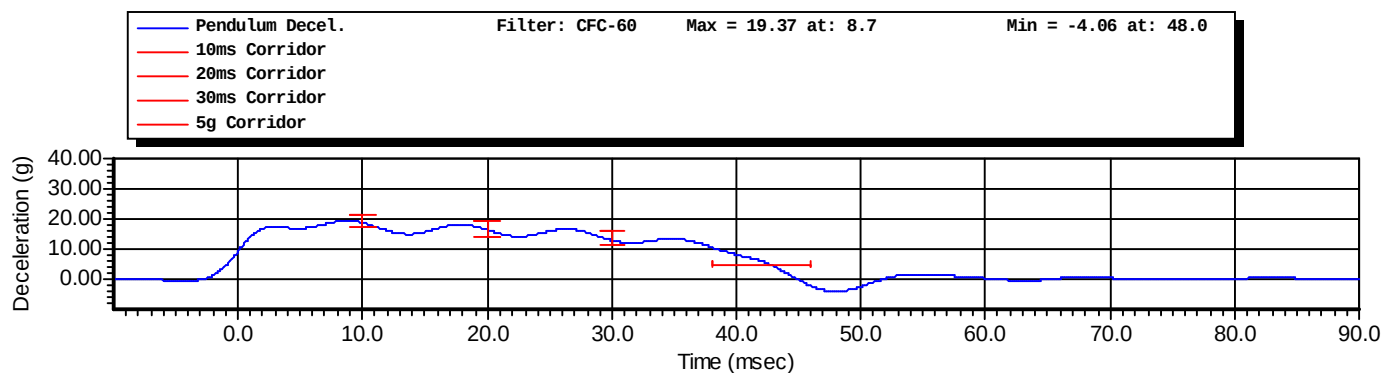
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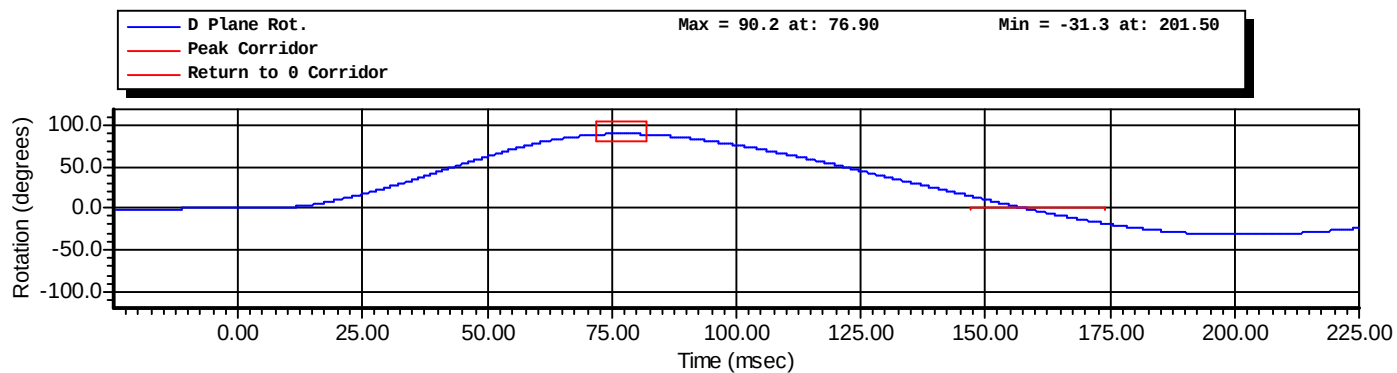
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	10/13/2010
Number of Test:	1	Time of Test:	1:45:29 PM



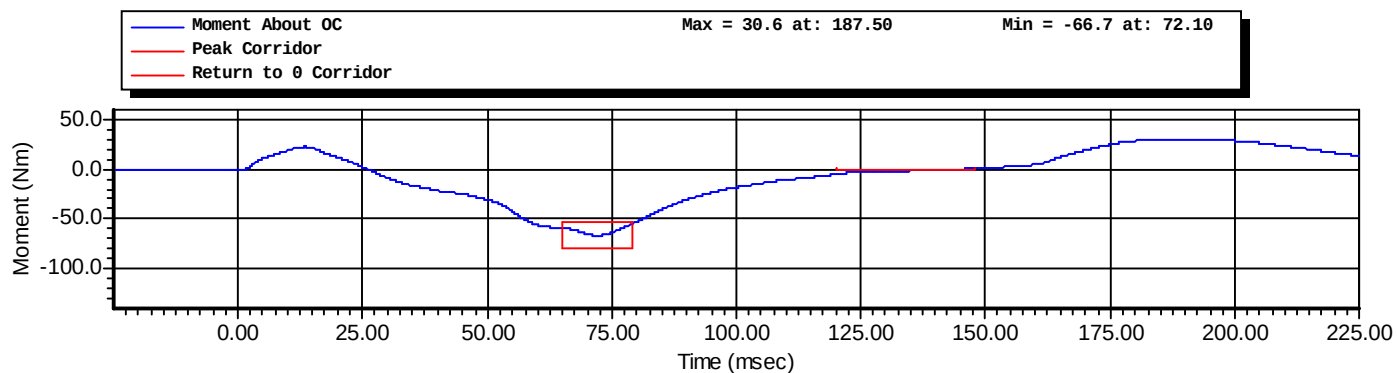
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	10/13/2010
Test Number:	1	Test Time:	1:07:37 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	33 %RH	P
Velocity		6.89	-- 7.13	7.09 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	24.9 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	20.0 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	15.6 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	15.6 g	P
Deceleration time to	5 g	34.0	-- 42.0	39.3 ms	P
D Plane Rotation		-78.0	-- -64.0	-66.8 degrees	P
Time at max rotation		57.0	-- 64.0	59.3 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.8 ms	P
Moment about OC		88.1	-- 108.4	102.0 Nm	P
Time at Max Moment		47.0	-- 58.0	53.4 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.5 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:07:37 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

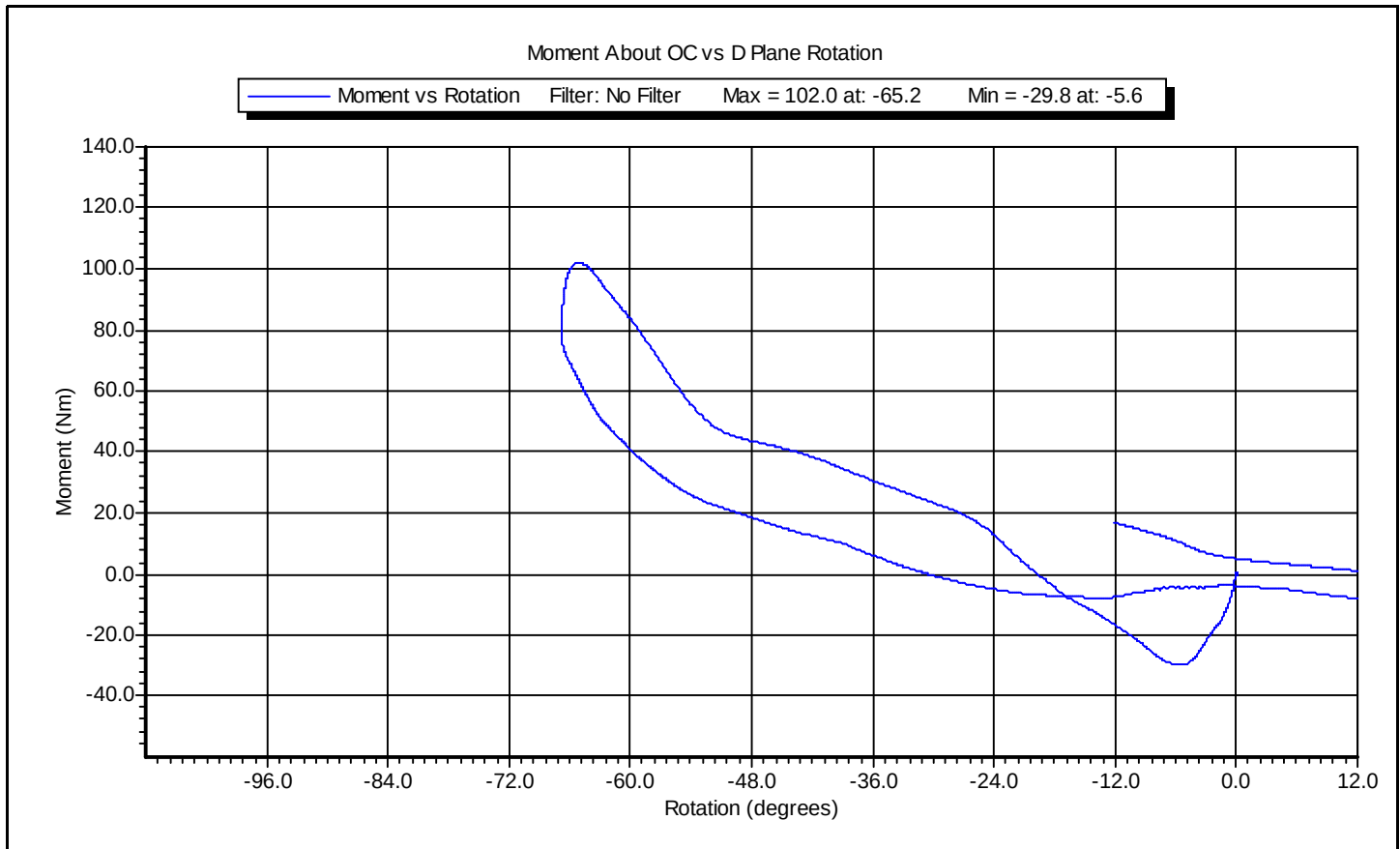
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

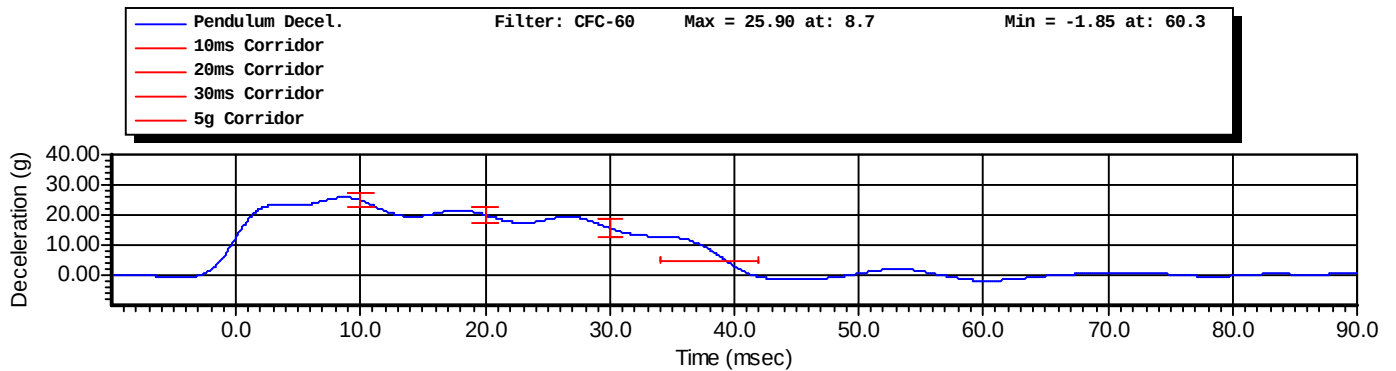
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Test Date: **10/13/2010**

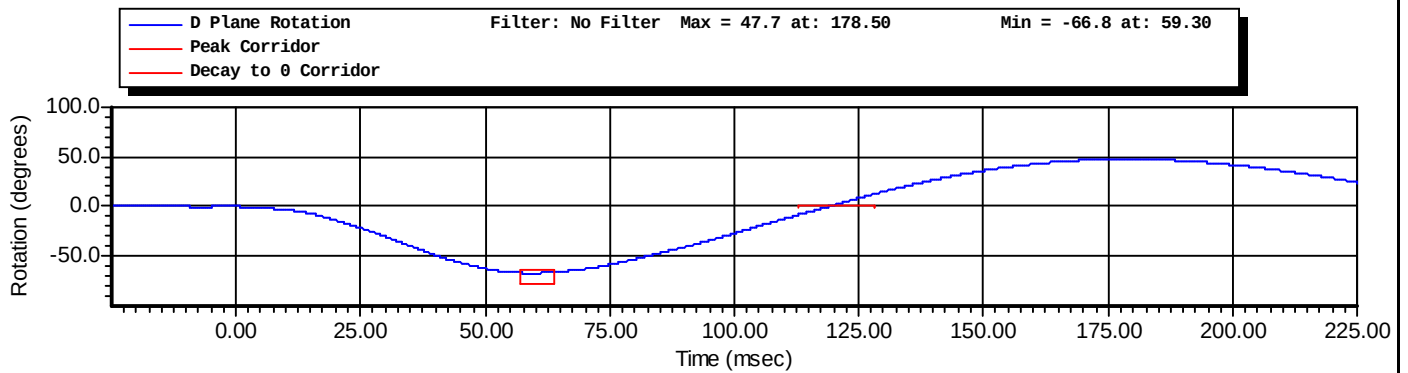
Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	10/13/2010
Number of Test:	1	Time of Test:	1:07:37 PM



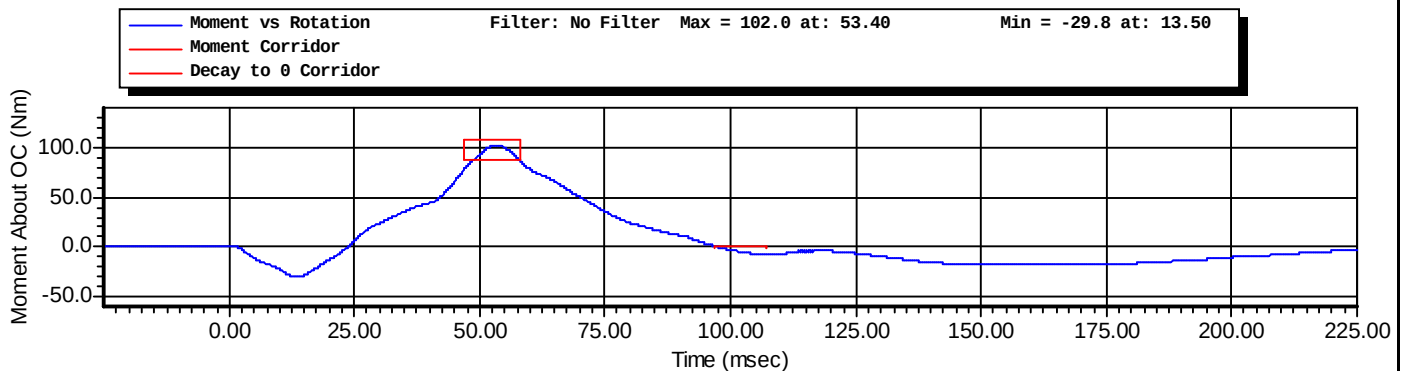
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	10/15/2010
Test Number:	1	Test Time:	5:52:03 PM

Component Part Number	Component Serial Number
Ribs 78051-RS	4273
Chest Jacket - 78051-169	2437

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	39.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.655 kN P
Sternum Displacement	-72.6 -- -63.5	-70.3 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **5:52:03 PM**

Test Date: **10/15/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

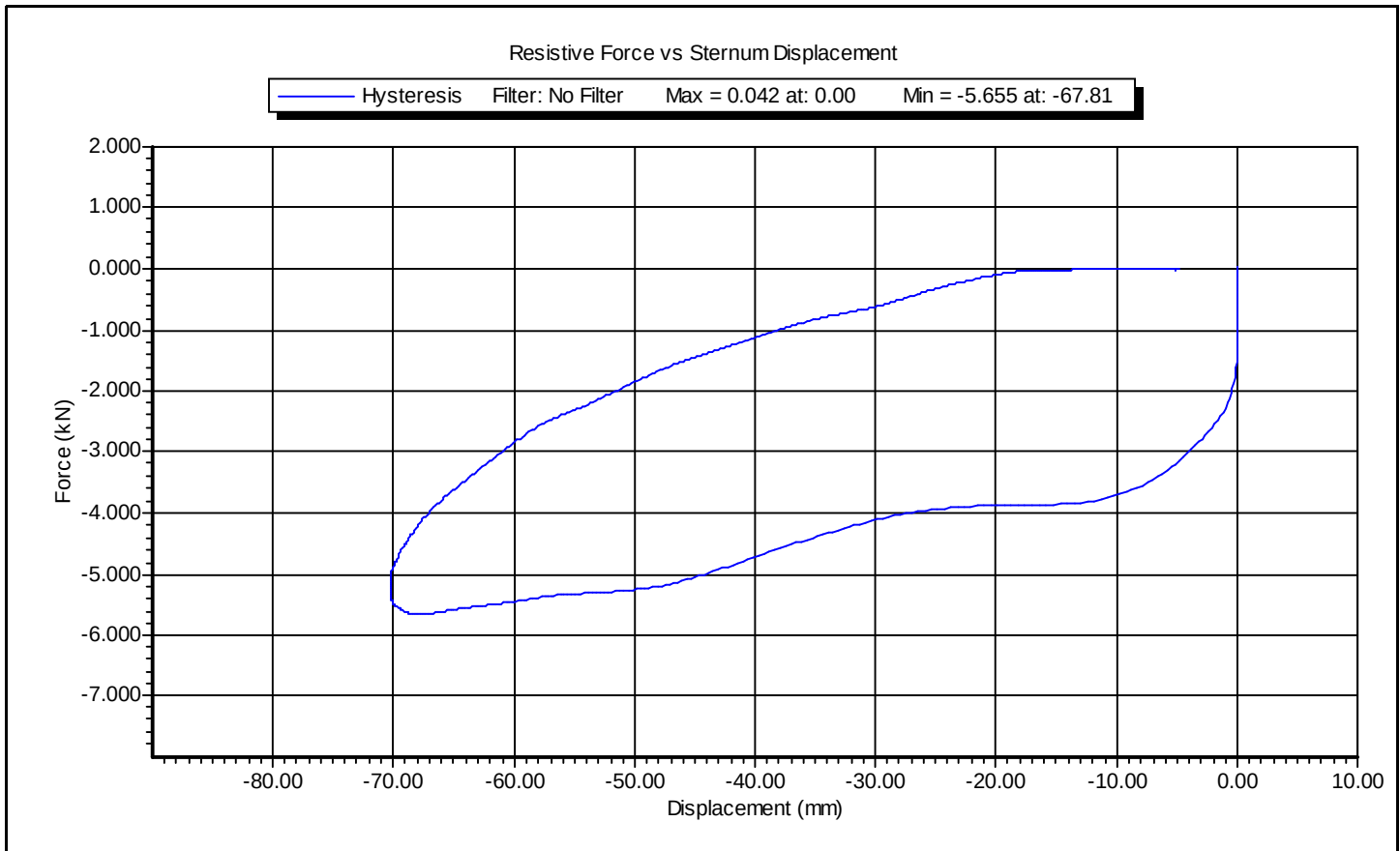
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-061	6/1/2010

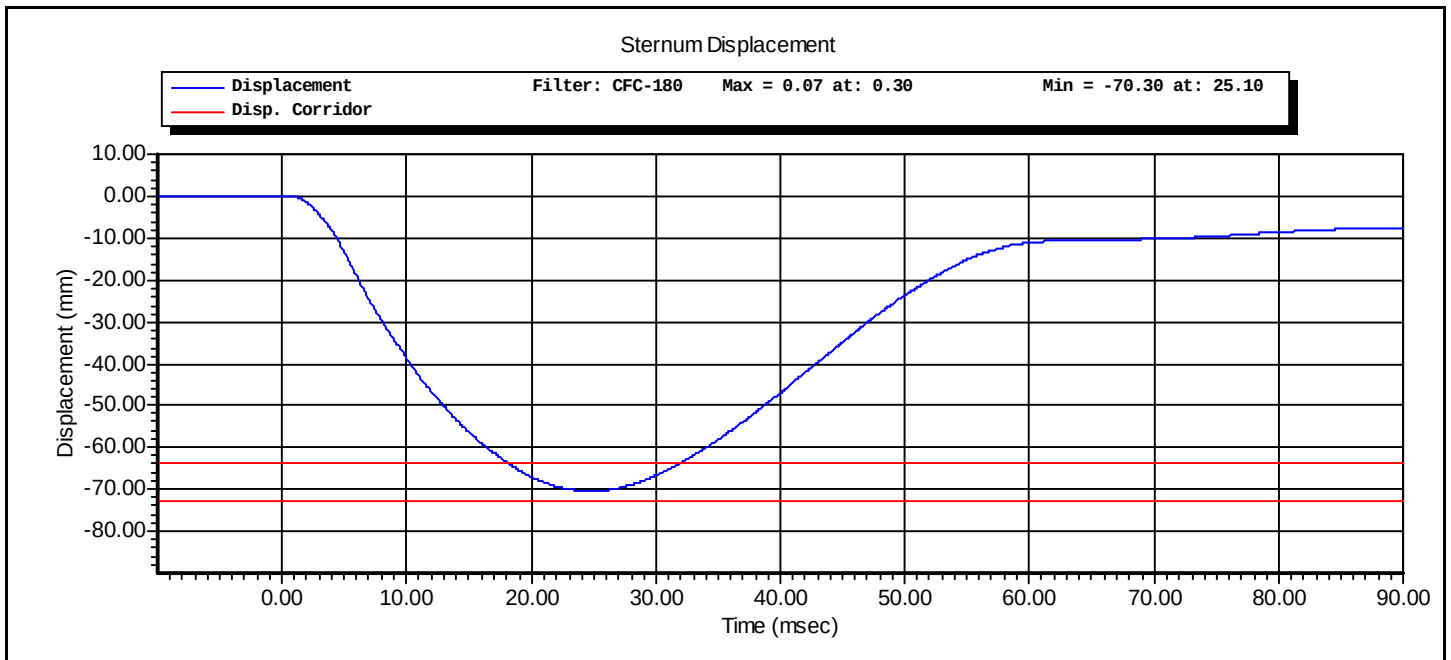
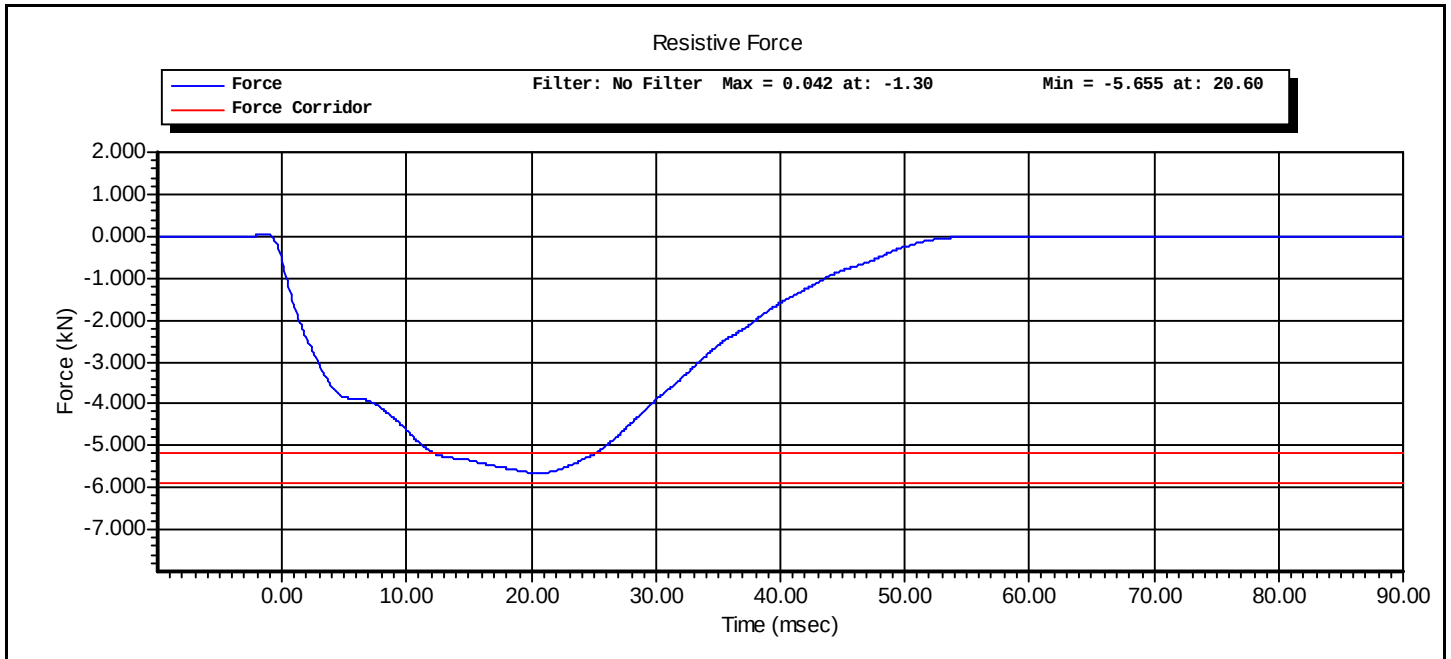
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Test Time: **5:52:03 PM**

Test Date: **10/15/2010**

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	10/15/2010
Test Number:	1	Test Time:	5:52:03 PM





CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number: 061
Test Number: 1
Comments: LEFT

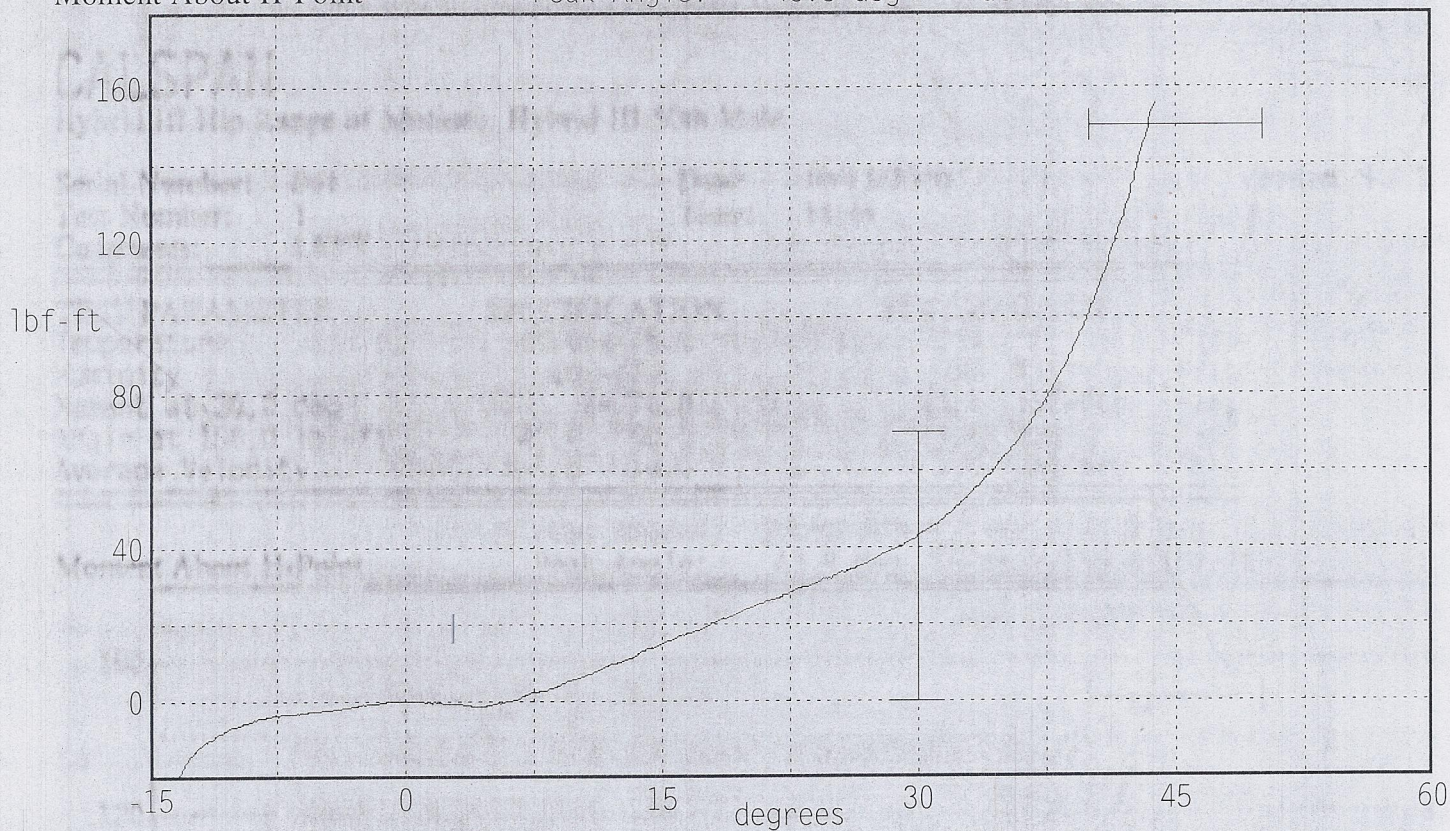
Date: 10/13/2010
Time: 11:46

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	33 % Pass
Moment at 30.0 deg	<= 70.0	43.2 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.4 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Peak Moment: 155.6 lbf-ft at 43.8 deg
Peak Angle: 43.8 deg at 155.6 lbf-ft

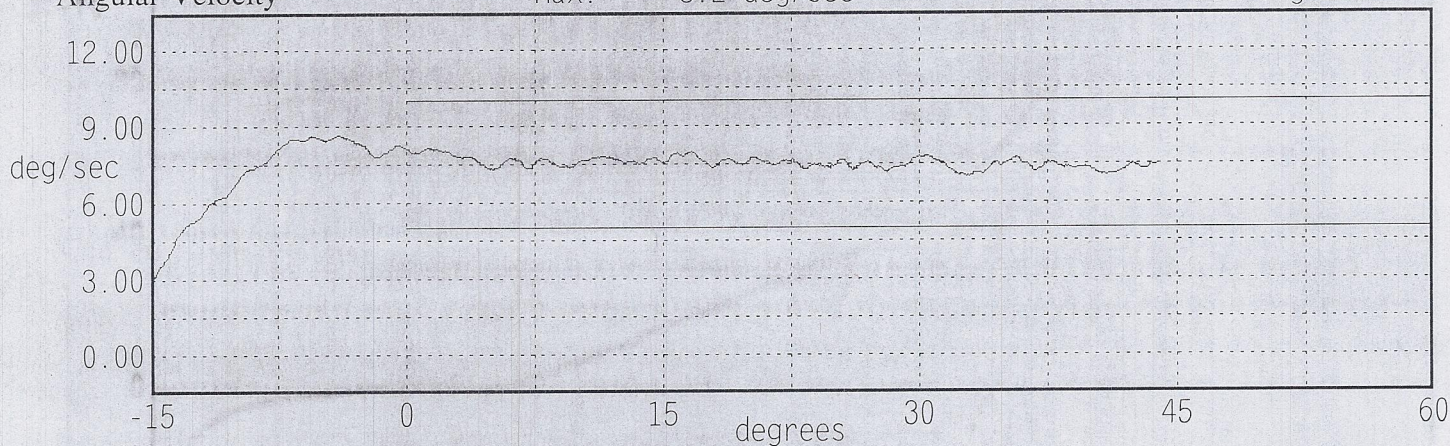
Moment About H-Point



Angular Velocity

Max: 8.2 deg/sec

Min: 7.0 deg/sec



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number: 061
Test Number: 1
Comments: RIGHT

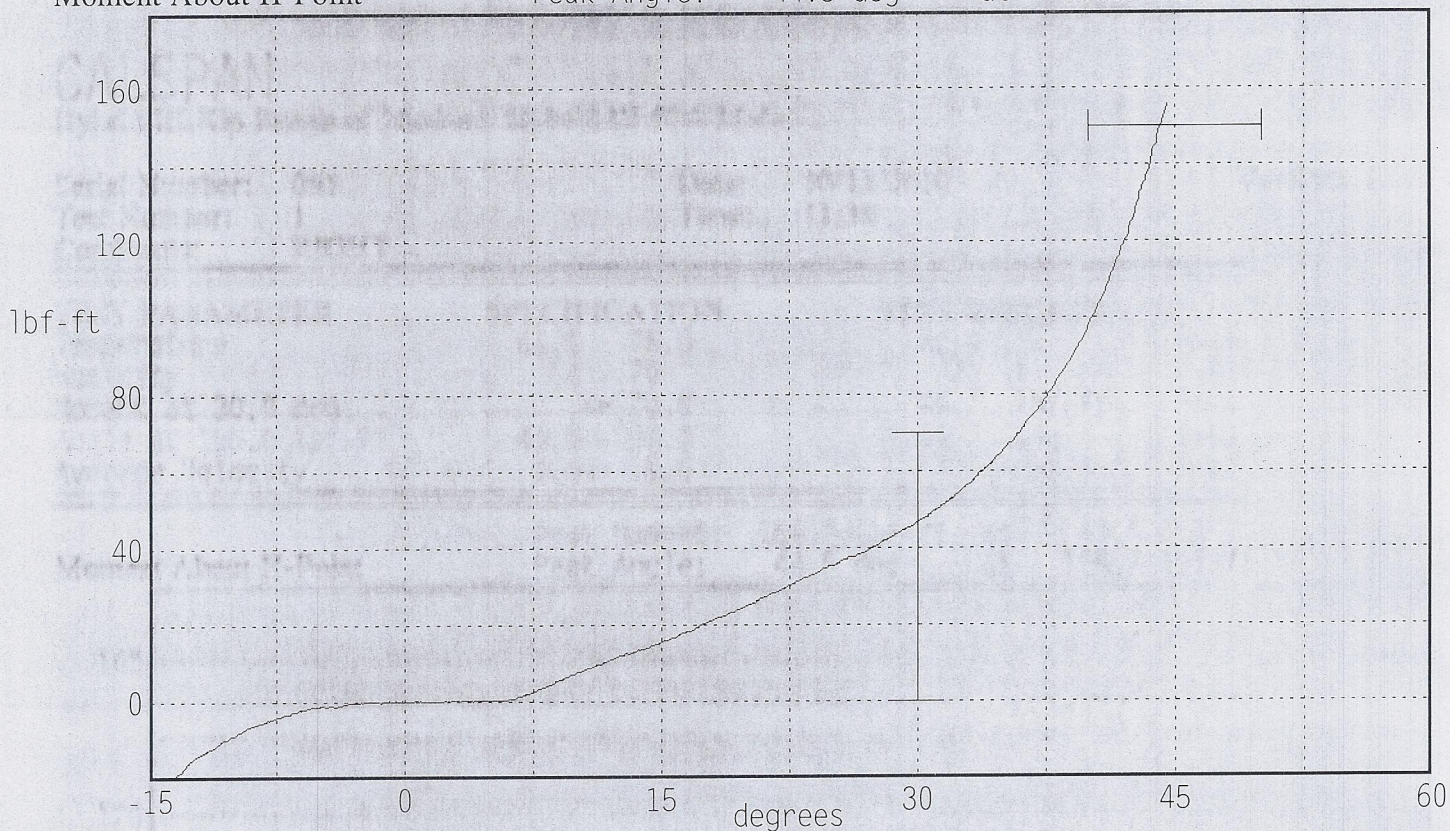
Date: 10/13/2010
Time: 11:38

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	33 % Pass
Moment at 30.0 deg	<= 70.0	46.7 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.2 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Peak Moment: 155.7 lbf-ft at 44.5 deg
Peak Angle: 44.5 deg at 155.7 lbf-ft

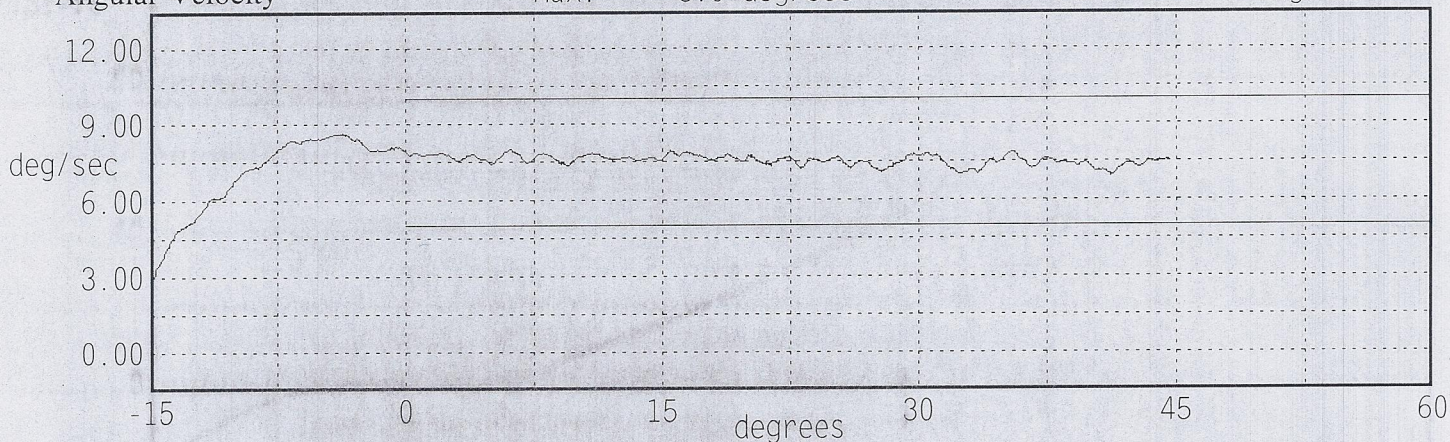
Moment About H-Point



Angular Velocity

Max: 8.0 deg/sec

Min: 6.9 deg/sec





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/13/2010
Test Number:	1	Test Time:	4:22:52 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	077

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-5.78 -- -4.72	-5.31 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **4:22:52 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **4:22:52 PM**

Test Date: **10/13/2010**

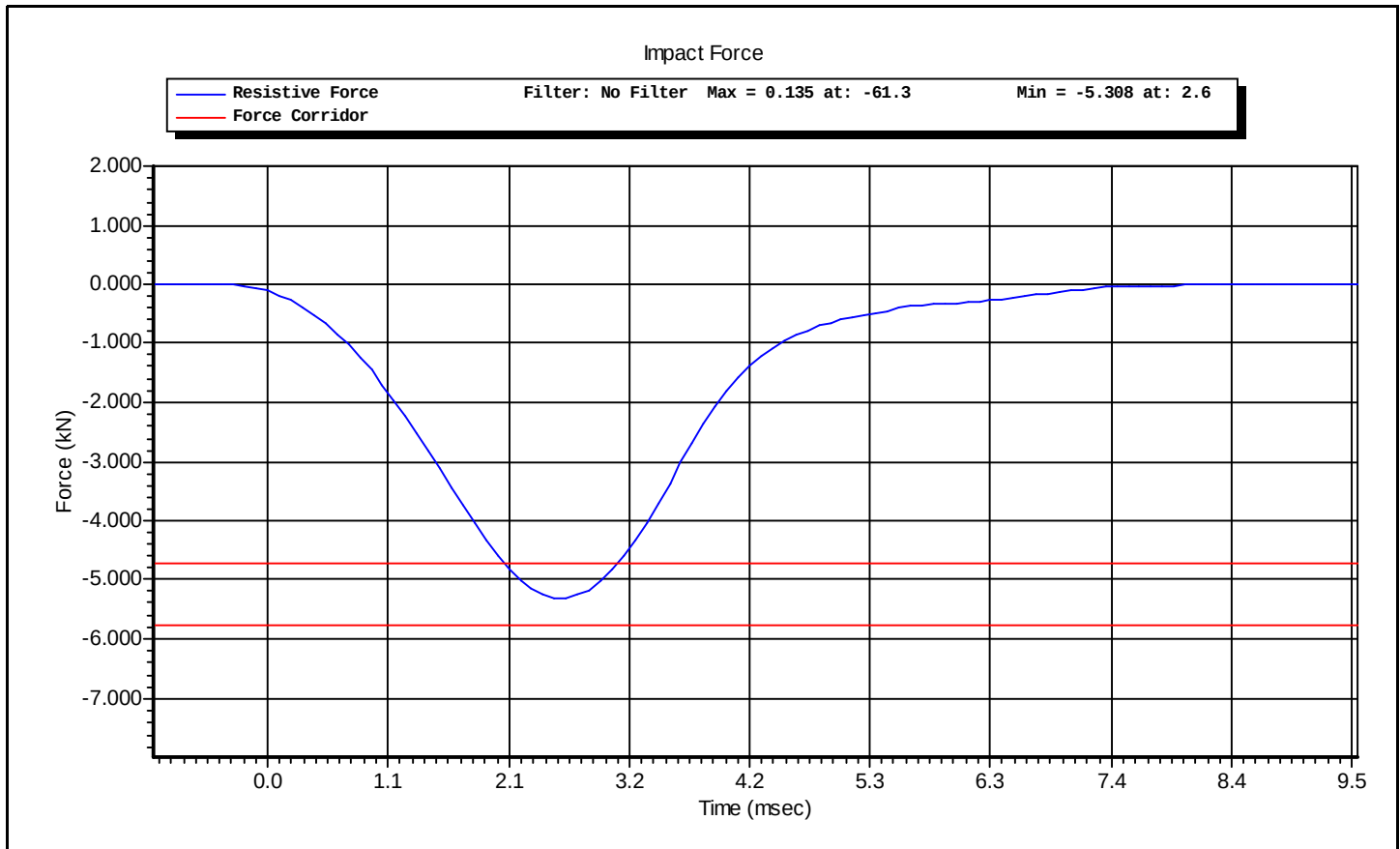


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/13/2010
Test Number:	1	Test Time:	4:22:52 PM



Test ID: **Left Knee**

Test Time: **4:22:52 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/13/2010
Test Number:	1	Test Time:	3:58:02 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3266

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.07 -- 2.13	2.07 m/s P
Resistive Force	-5.78 -- -4.72	-5.02 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **3:58:02 PM**

Test Date: **10/13/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right Knee**

Test Time: **3:58:02 PM**

Test Date: **10/13/2010**

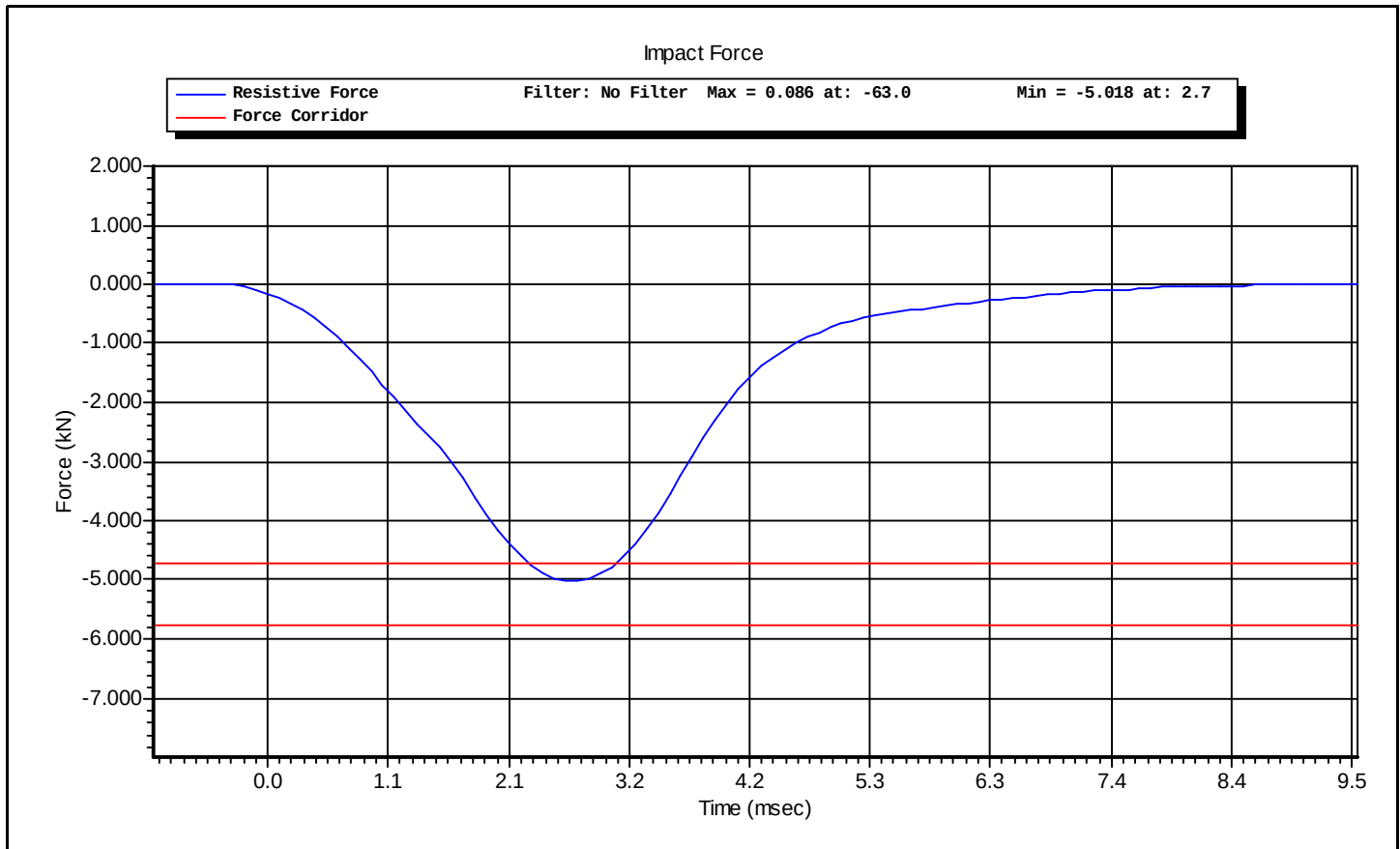


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/13/2010
Test Number:	1	Test Time:	3:58:02 PM



Test ID: **Right Knee**

Test Time: **3:58:02 PM**

Test Date: **10/13/2010**

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

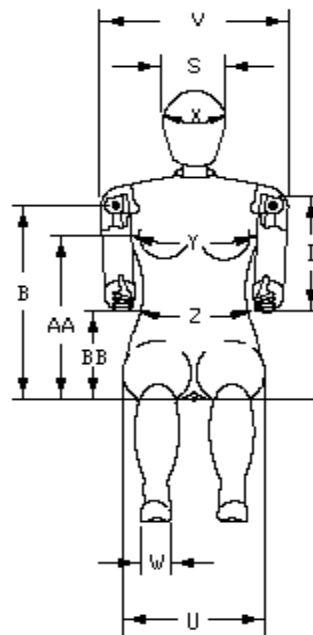
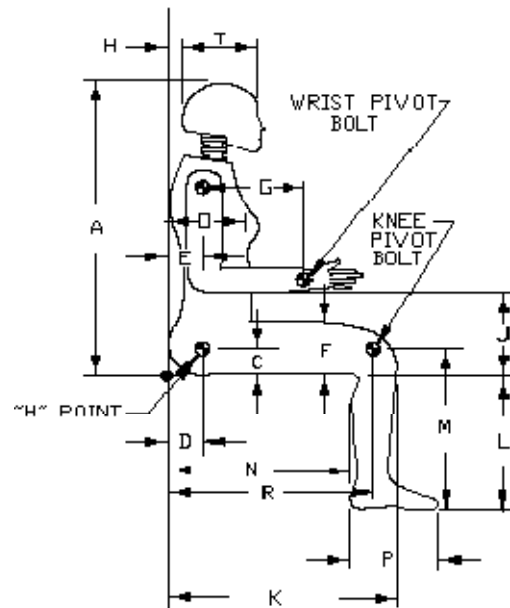
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	401	Yes
N	Buttock Popliteal Length	414 – 439.4	425	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	222	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	479	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	309	Yes
V	Shoulder Breadth	350.5 – 365.7	359	Yes
W	Foot Breadth	78.8 - 94	88	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: SZ

Date: 10/15/2010

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/15/2010
Test Number:	1	Test Time:	8:35:34 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.0 deg C P
Humidity	10 -- 70	39 %RH P
Resultant Acceleration	250 -- 300	277 g P
Oscillation	0.0 -- 10.0	2.5 % P
Lateral Acceleration	-15.00 -- 15.00	-3.77 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **8:35:34 AM**

Test Date: **10/15/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **8:35:34 AM**

Test Date: **10/15/2010**

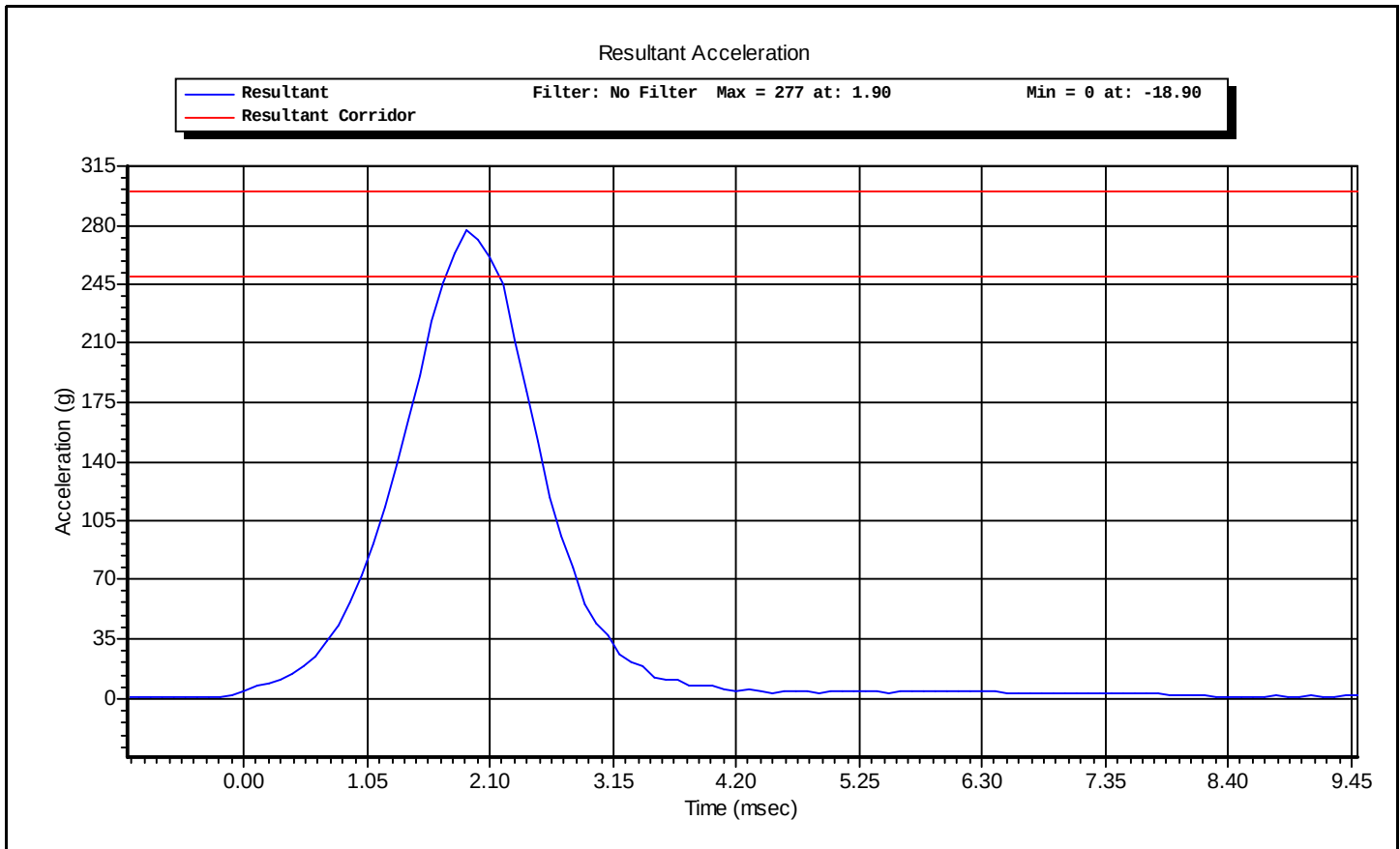


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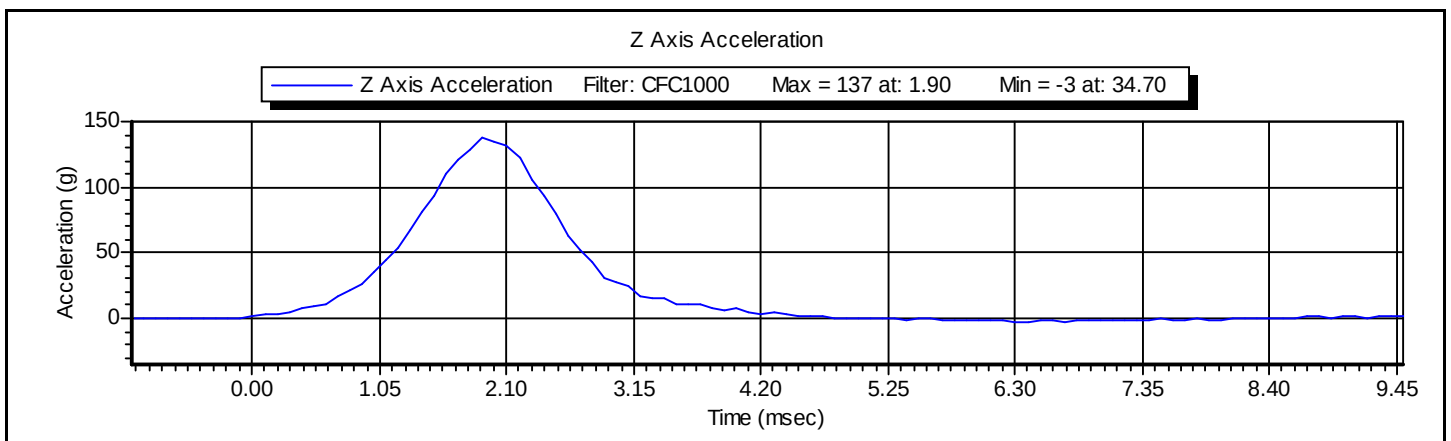
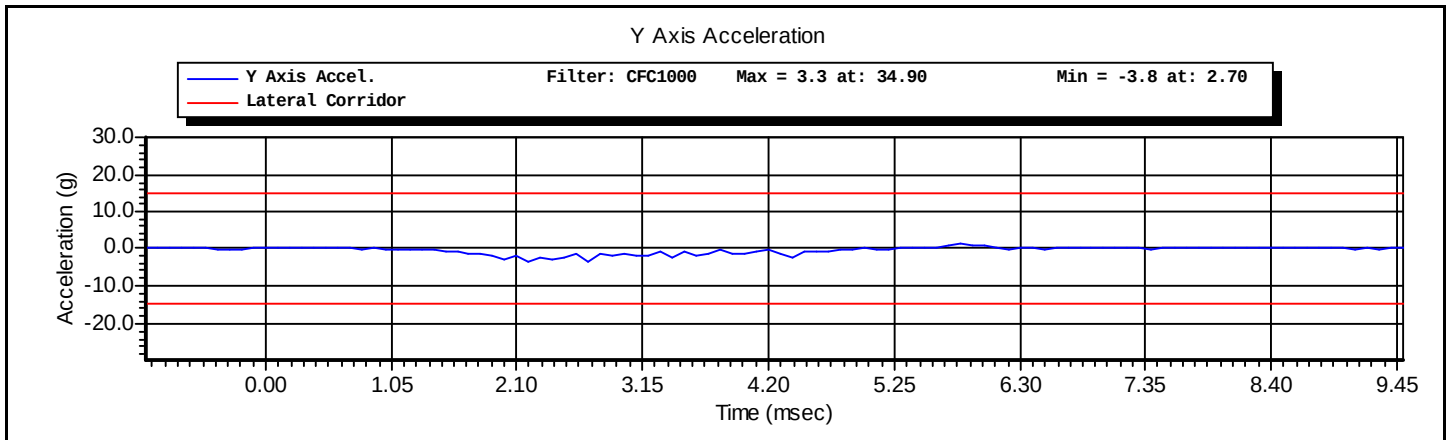
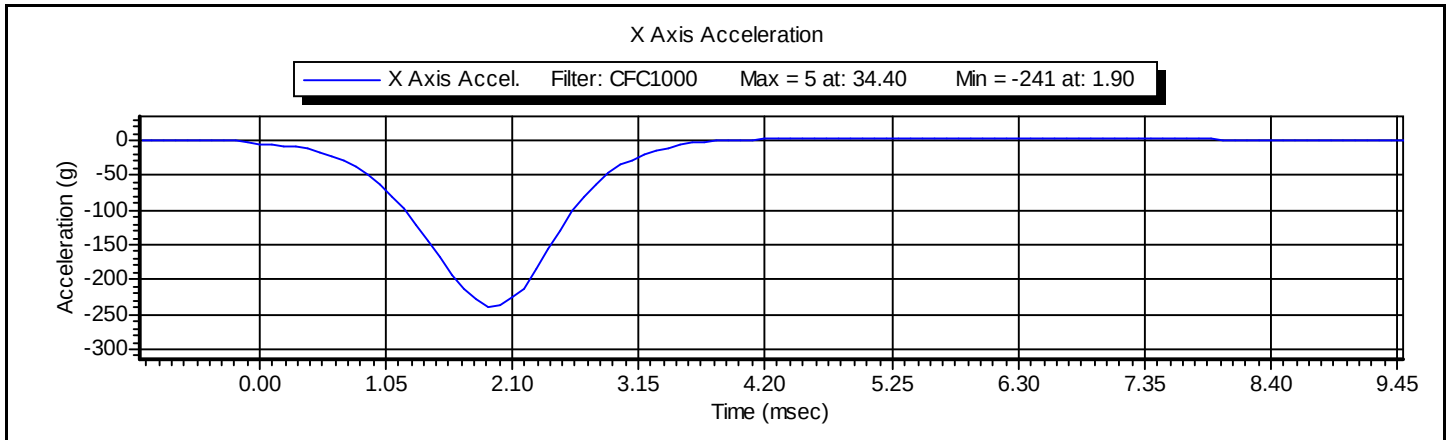
Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/15/2010
Test Number:	1	Test Time:	8:35:34 AM



Test ID: Head Drop

Test Time: 8:35:34 AM

Test Date: 10/15/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/14/2010
Test Number:	1	Test Time:	3:12:50 PM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	5.95 -- 6.19	6.09 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.83 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.61 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.20 m/s P
D Plane Rotation	99.0 -- 114.0	109.2 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-58.8 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.7 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **3:12:50 PM**

Test Date: **10/14/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Extension**

Test Time: **3:12:50 PM**

Test Date: **10/14/2010**

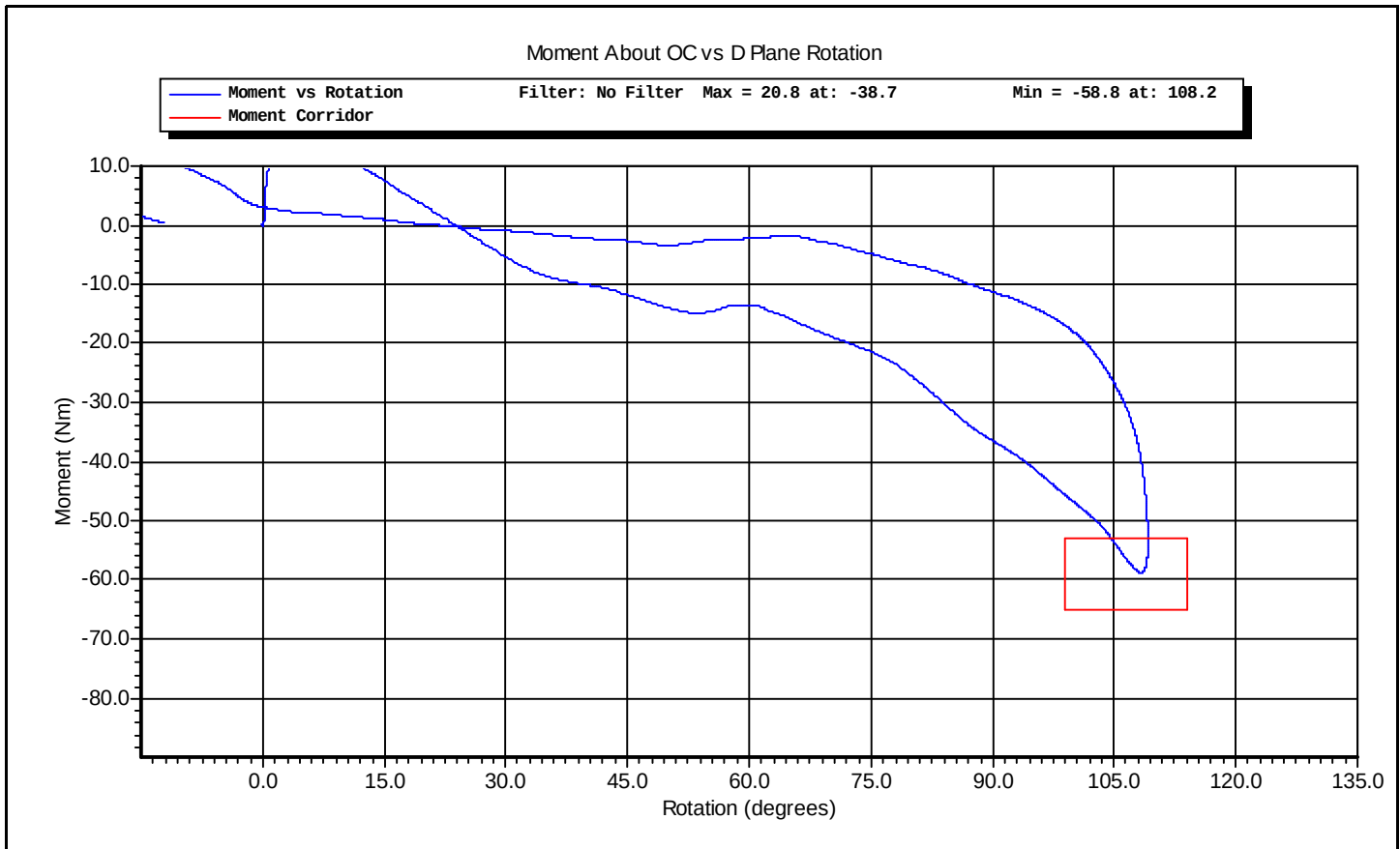


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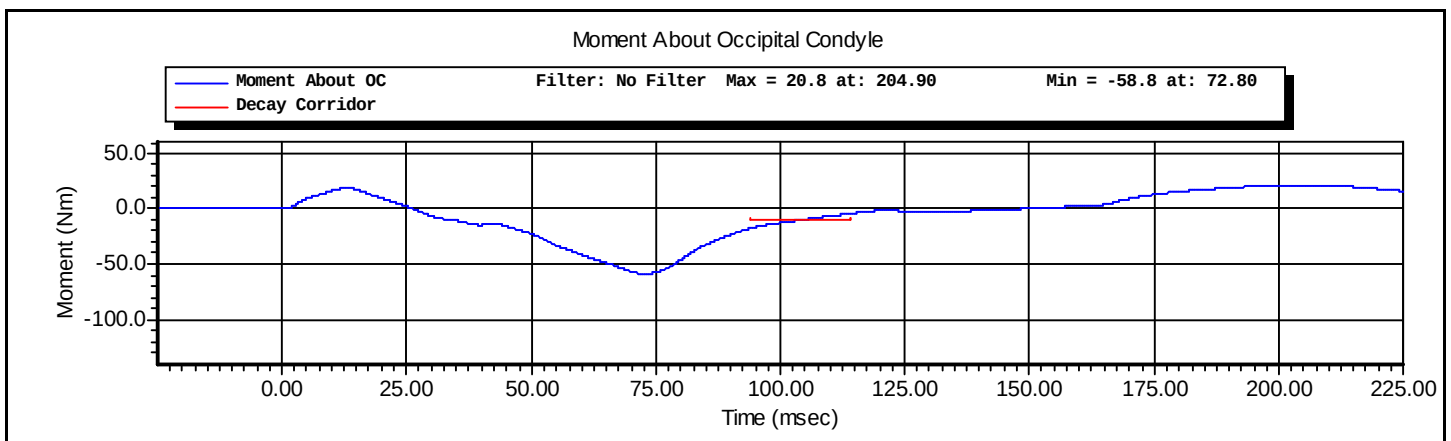
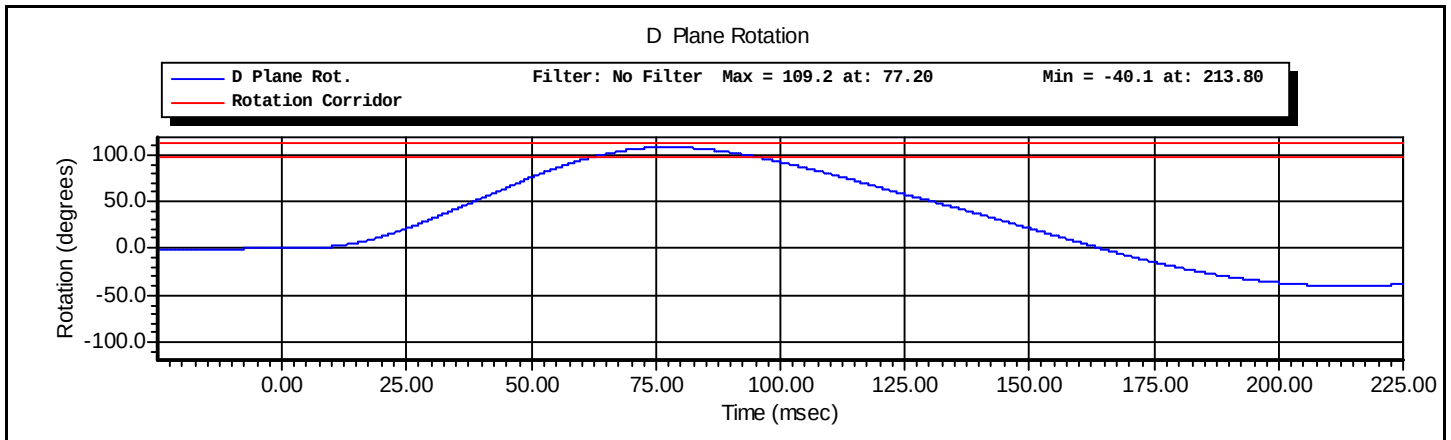
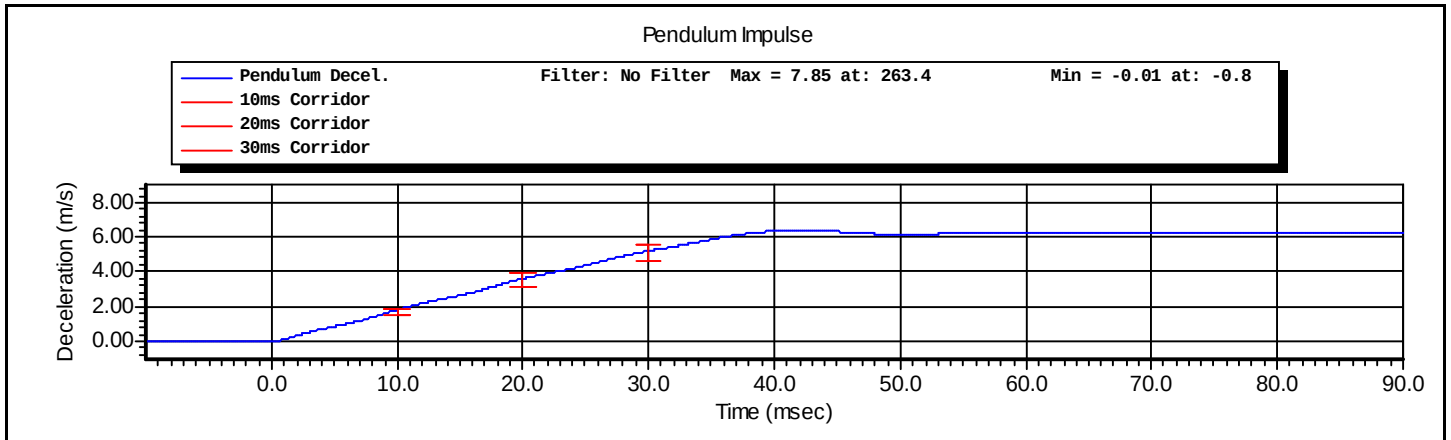
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/14/2010
Test Number:	1	Test Time:	3:12:50 PM



Test ID: Neck Extension Test Time: 3:12:50 PM

Test Date: 10/14/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/14/2010
Test Number:	3	Test Time:	2:40:13 PM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	6.89 -- 7.13	7.08 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.27 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.49 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.41 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.0 degrees P
Moment During Rotation Interval	69.0 -- 83.0	70.8 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	90.0 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **2:40:13 PM**

Test Date: **10/14/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Flexion**

Test Time: **2:40:13 PM**

Test Date: **10/14/2010**

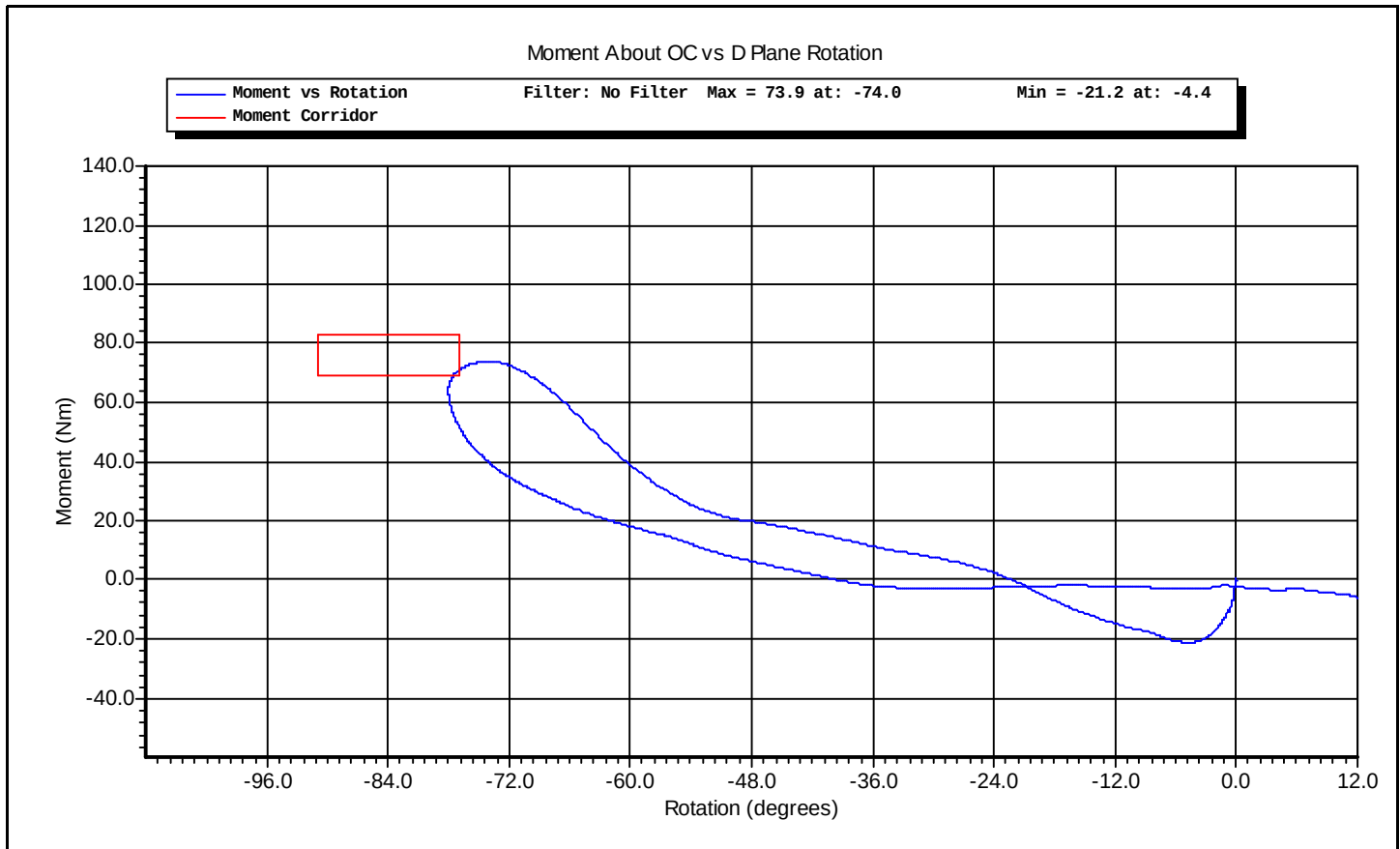


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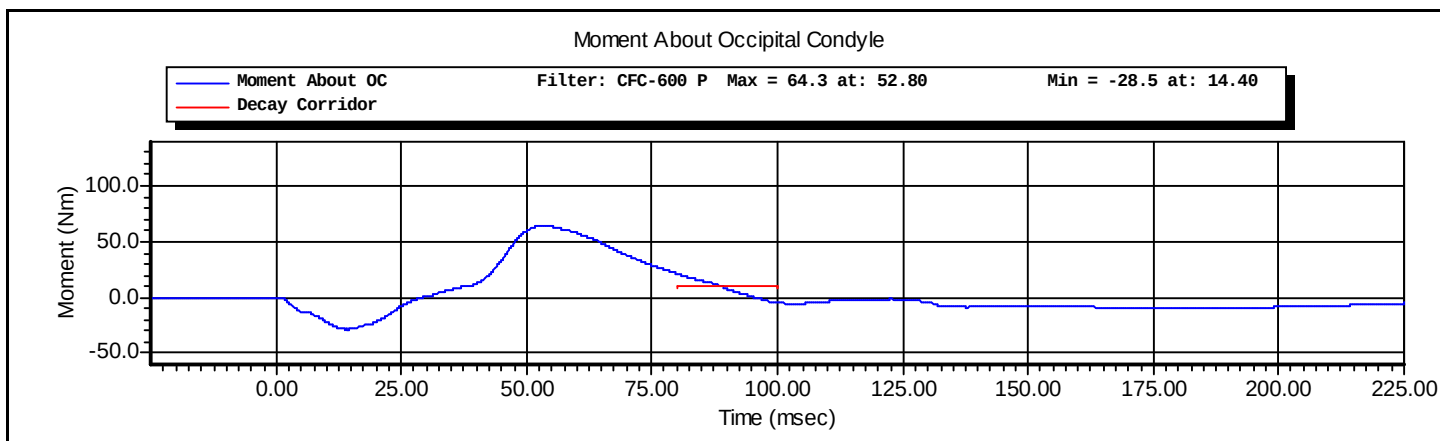
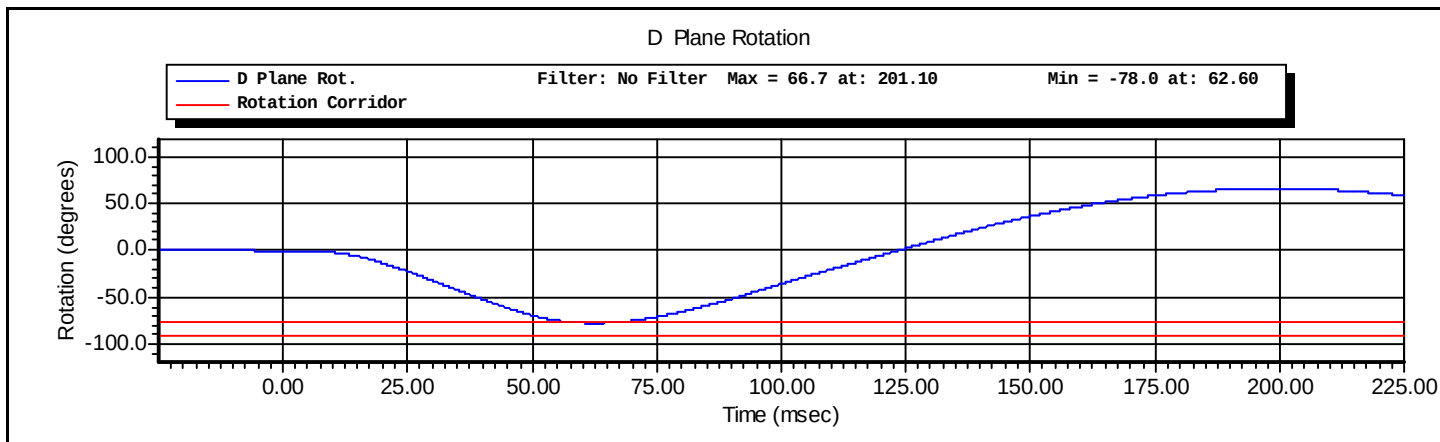
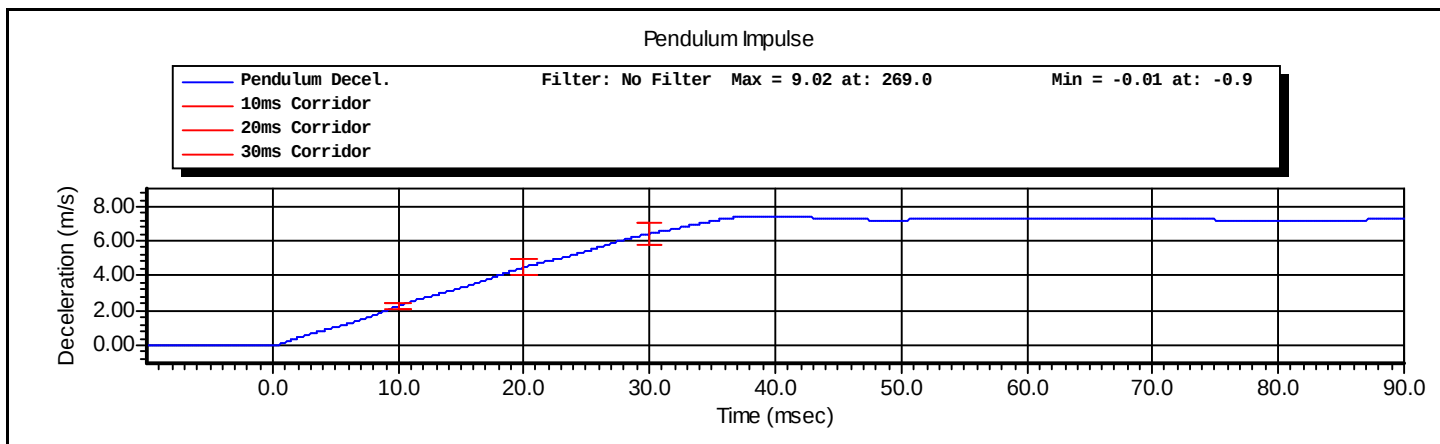
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/14/2010
Test Number:	3	Test Time:	2:40:13 PM



Test ID: Neck Flexion

Test Time: 2:40:13 PM

Test Date: 10/14/2010



Torso Flexion Test

Technician: AR

Calibration Date: 10/15/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	39%	P
Max Force @ 45 deg	320 – 390N	362N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	15°	P
Final ref plan angle	Initial ref plane ± 8 deg	21°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/15/2010
Test Number:	4	Test Time:	4:59:41 PM

Component Part Number	Component Serial Number
Ribs 880105-RS	
Chest Jacket - 880105-355-E	948
Lumbar Spine - 880105-1095	

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	39.0 %RH	P
Velocity	6.59	--	6.83	6.70 m/s	P
Sternum Displacement	-58.0	--	-50.0	-52.1 mm	P
Force During Displacement Interval	-4400	--	-3900	-4393 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-4383 N	P
Hysteresis	69	--	85	69 %	P

All test parameters are within specifications

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

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

Test ID: **Thorax Impact**

Test Time: **4:59:41 PM**

Test Date: **10/15/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-273	4/13/2010

Test ID: **Thorax Impact**

Test Time: **4:59:41 PM**

Test Date: **10/15/2010**



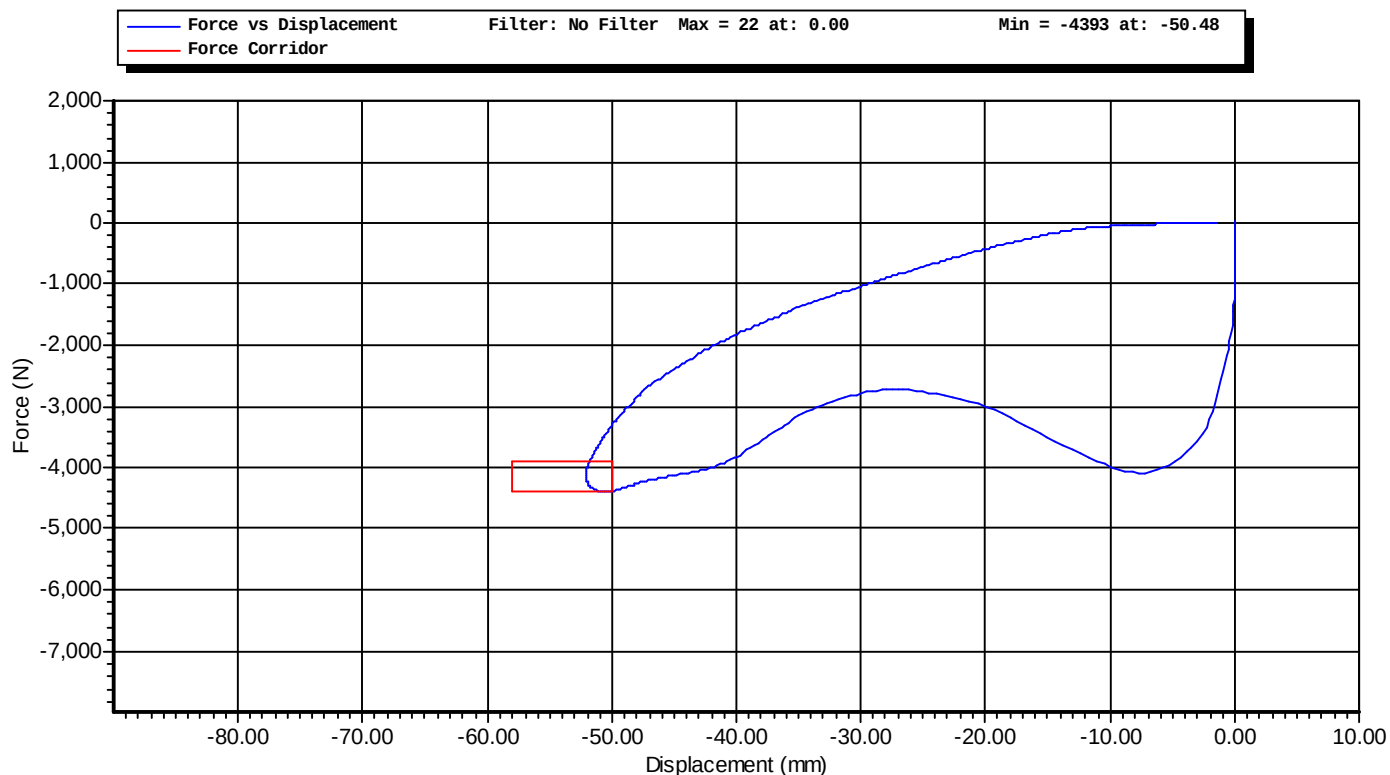
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/15/2010
Test Number:	4	Test Time:	4:59:41 PM

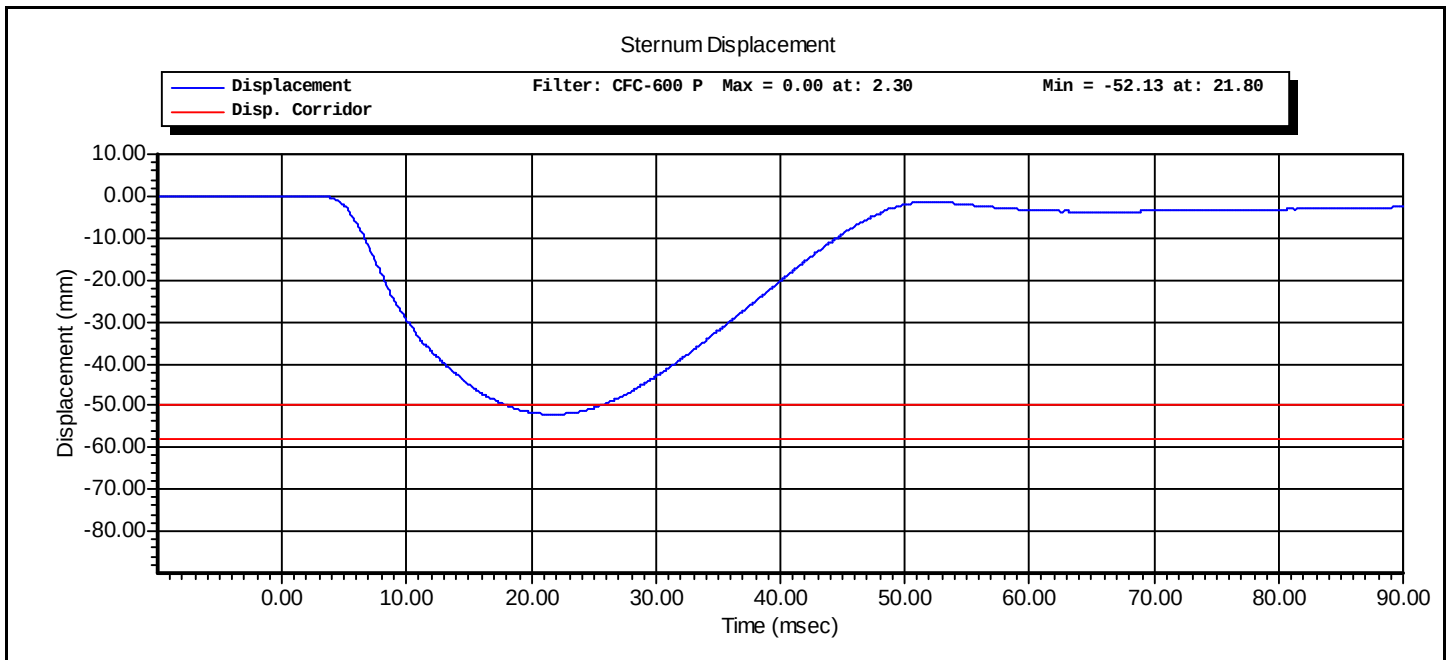
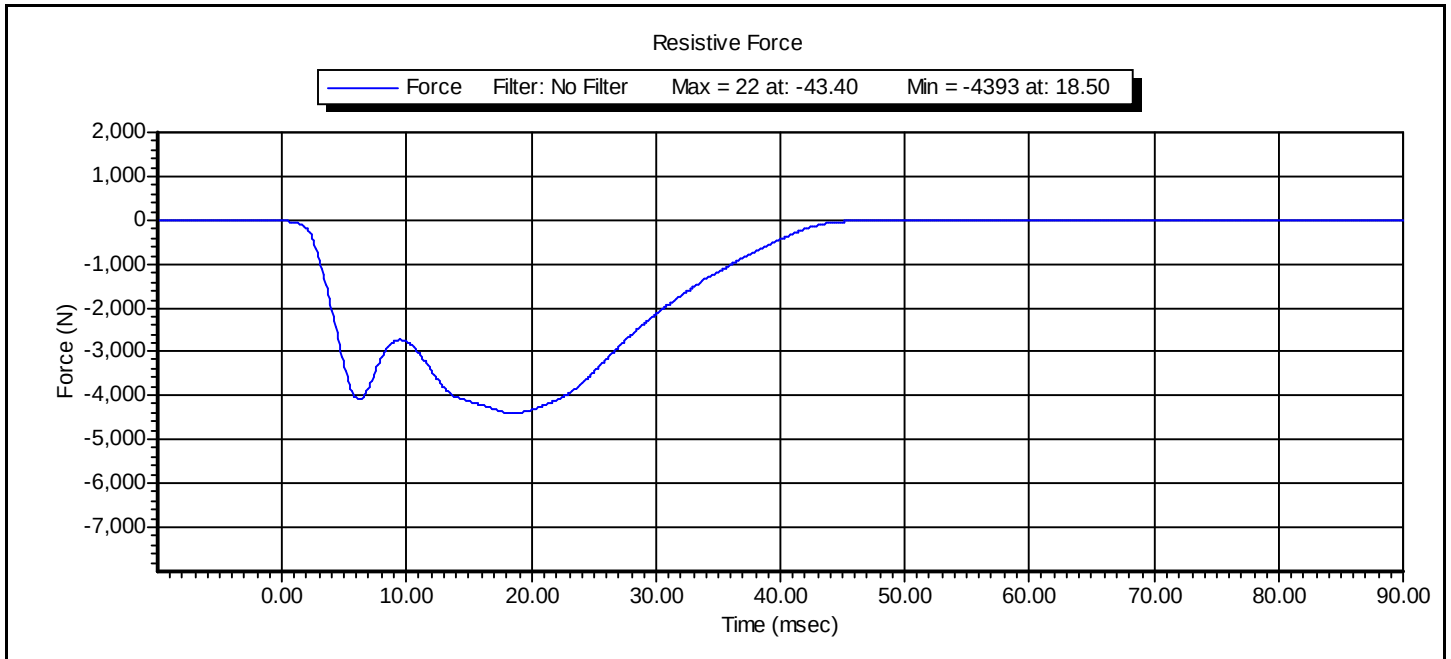
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

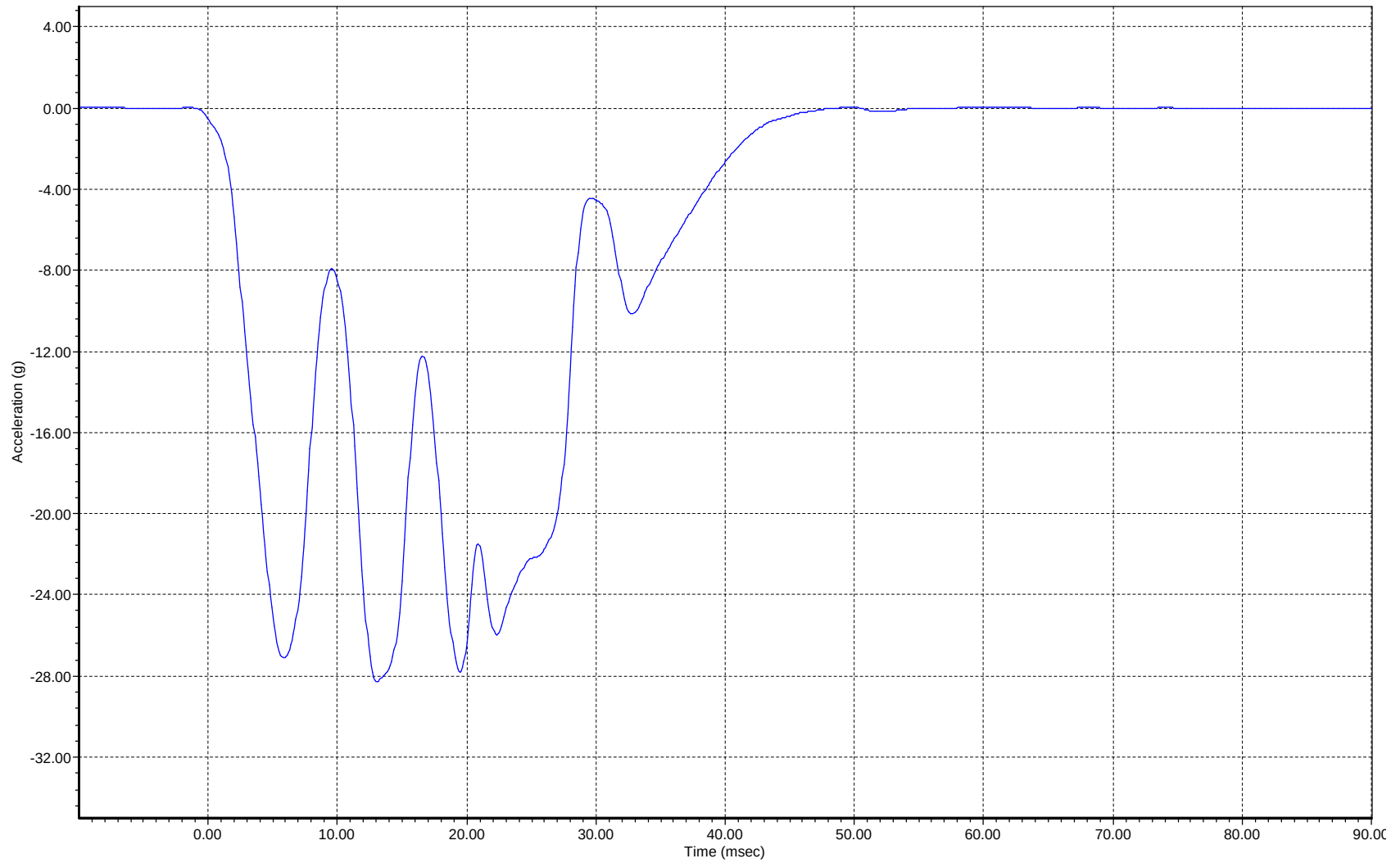
Test Time: 4:59:41 PM

Test Date: 10/15/2010



Probe Accelerometer

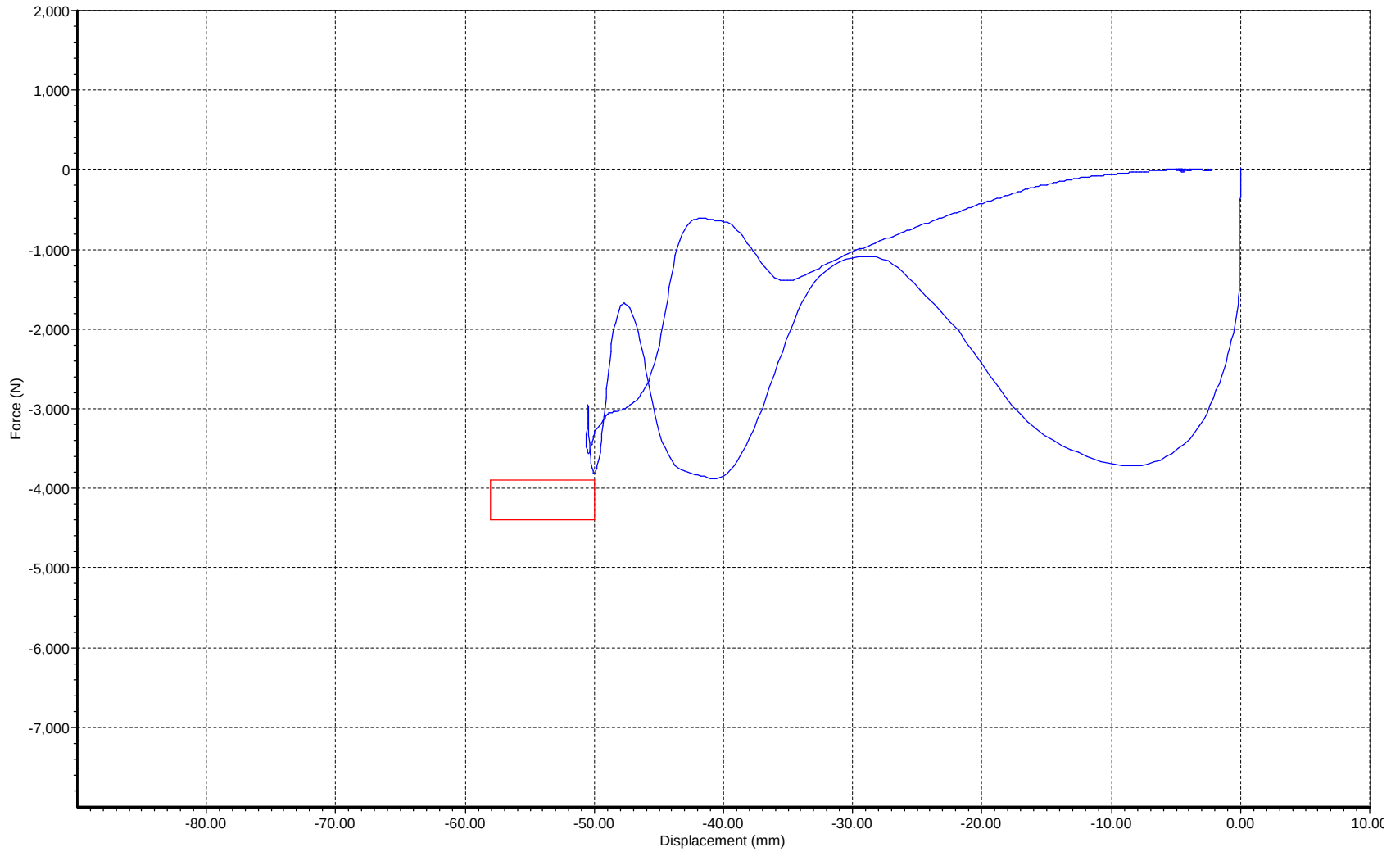
Probe Accel. Filter: CFC-180 Max = 0.16 at: -43.20 Min = -28.28 at: 13.10



Hybrid III 5'th, Thorax Impact, 10/12/2010, 4:21:05 PM

Resistive Force vs Sternum Displacement

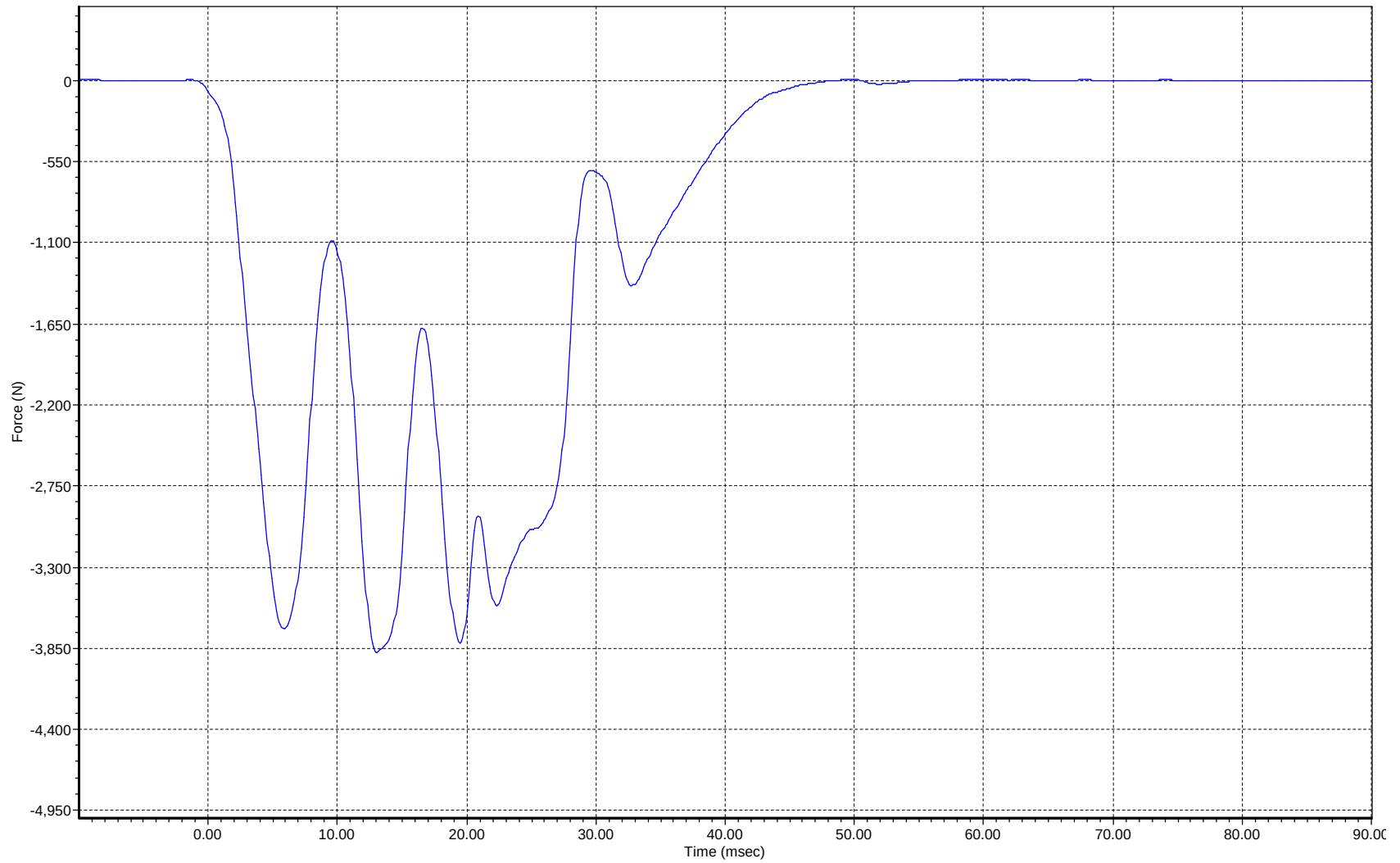
Force vs Displacement Filter: No Filter Max = 22 at: 0.00 Min = -3878 at: -40.80
Force Corridor



Hybrid III 5'th, Thorax Impact, 10/12/2010, 4:21:05 PM

Resistive Force

Force Filter: No Filter Max = 22 at: -43.20 Min = -3878 at: 13.10



Hybrid III 5'th, Thorax Impact, 10/12/2010, 4:21:05 PM



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/14/2010
Test Number:	1	Test Time:	4:02:18 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	43.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-4060 -- -3450	-3714 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **4:02:18 PM**

Test Date: **10/14/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **4:02:18 PM**

Test Date: **10/14/2010**

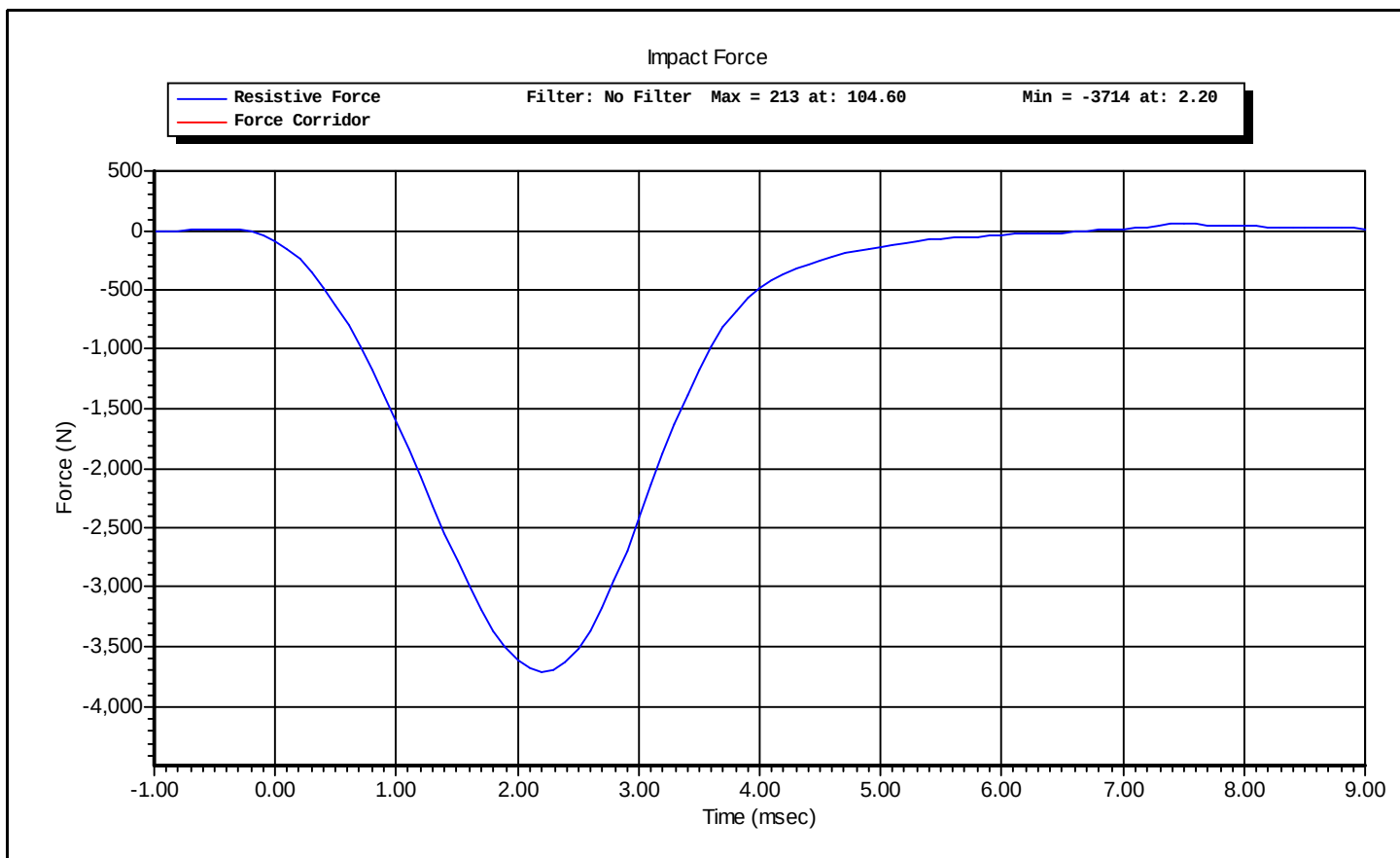


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/14/2010
Test Number:	1	Test Time:	4:02:18 PM



Test ID: **Left Knee**

Test Time: **4:02:18 PM**

Test Date: **10/14/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/14/2010
Test Number:	1	Test Time:	4:09:39 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	43.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-4060 -- -3450	-3710 N P

All test parameters are within specifications

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

Test ID: **Right Knee**

Test Time: **4:09:39 PM**

Test Date: **10/14/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right Knee**

Test Time: **4:09:39 PM**

Test Date: **10/14/2010**

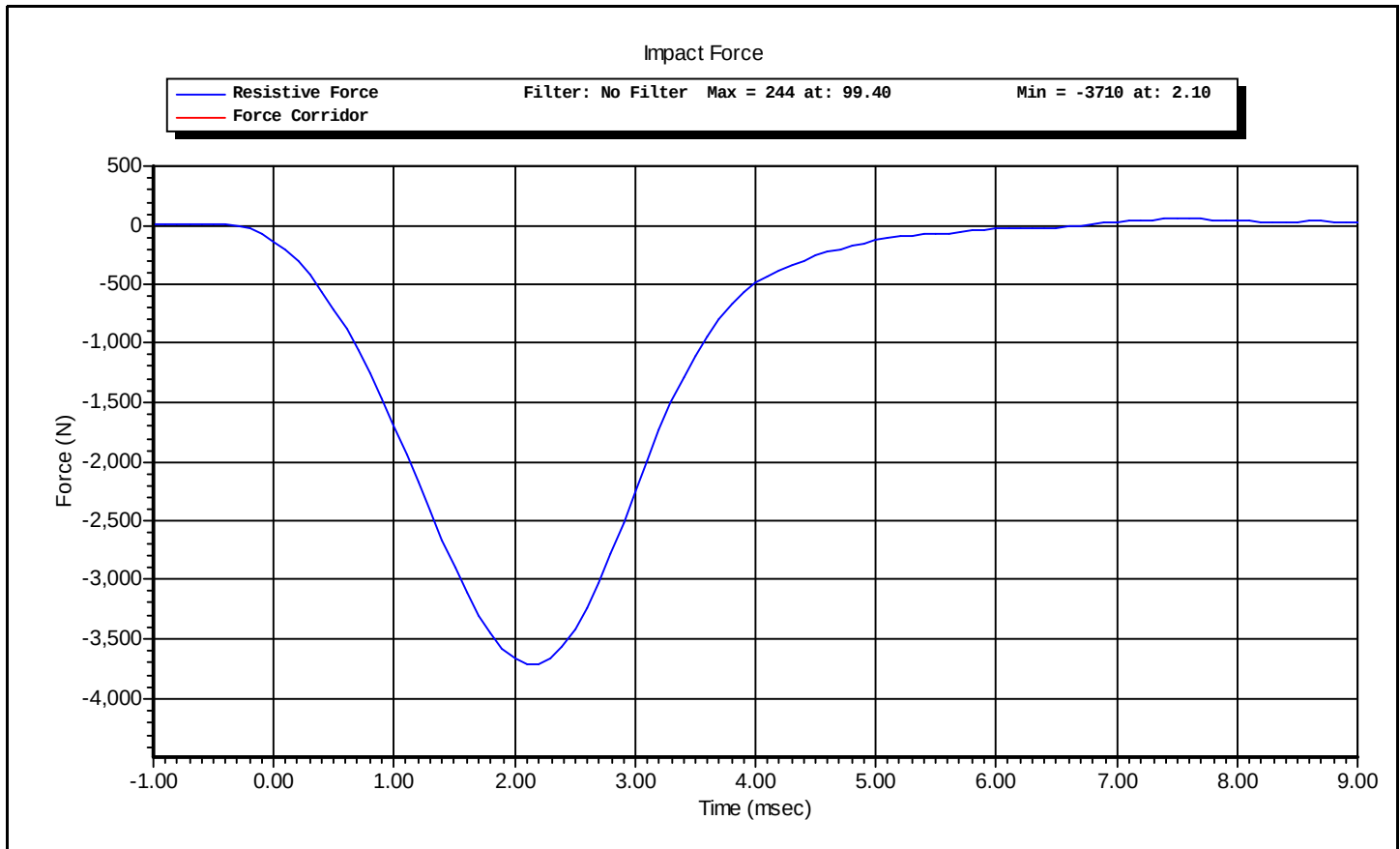


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/14/2010
Test Number:	1	Test Time:	4:09:39 PM



Test ID: **Right Knee**

Test Time: **4:09:39 PM**

Test Date: **10/14/2010**

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	2.04	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.3	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.7	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.2	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.4	Yes
L	Popliteal Height	16.9 - 17.9	17.5	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.5	Yes
P	Foot Length (right)	9.9 - 10.5	10.1	Yes
V	Shoulder Breadth	16.3 - 17.2	16.8	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: AR

Date: 9/24/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	3:05:29 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	243

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	56 %RH P
Resultant Acceleration	225 -- 275	256 g P
Oscillation	0.0 -- 10.0	4.4 % P
Lateral Acceleration	-15.00 -- 15.00	-7.69 g P

All test parameters are within specifications

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

Test ID: **Head Drop**

Test Time: **3:05:29 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **3:05:29 PM**

Test Date: **9/23/2010**

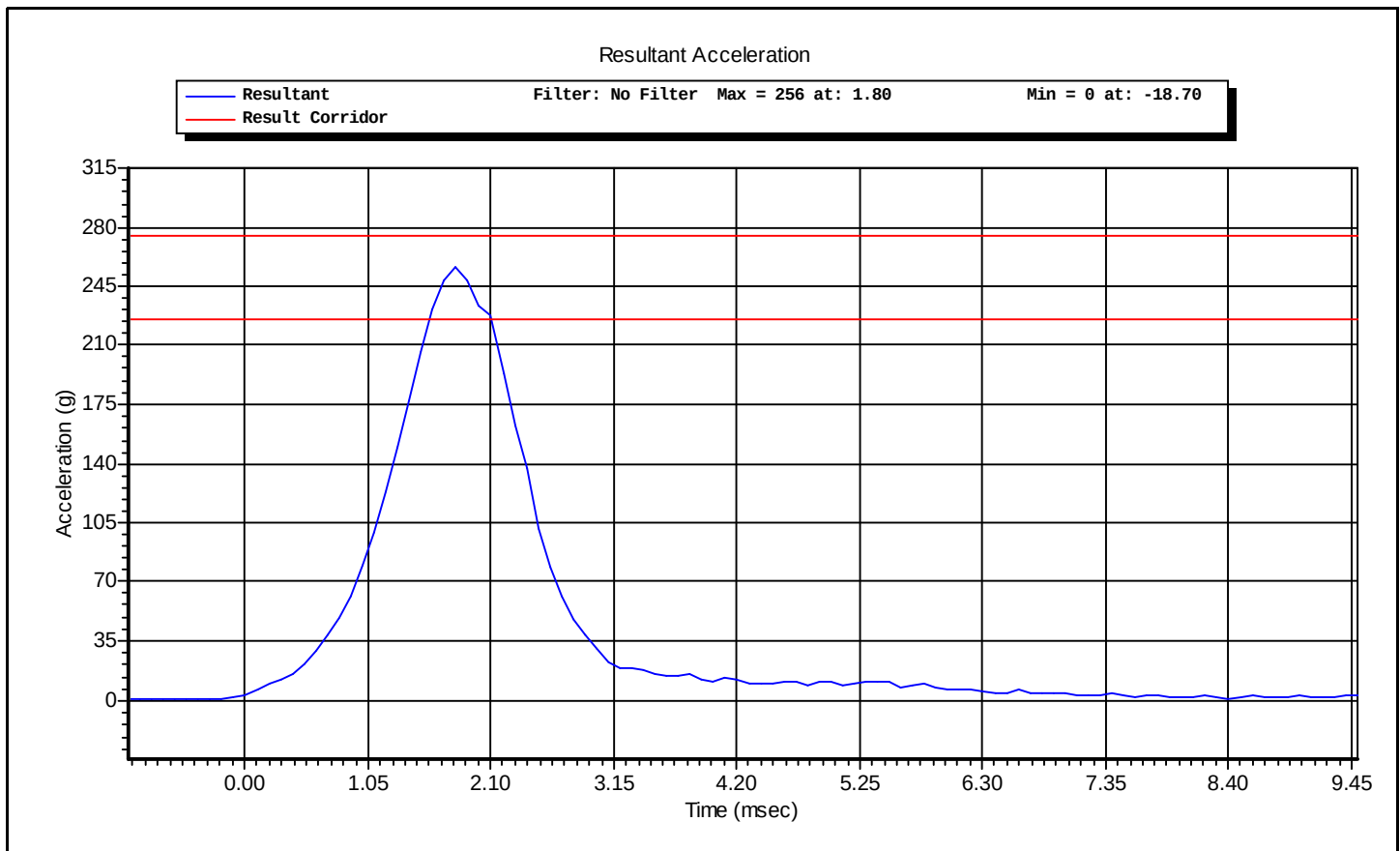


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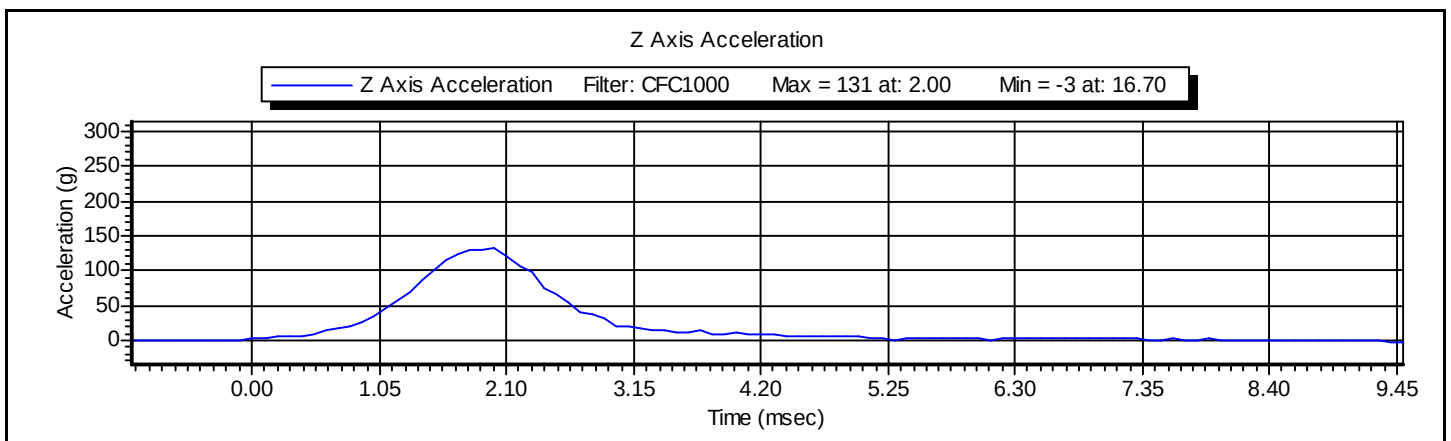
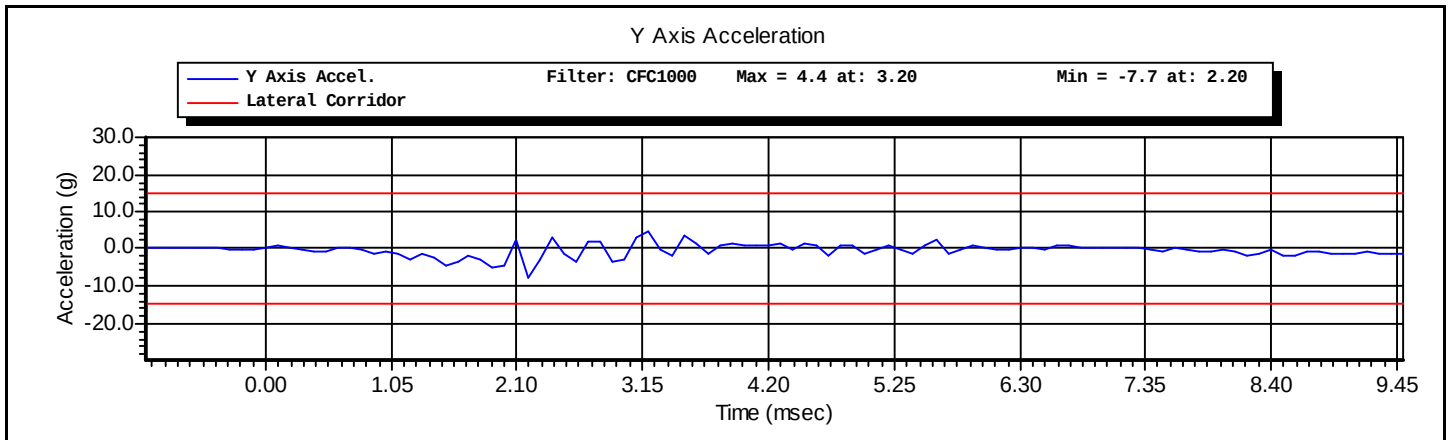
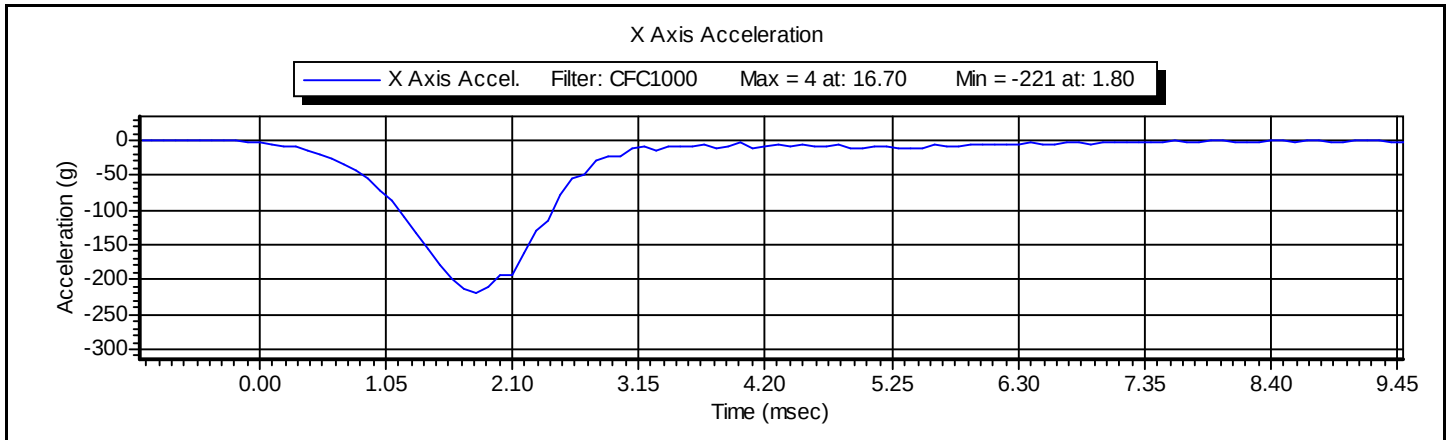
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	3:05:29 PM



Test ID: Head Drop

Test Time: 3:05:29 PM

Test Date: 9/23/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	2	Test Time:	9:45:55 AM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	59 %RH	P
Velocity		5.94	-- 6.19	6.13 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	19.0 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	17.2 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	13.5 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.7 g	P
Decel Time to	5 g	38.0	-- 46.0	43.3 ms	P
D Plane Rotation		81.0	-- 106.0	94.3 degrees	P
Time at Max Rotation		72.0	-- 82.0	77.4 ms	P
Rotation Decay to Zero		147.0	-- 174.0	158.7 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-68.2 Nm	P
Time at Max Moment		65.0	-- 79.0	72.3 ms	P
Moment Decay to Zero		120.0	-- 148.0	142.8 ms	P

All test parameters are within specifications

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

Test ID: **Neck Extension**

Test Time: **9:45:55 AM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Extension**

Test Time: **9:45:55 AM**

Test Date: **9/24/2010**

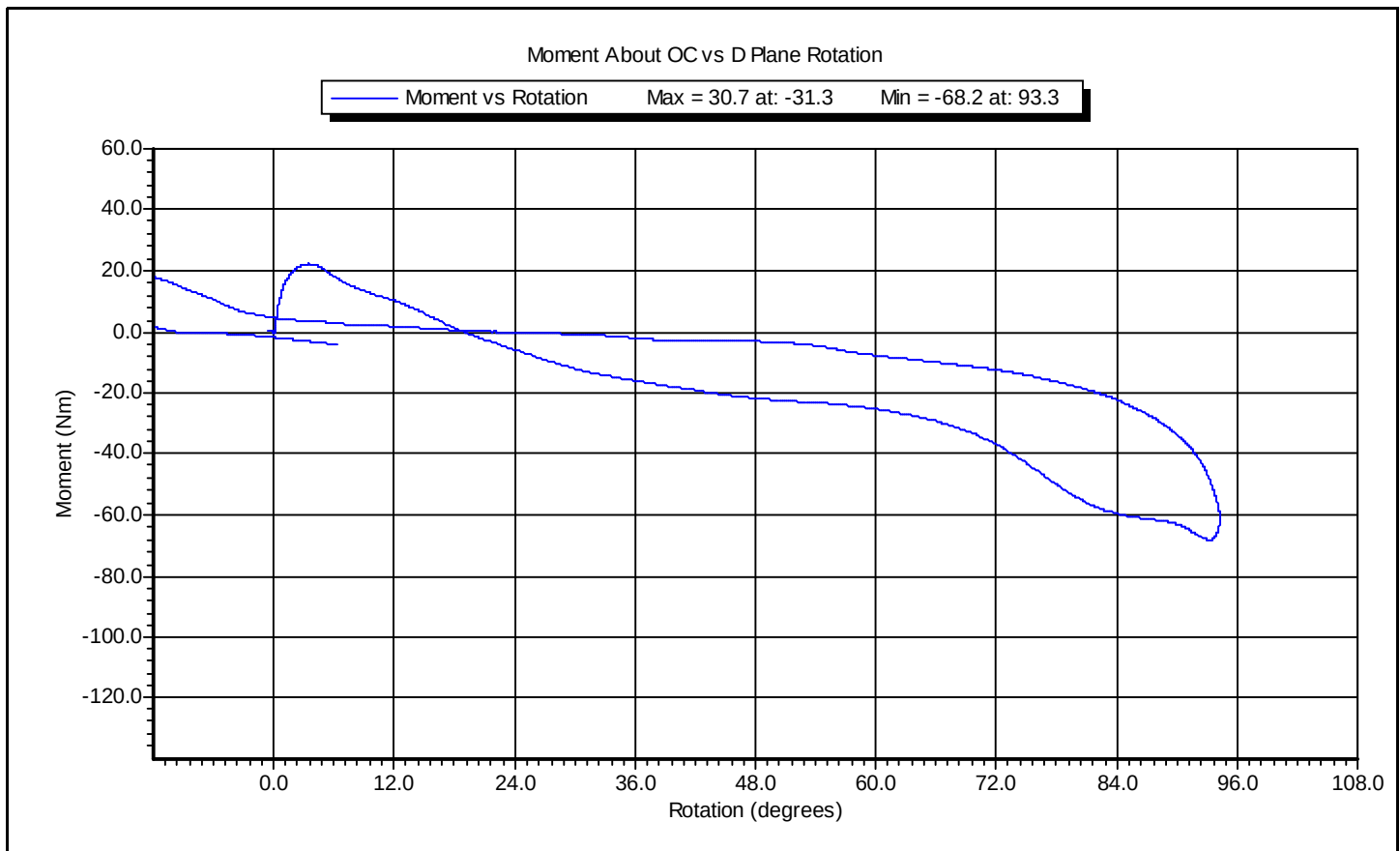


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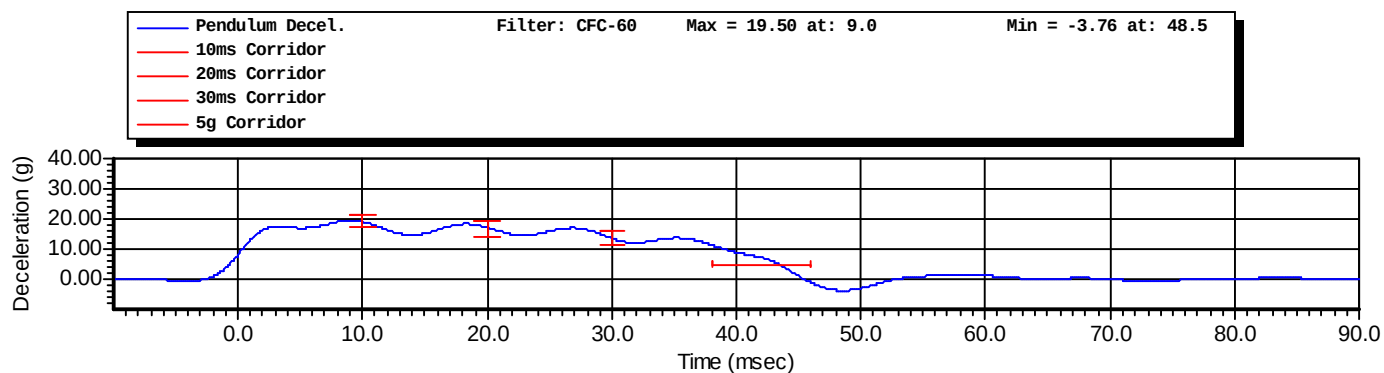
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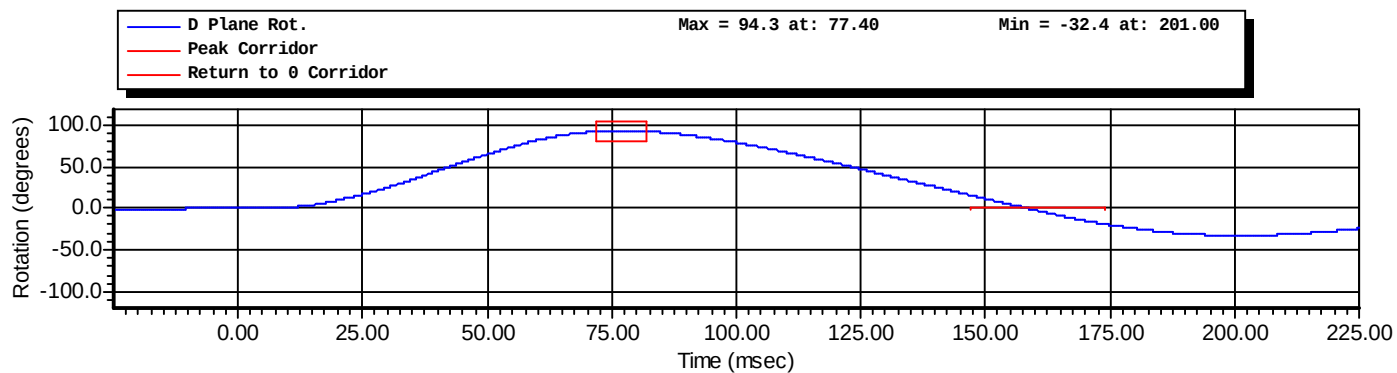
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	9/24/2010
Number of Test:	2	Time of Test:	9:45:55 AM



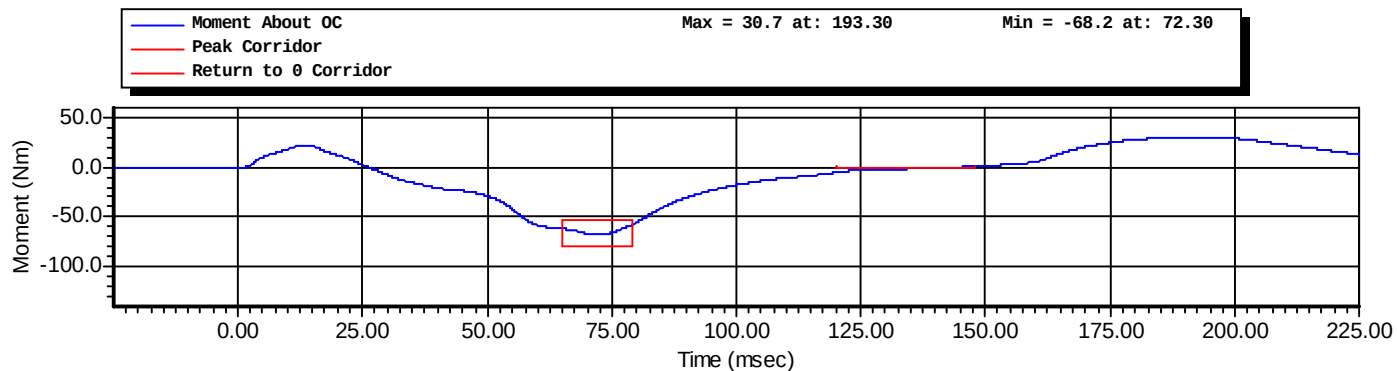
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	9/23/2010
Test Number:	1	Test Time:	7:05:58 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	53 %RH	P
Velocity		6.89	-- 7.13	7.09 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	26.4 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	21.0 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	16.3 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	16.3 g	P
Deceleration time to	5 g	34.0	-- 42.0	37.4 ms	P
D Plane Rotation		-78.0	-- -64.0	-71.4 degrees	P
Time at max rotation		57.0	-- 64.0	58.6 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.8 ms	P
Moment about OC		88.1	-- 108.4	98.9 Nm	P
Time at Max Moment		47.0	-- 58.0	49.8 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.0 ms	P

All test parameters are within specifications

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

Test ID: **Neck Flexion**

Test Time: **7:05:58 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

Test Time: **7:05:58 PM**

Test Date: **9/23/2010**

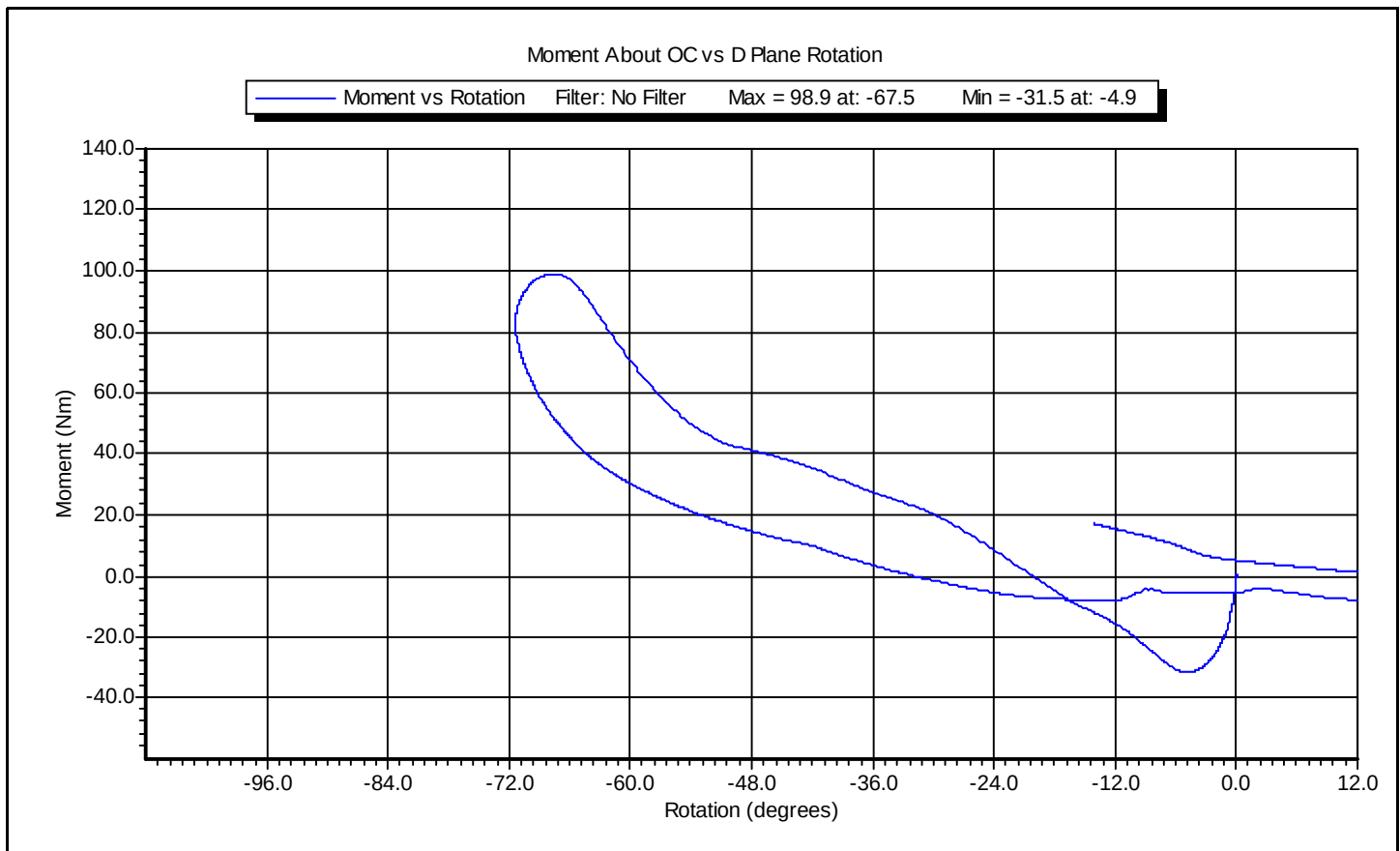


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	9/23/2010
Number of Test:	1	Time of Test:	7:05:58 PM

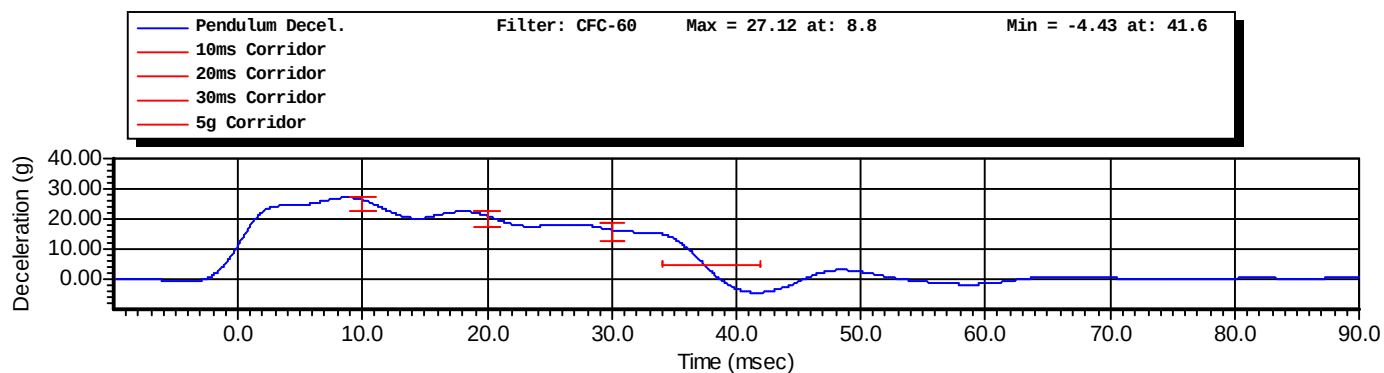


ID of Test: Neck Flexion

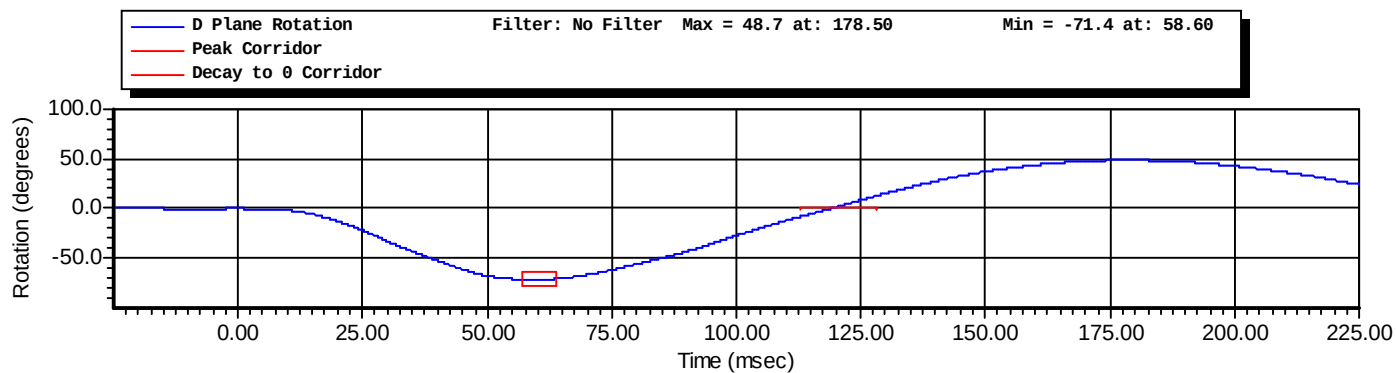
Time of Test: 7:05:58 PM

Date of Test: 9/23/2010

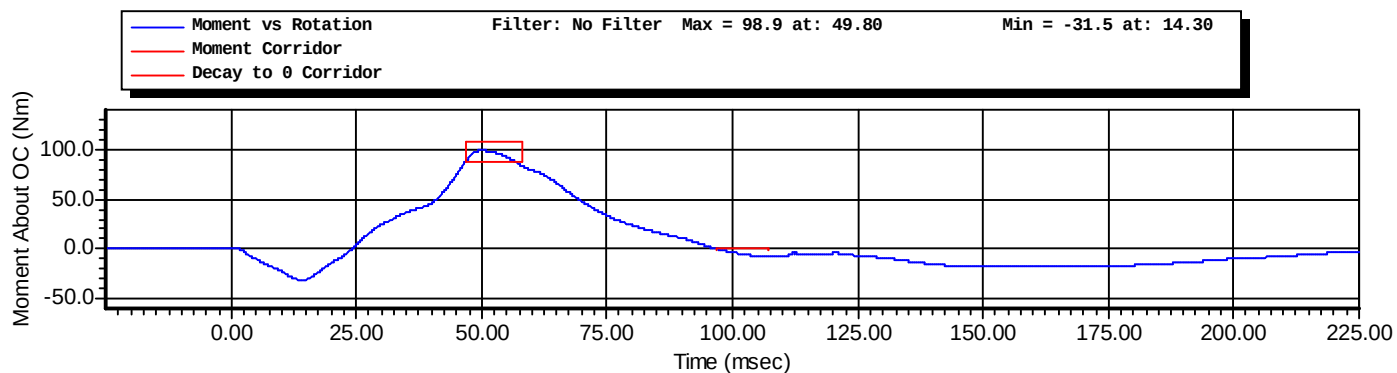
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	1:53:57 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	53.0 %RH P
Velocity	6.59 -- 6.83	6.70 m/s P
Resistive Force	-5.894 -- -5.160	-5.396 kN P
Sternum Displacement	-72.6 -- -63.5	-71.4 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **1:53:57 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

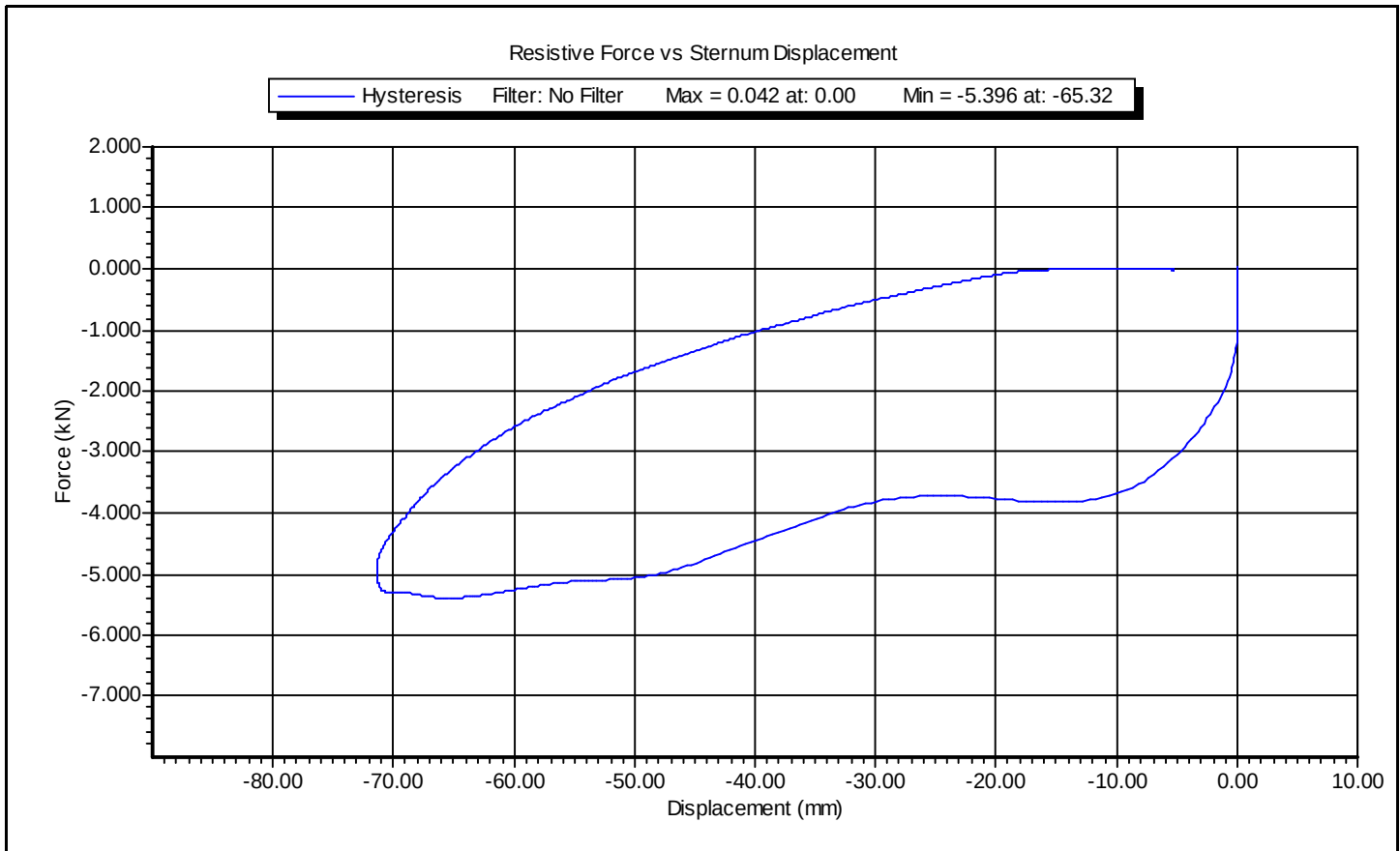
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-061	6/1/2010

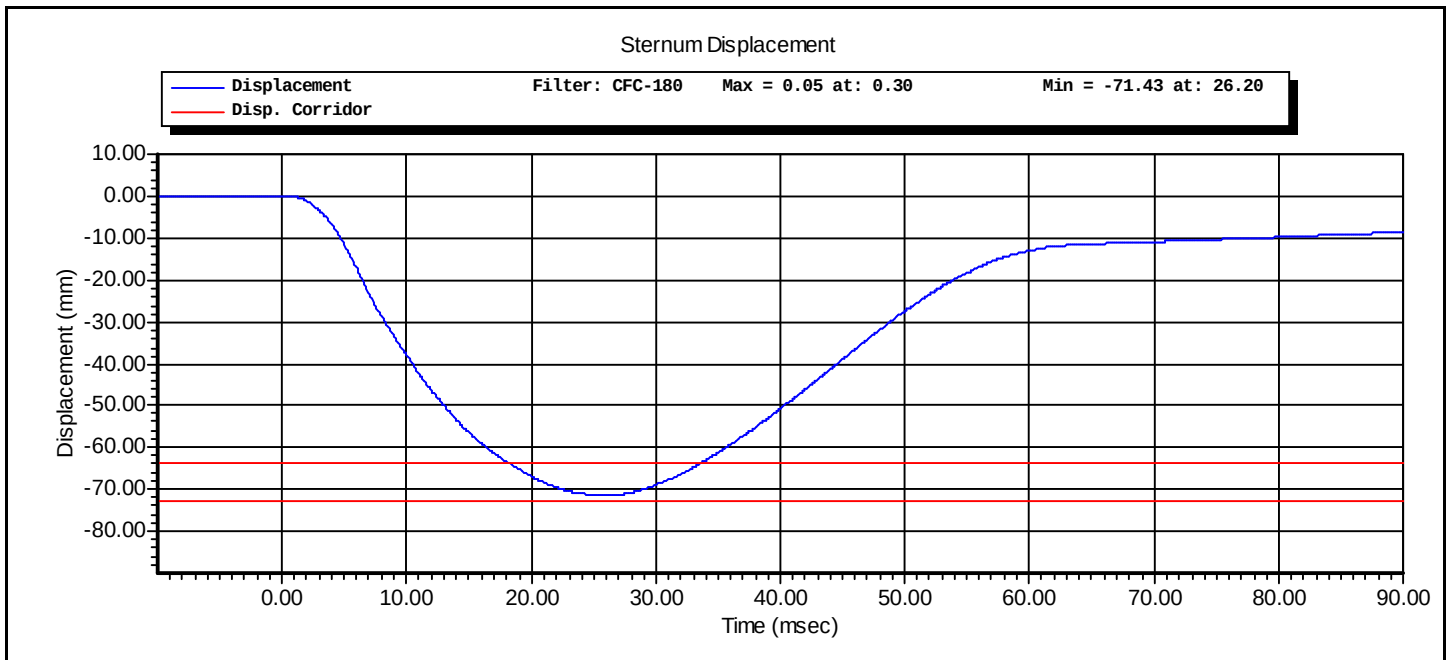
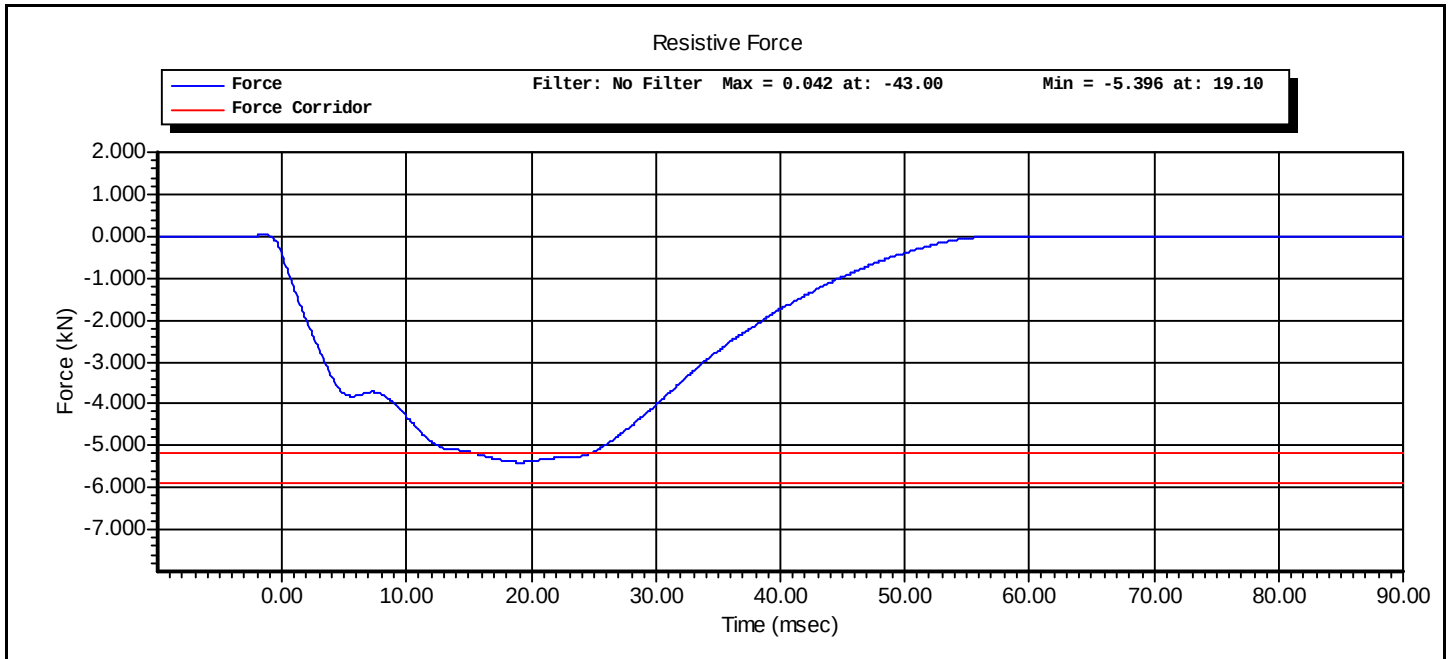
Test ID: **Thorax**

Test Time: **1:53:57 PM**

Test Date: **9/23/2010**

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	1:53:57 PM





CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

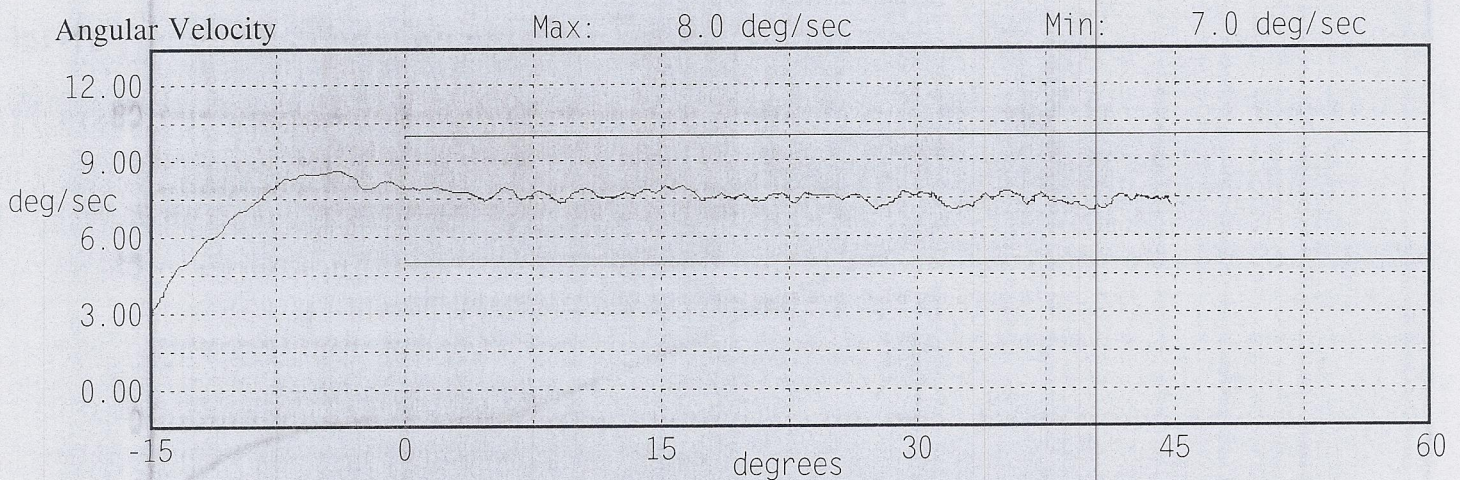
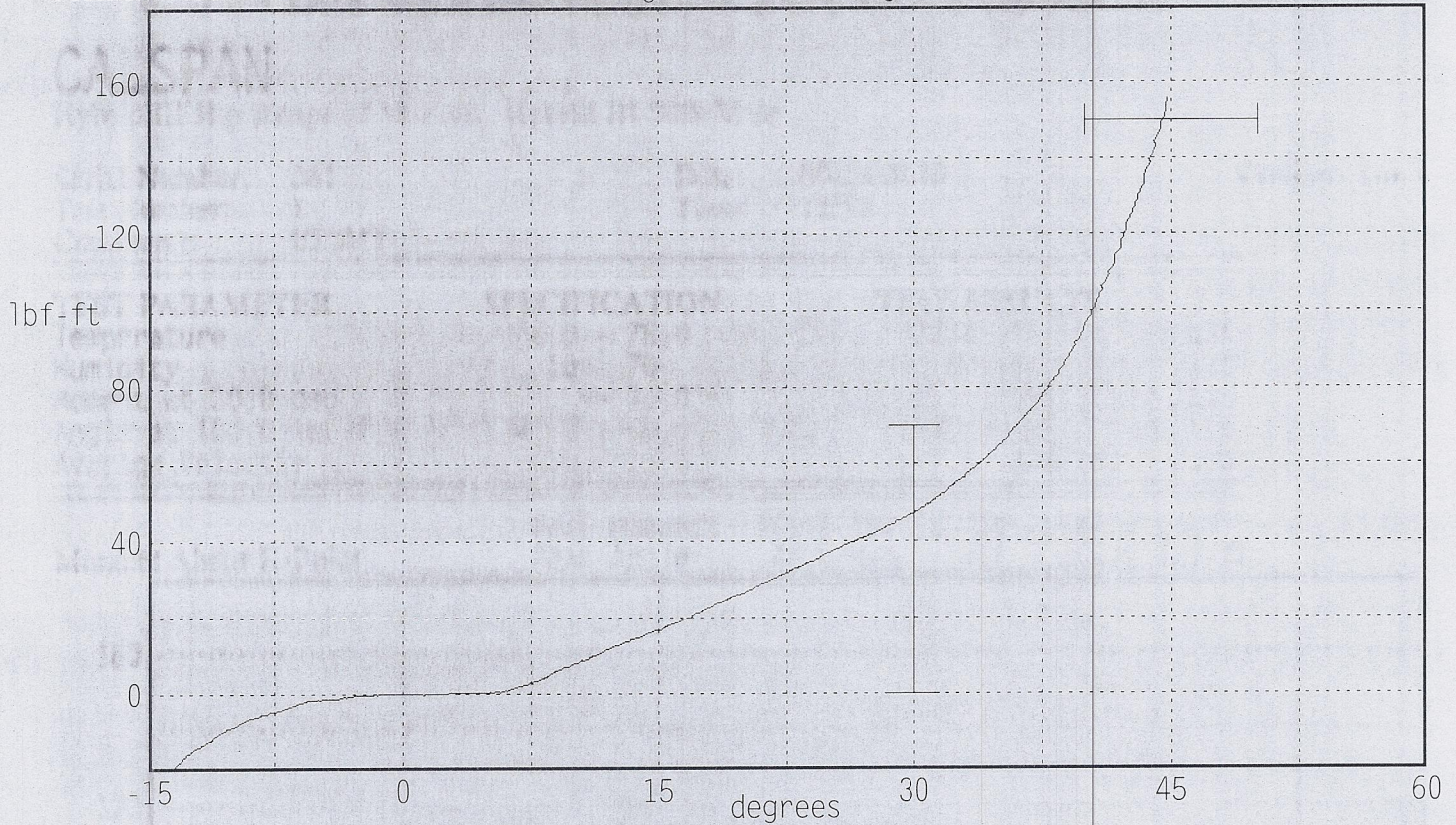
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 09/24/2010
Time: 12:56

Version: 1.6.3,

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	52 % Pass
Moment at 30.0 deg	<= 70.0	47.3 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.6 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.5 lbf-ft at 44.8 deg
Peak Angle: 44.8 deg at 155.5 lbf-ft



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

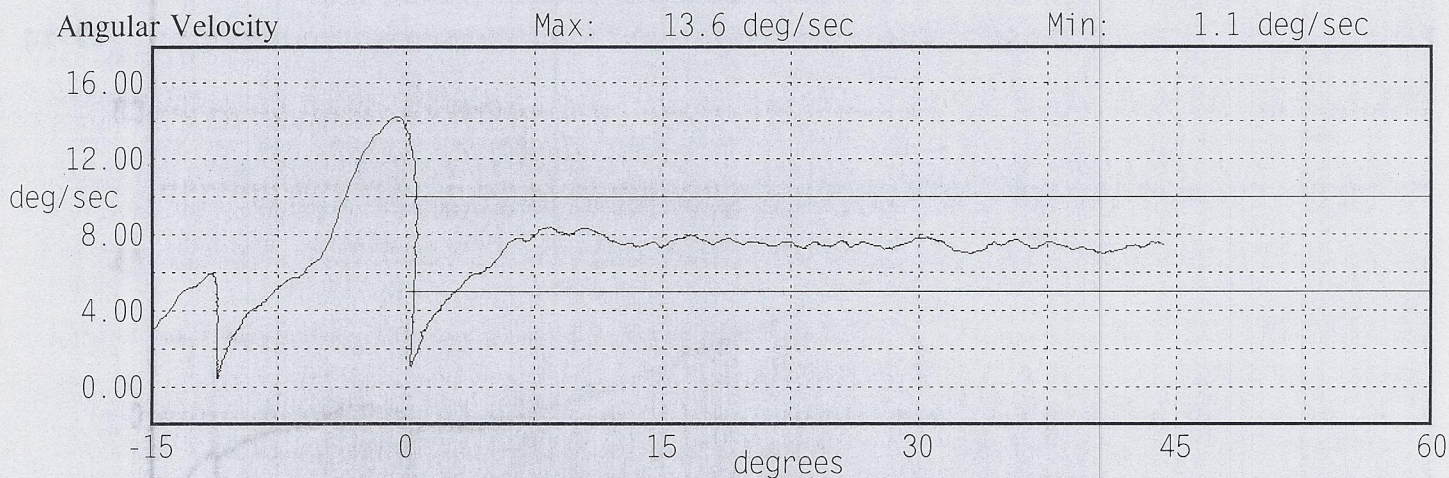
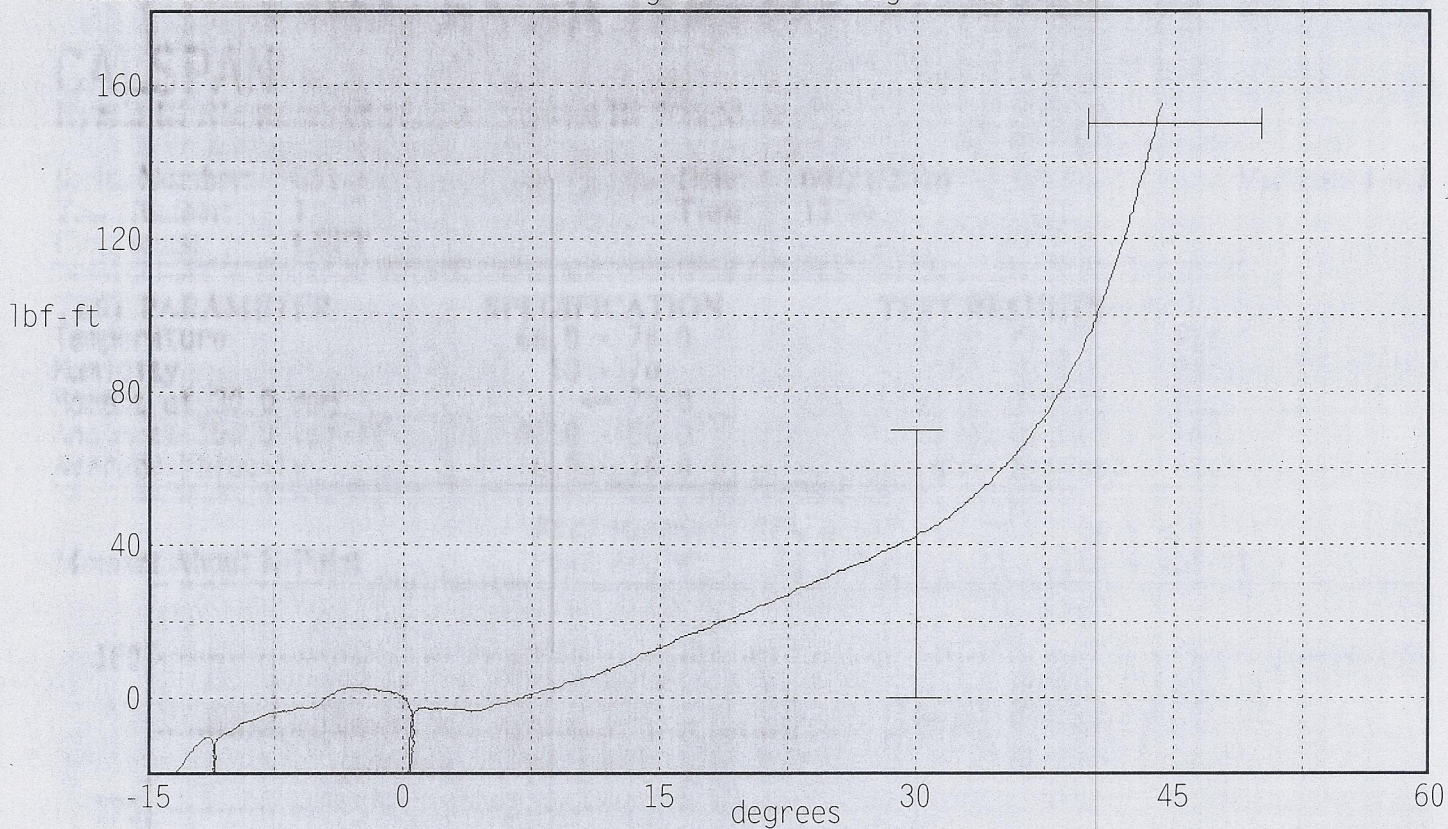
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 09/24/2010
Time: 12:49

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	52 % Pass
Moment at 30.0 deg	<= 70.0	42.6 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.9 deg Pass
Average Velocity	5.0 - 10.0	6.9 deg/sec Pass

Moment About H-Point
Peak Moment: 155.4 lbf-ft at 44.2 deg
Peak Angle: 44.2 deg at 155.4 lbf-ft





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	2	Test Time:	2:37:59 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	077

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	50.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-5.78 -- -4.72	-4.96 kN P

All test parameters are within specifications

Technician: **A Rudniski** Signature: _____

Supervisor: **D Travale** Signature: _____

Test ID: **Left Knee**

Test Time: **2:37:59 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **2:37:59 PM**

Test Date: **9/24/2010**

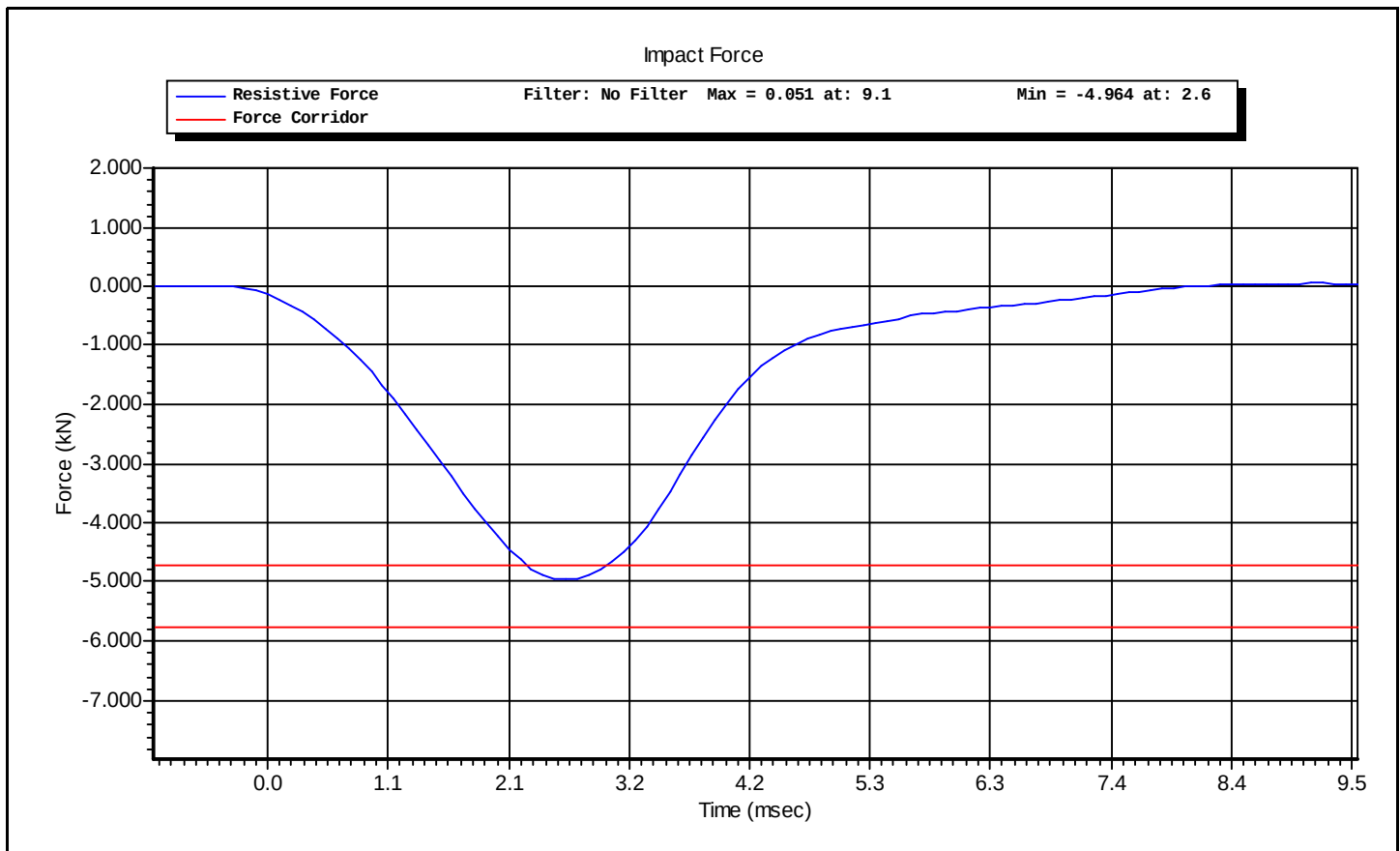


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	2	Test Time:	2:37:59 PM



Test ID: Left Knee

Test Time: 2:37:59 PM

Test Date: 9/24/2010



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	2:47:45 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3266

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	50.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-4.89 kN P

All test parameters are within specifications

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

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

Test ID: **Right knee**

Test Time: **2:47:45 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right knee**

Test Time: **2:47:45 PM**

Test Date: **9/24/2010**

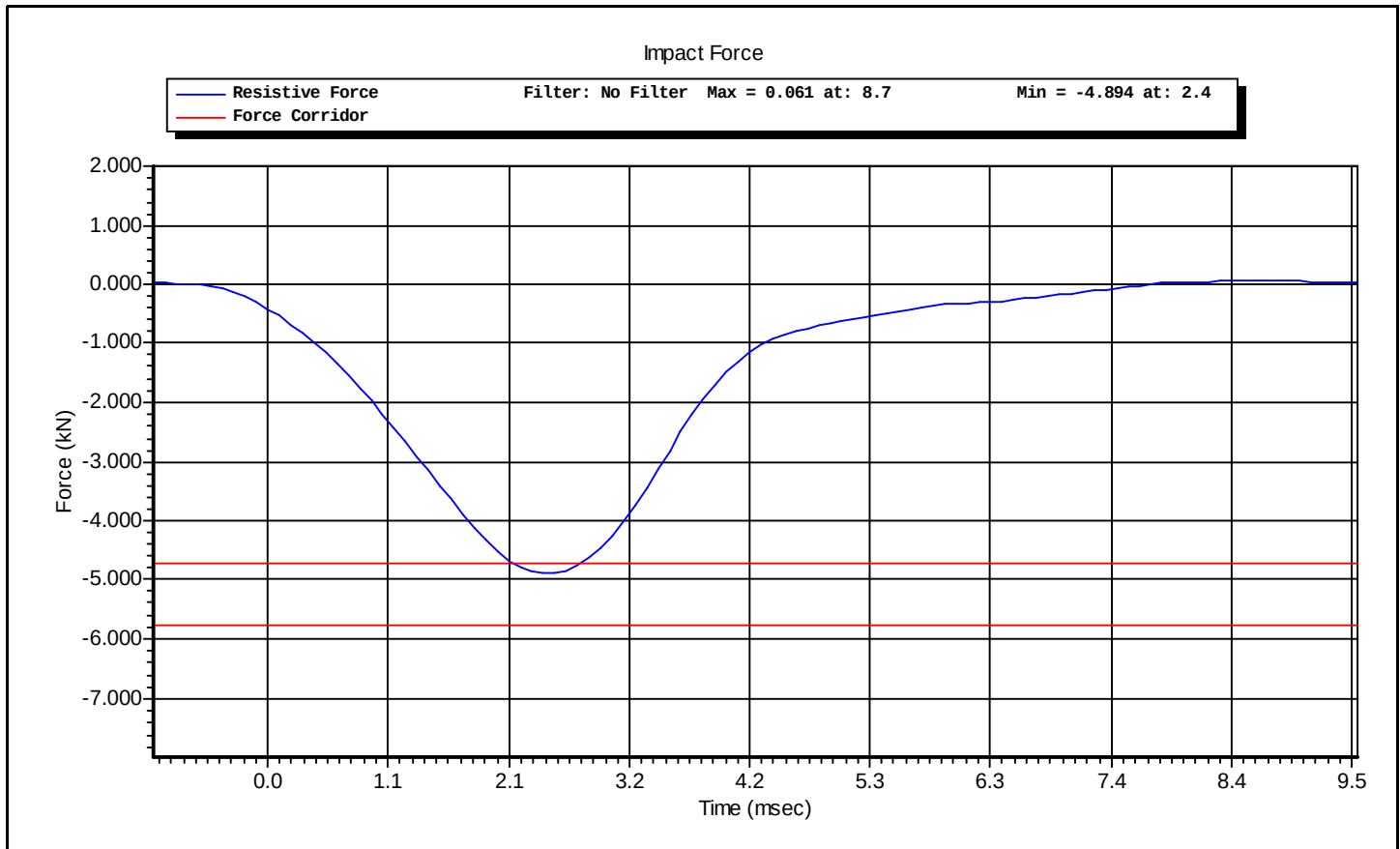


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	2:47:45 PM



Test ID: Right knee

Test Time: 2:47:45 PM

Test Date: 9/24/2010

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

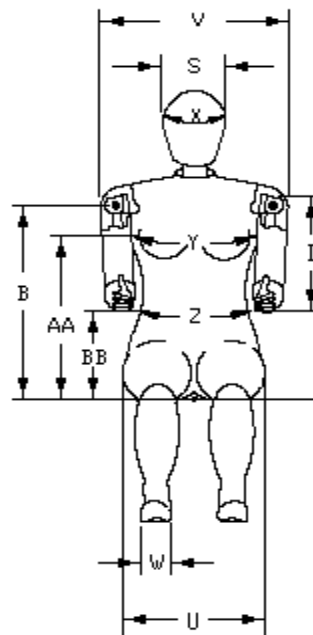
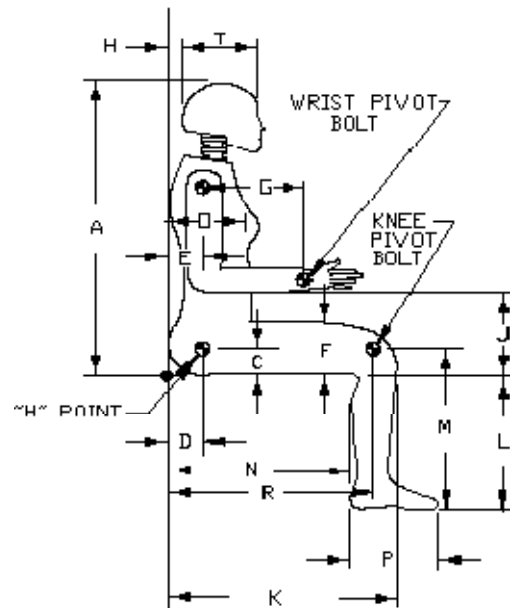
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	401	Yes
N	Buttock Popliteal Length	414 – 439.4	425	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	222	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	479	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	309	Yes
V	Shoulder Breadth	350.5 – 365.7	359	Yes
W	Foot Breadth	78.8 - 94	88	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: AR

Date: 9/27/2010

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	4:03:03 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	52 %RH P
Resultant Acceleration	250 -- 300	275 g P
Oscillation	0.0 -- 10.0	7.9 % P
Lateral Acceleration	-15.00 -- 15.00	-3.60 g P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Head Drop**

Test Time: **4:03:03 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **4:03:03 PM**

Test Date: **9/23/2010**

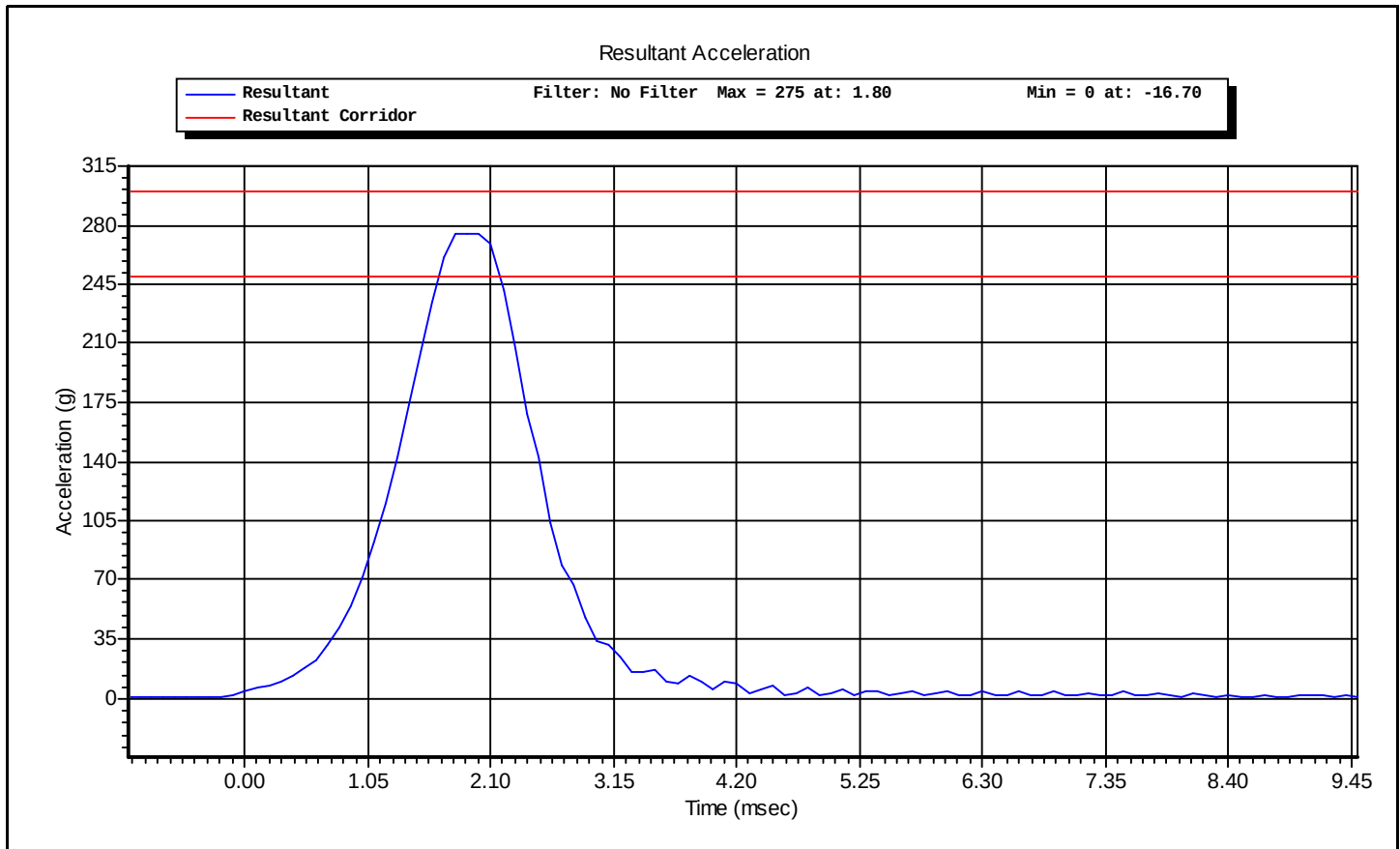


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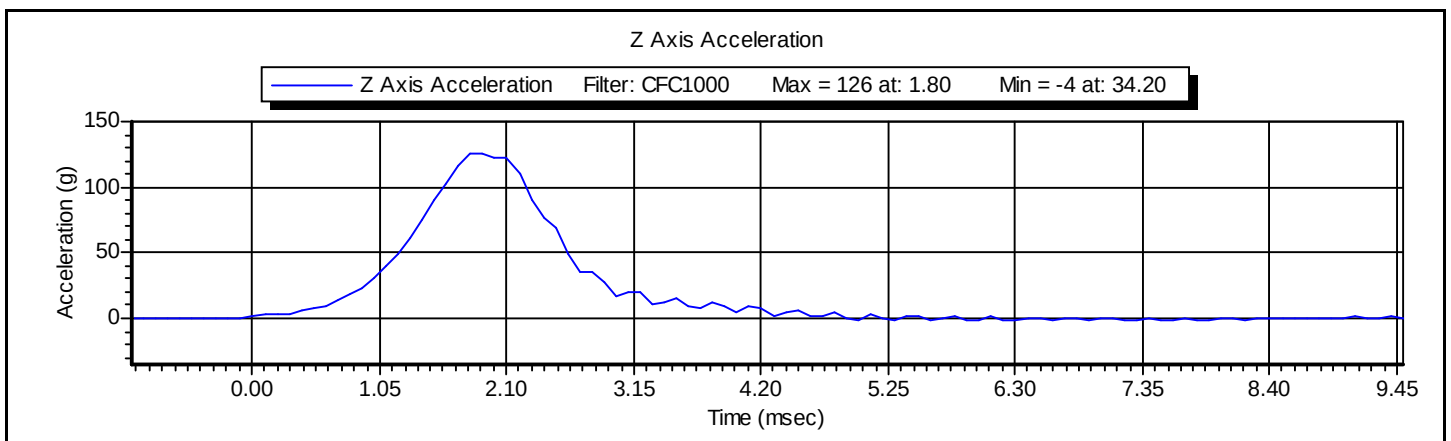
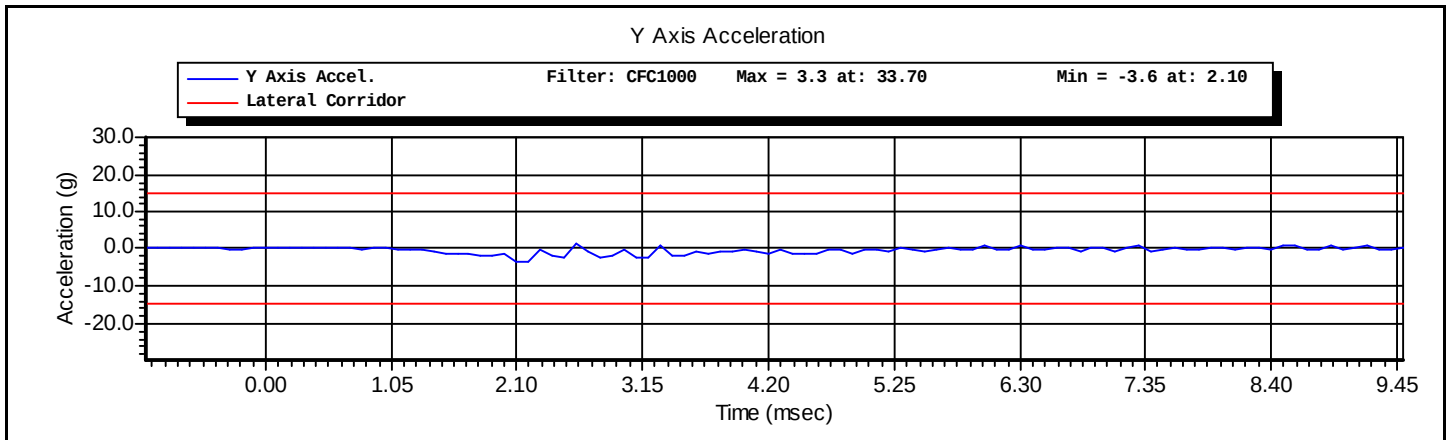
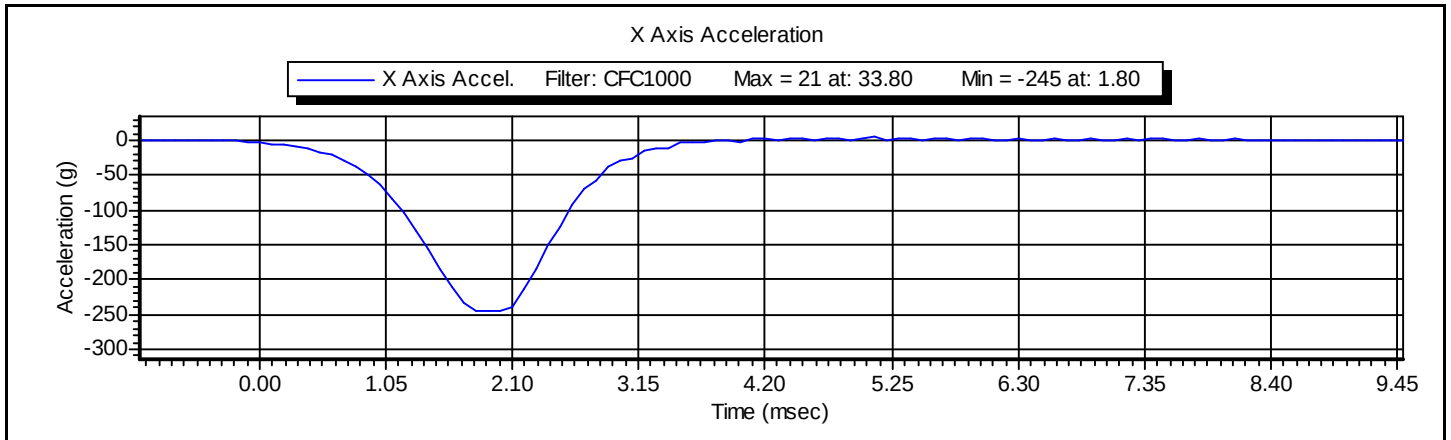
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	4:03:03 PM



Test ID: Head Drop

Test Time: 4:03:03 PM

Test Date: 9/23/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:56:13 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Velocity	5.95 -- 6.19	6.06 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.82 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.58 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.16 m/s P
D Plane Rotation	99.0 -- 114.0	111.0 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.9 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	103.5 ms P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: Neck Extension

Test Time: 11:56:13 AM

Test Date: 9/24/2010



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Extension**

Test Time: **11:56:13 AM**

Test Date: **9/24/2010**

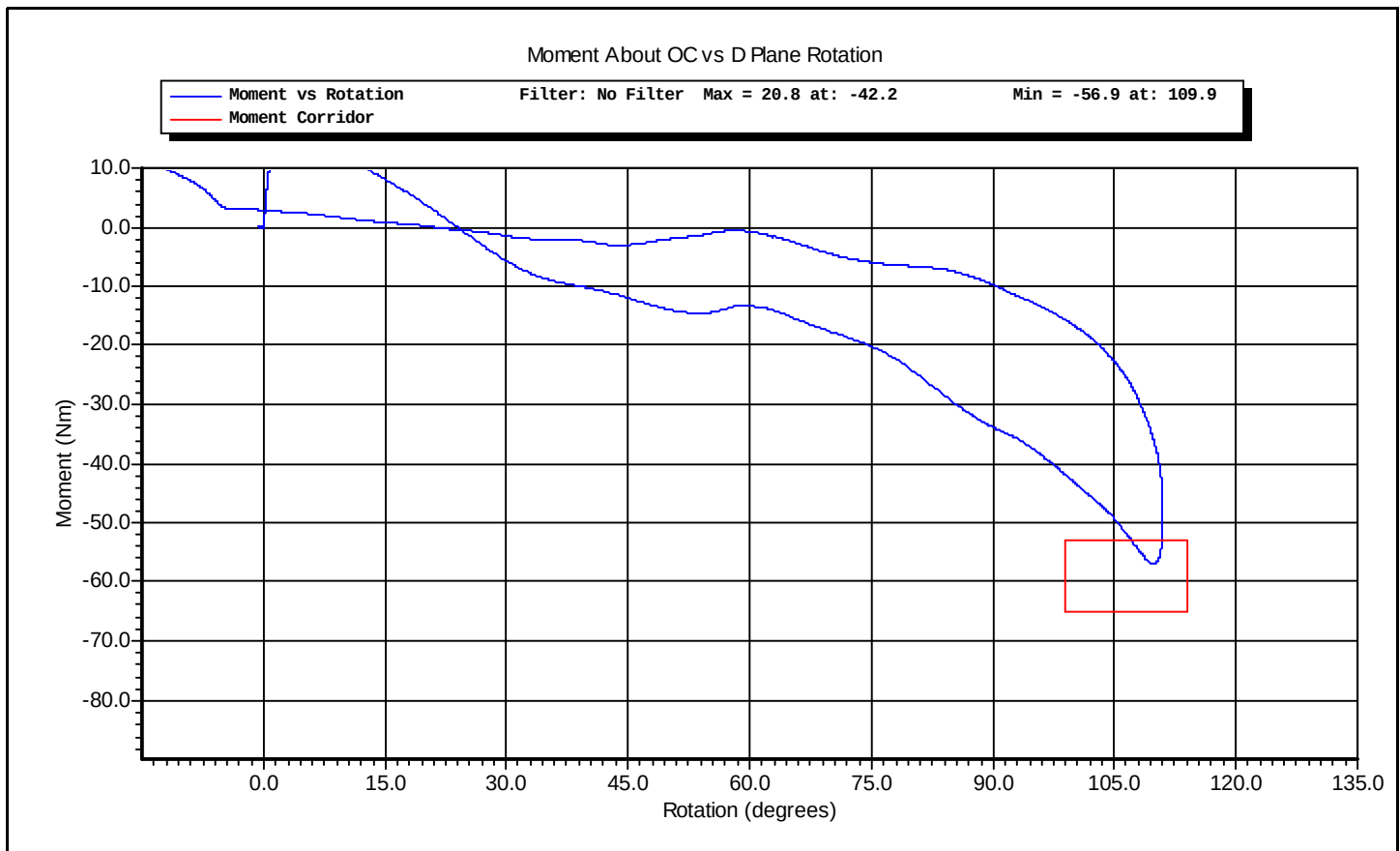


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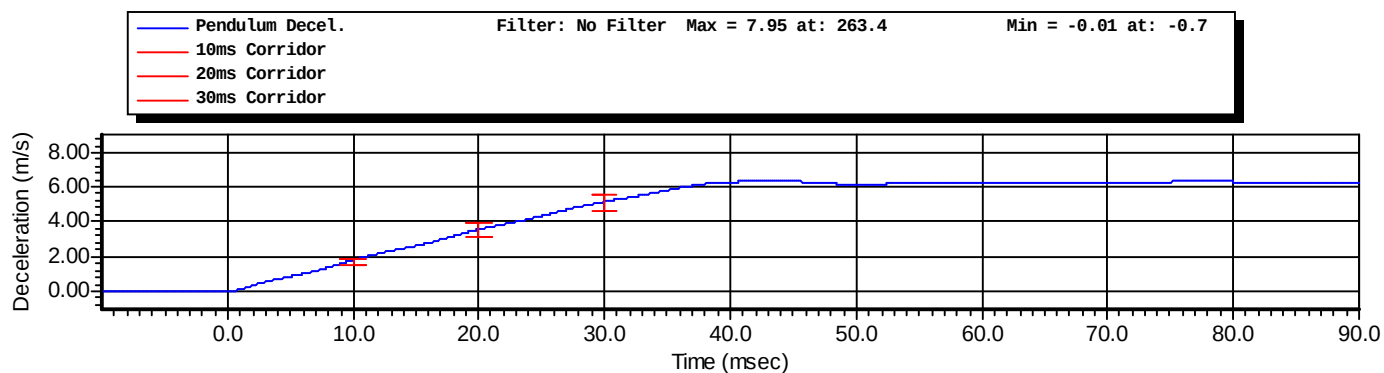
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:56:13 AM



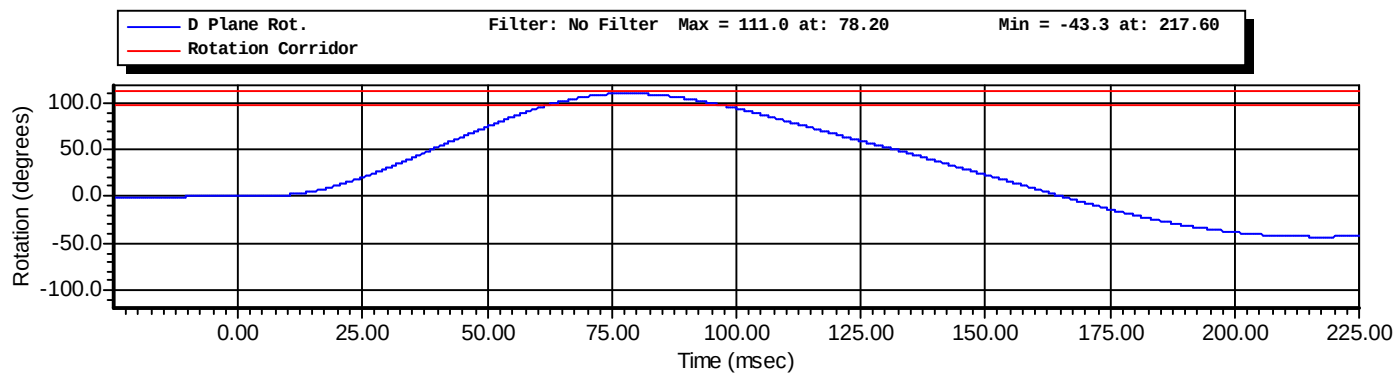
Test ID: Neck Extension Test Time: 11:56:13 AM

Test Date: 9/24/2010

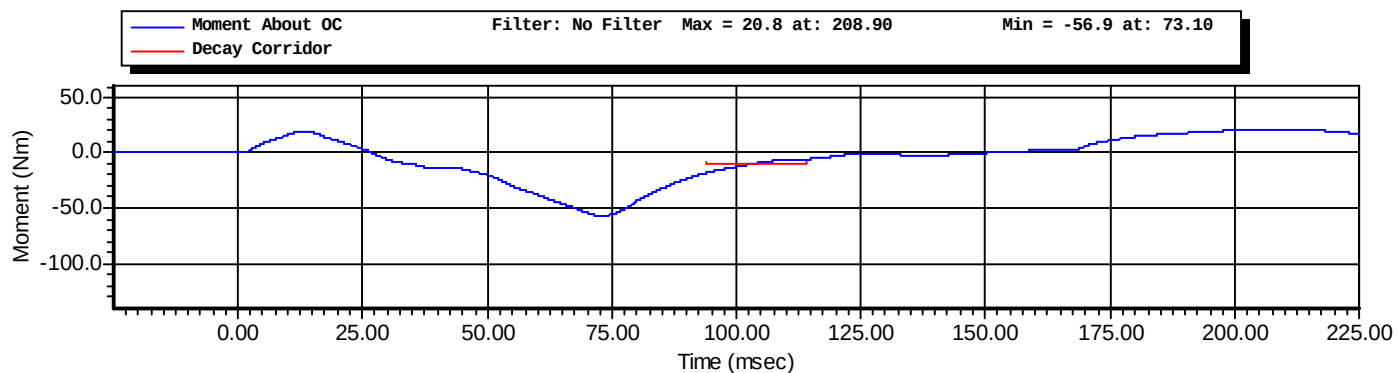
Pendulum Impulse



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:29:30 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Velocity	6.89 -- 7.13	7.02 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.47 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.86 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.94 m/s P
D Plane Rotation	-91.0 -- -77.0	-88.1 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.9 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.6 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:29:30 AM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Flexion**

Test Time: **11:29:30 AM**

Test Date: **9/24/2010**

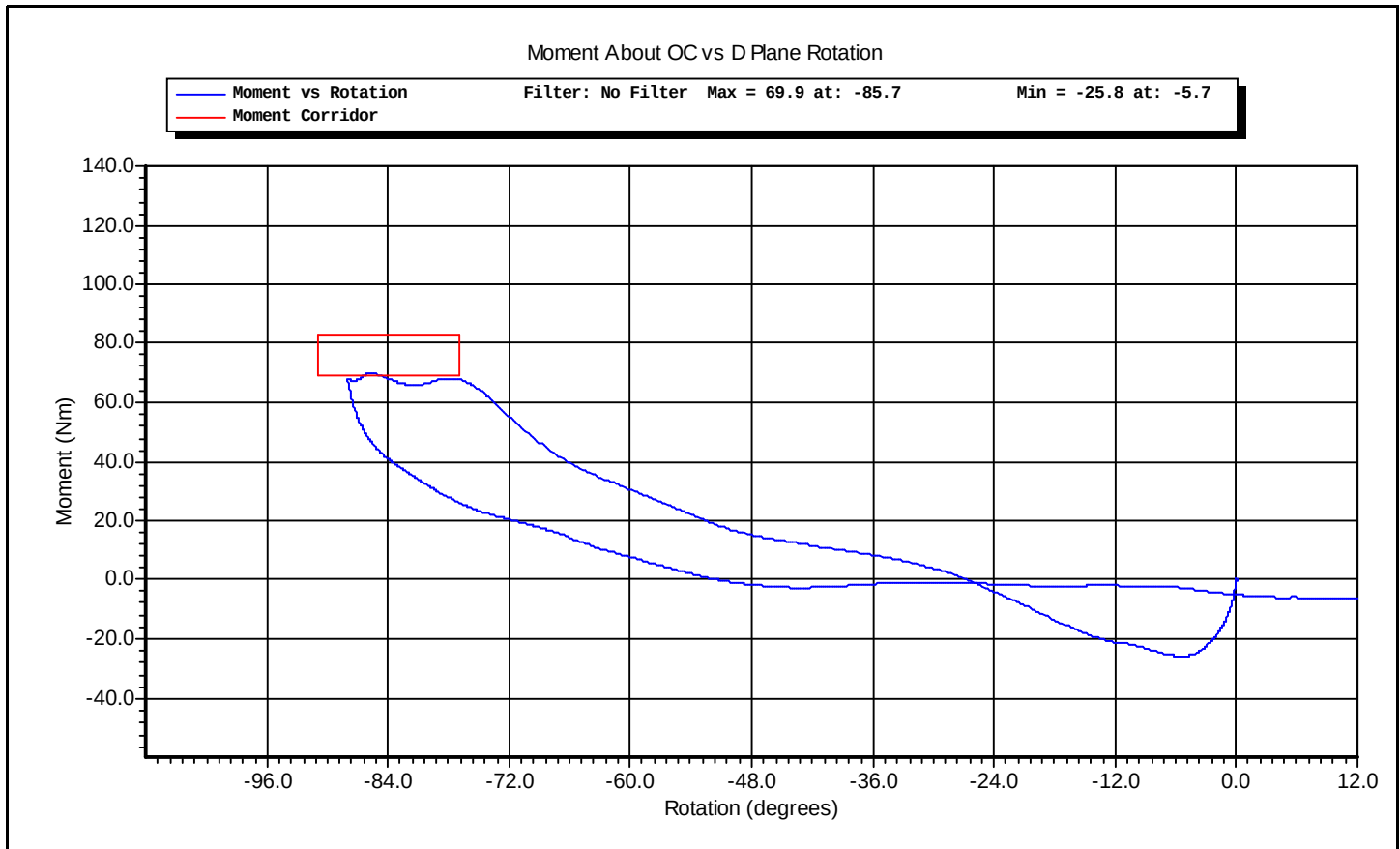


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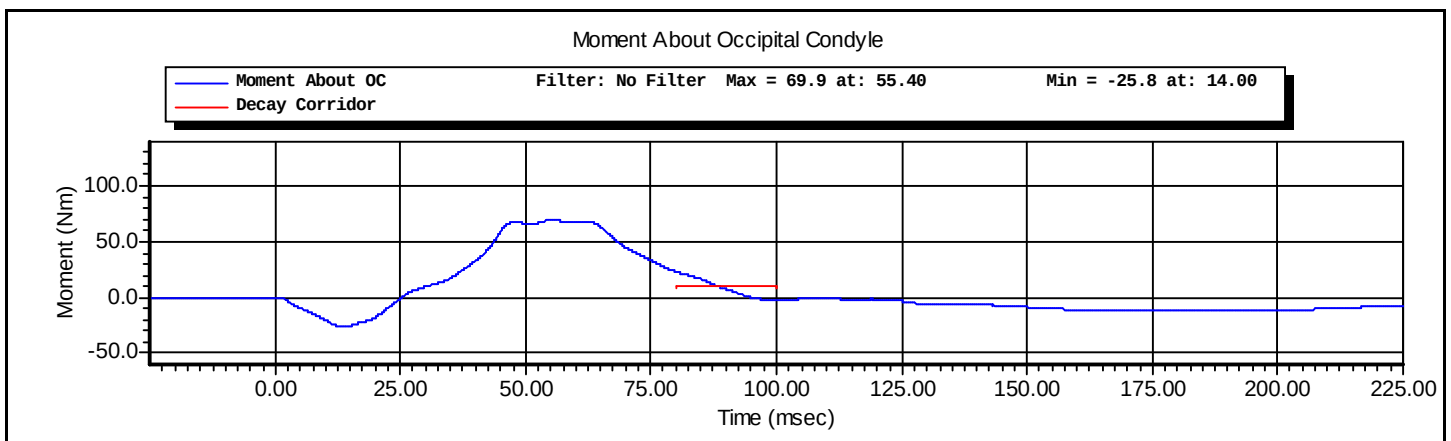
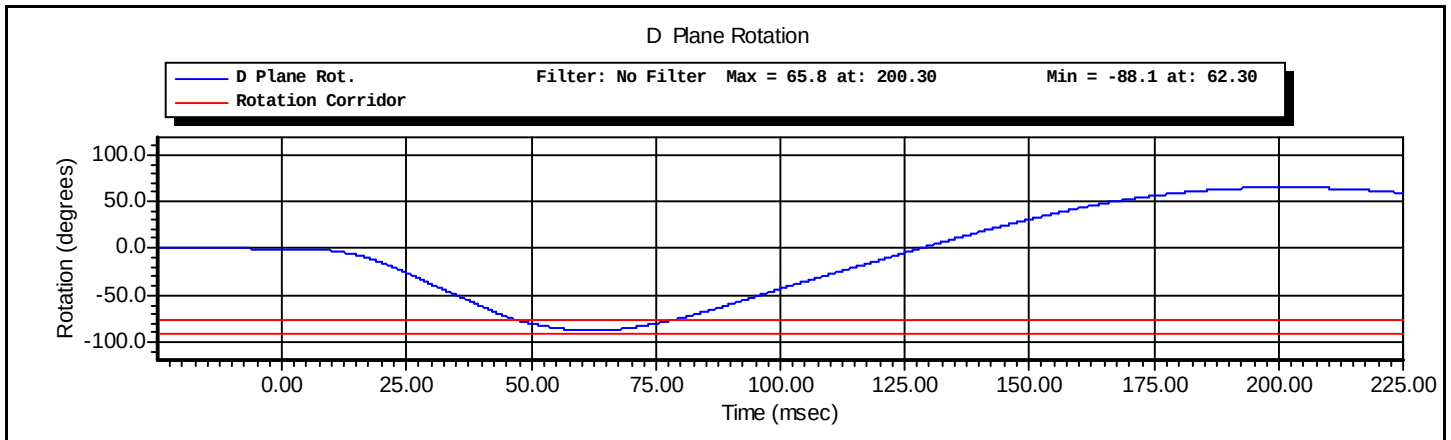
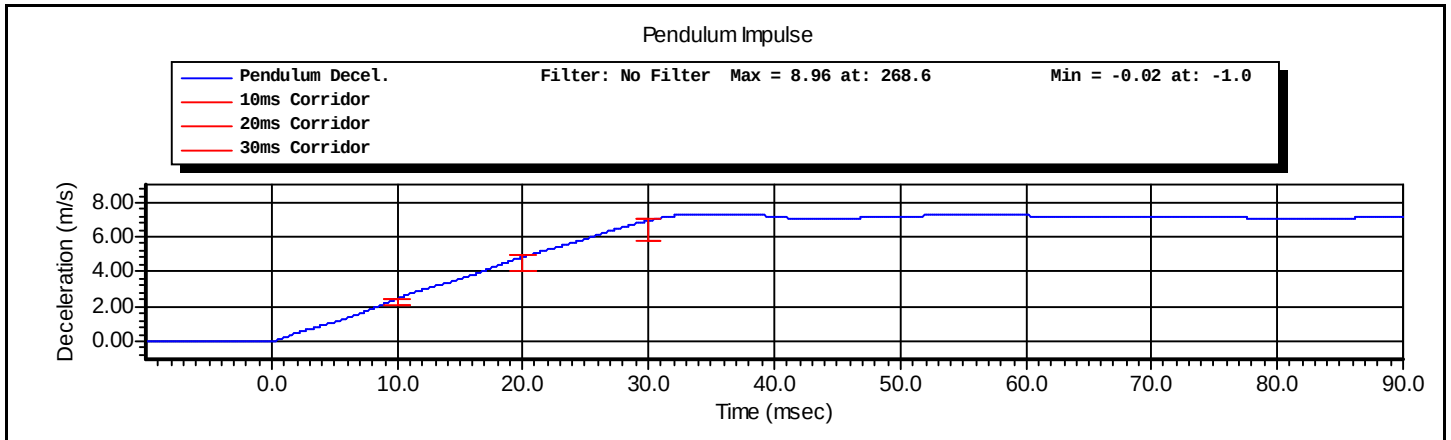
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:29:30 AM



Test ID: Neck Flexion

Test Time: 11:29:30 AM

Test Date: 9/24/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	11:40:40 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	52.0 %RH	P
Velocity	6.59	--	6.83	6.69 m/s	P
Sternum Displacement	-58.0	--	-50.0	-52.8 mm	P
Force During Displacement Interval	-4400	--	-3900	-4048 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-3993 N	P
Hysteresis	69	--	85	70 %	P

All test parameters are within specifications

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

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

Test ID: **Thorax**

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

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-273	4/13/2010

Test ID: **Thorax**

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

Test Date: **9/23/2010**

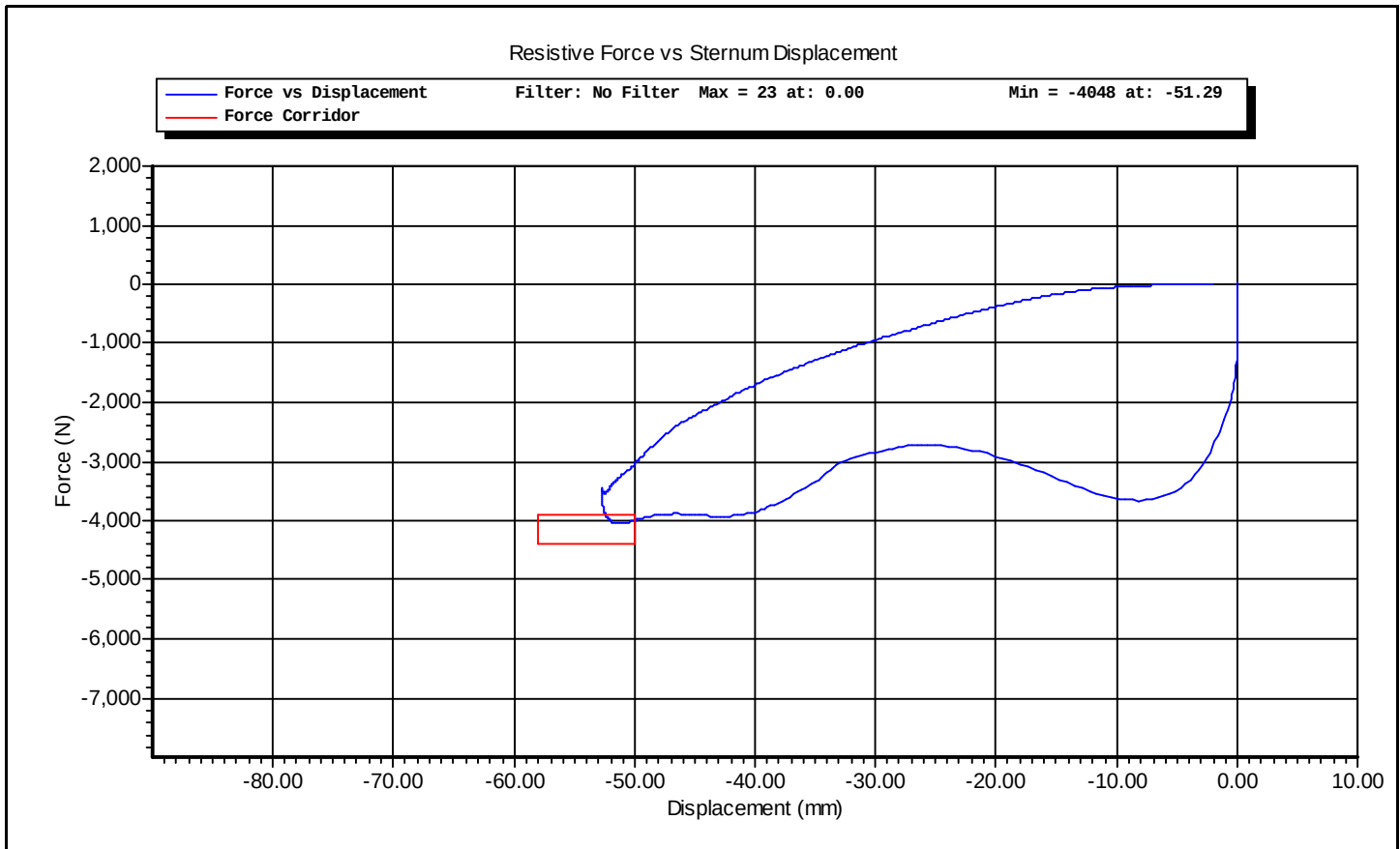


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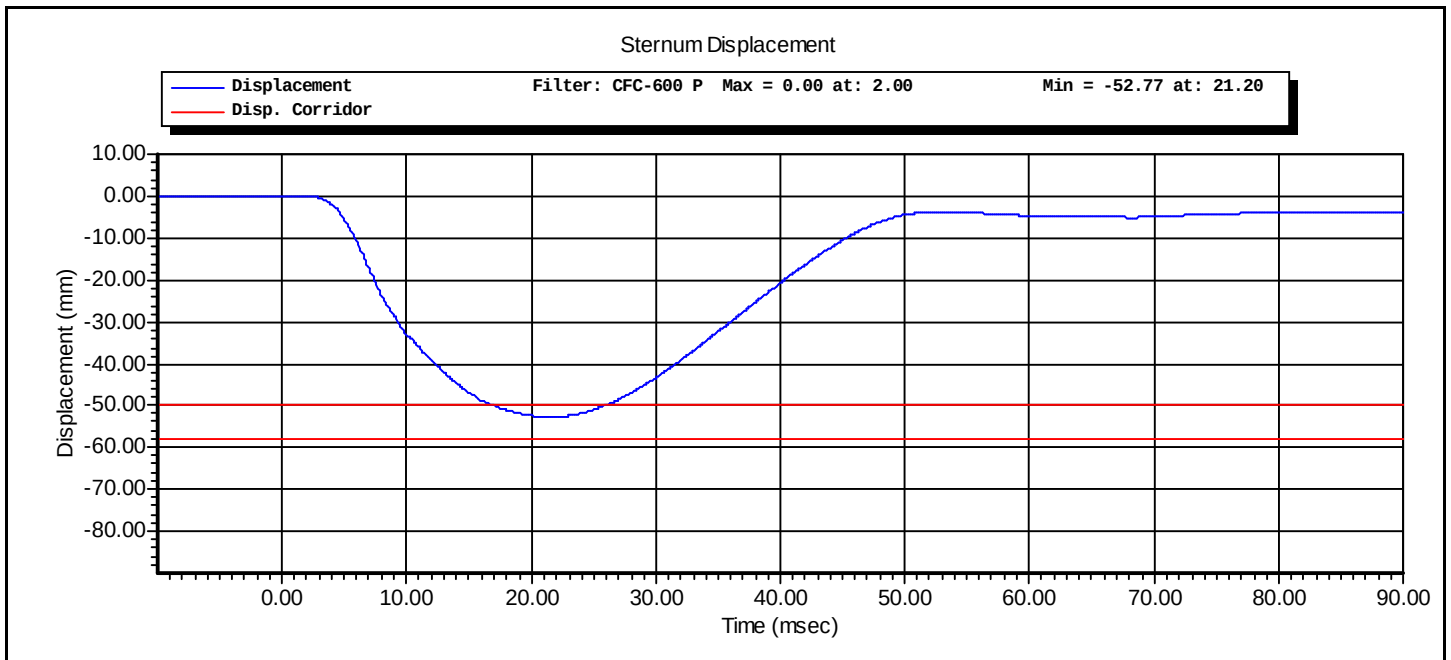
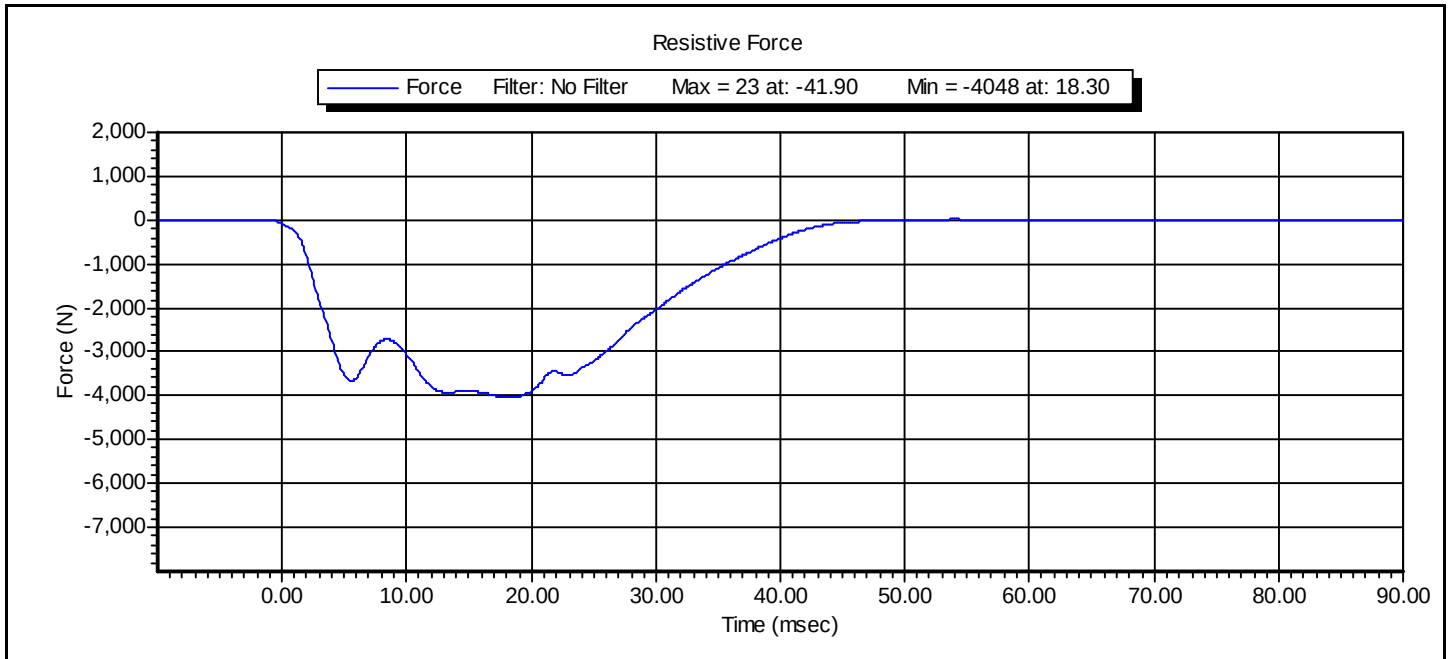
Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	11:40:40 AM



Test ID: Thorax

Test Time: 11:40:40 AM

Test Date: 9/23/2010



Torso Flexion Test

Technician: AR

Calibration Date: 9/27/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	45%	P
Max Force @ 45 deg	320 – 390N	350N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	15°	P
Final ref plan angle	Initial ref plane ± 8 deg	21°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:07:26 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	2.07 -- 2.13	2.08 m/s P
Resistive Force	-4060 -- -3450	-3505 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**

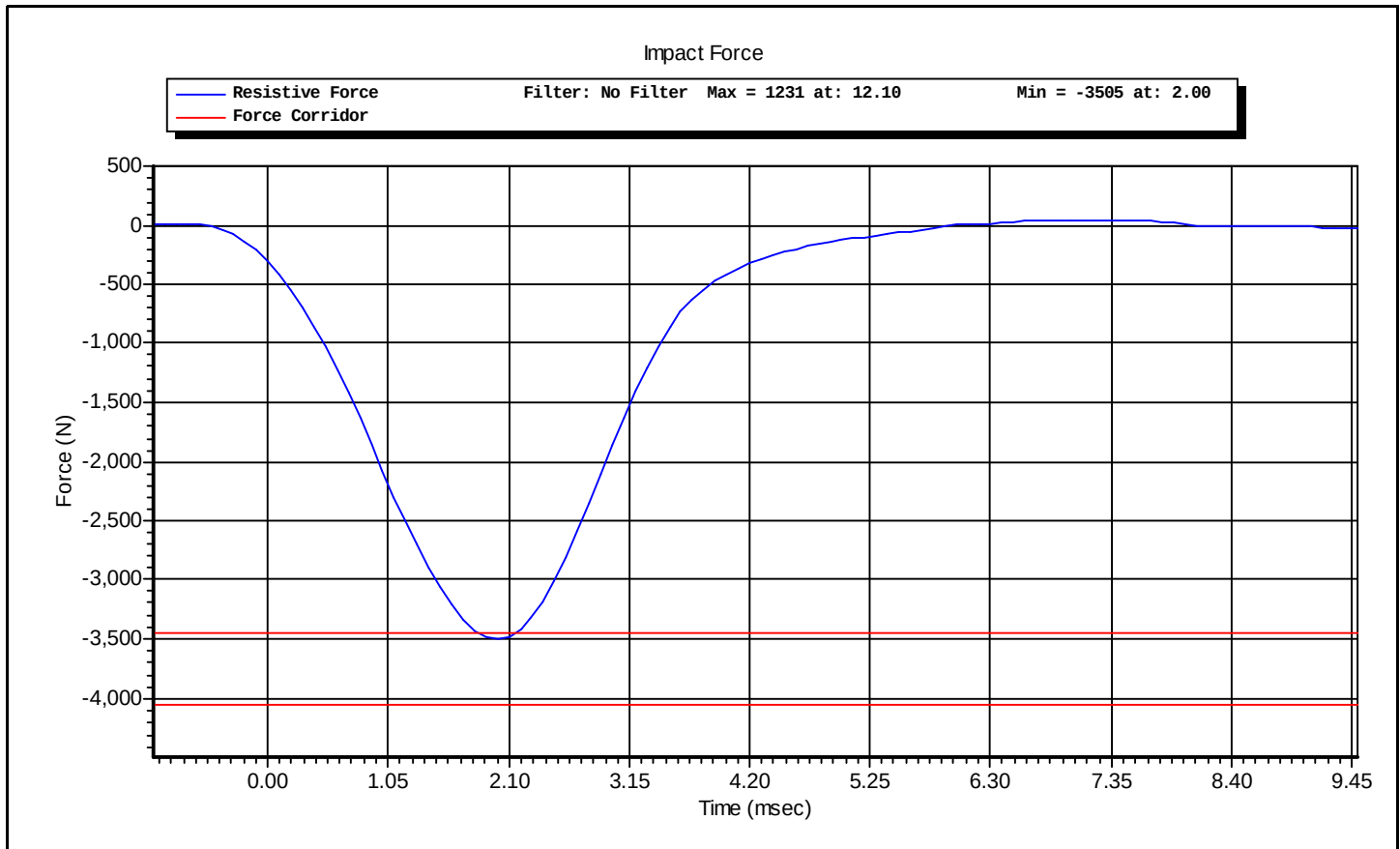


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:07:26 PM



Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:23:39 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-4060 -- -3450	-3491 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**

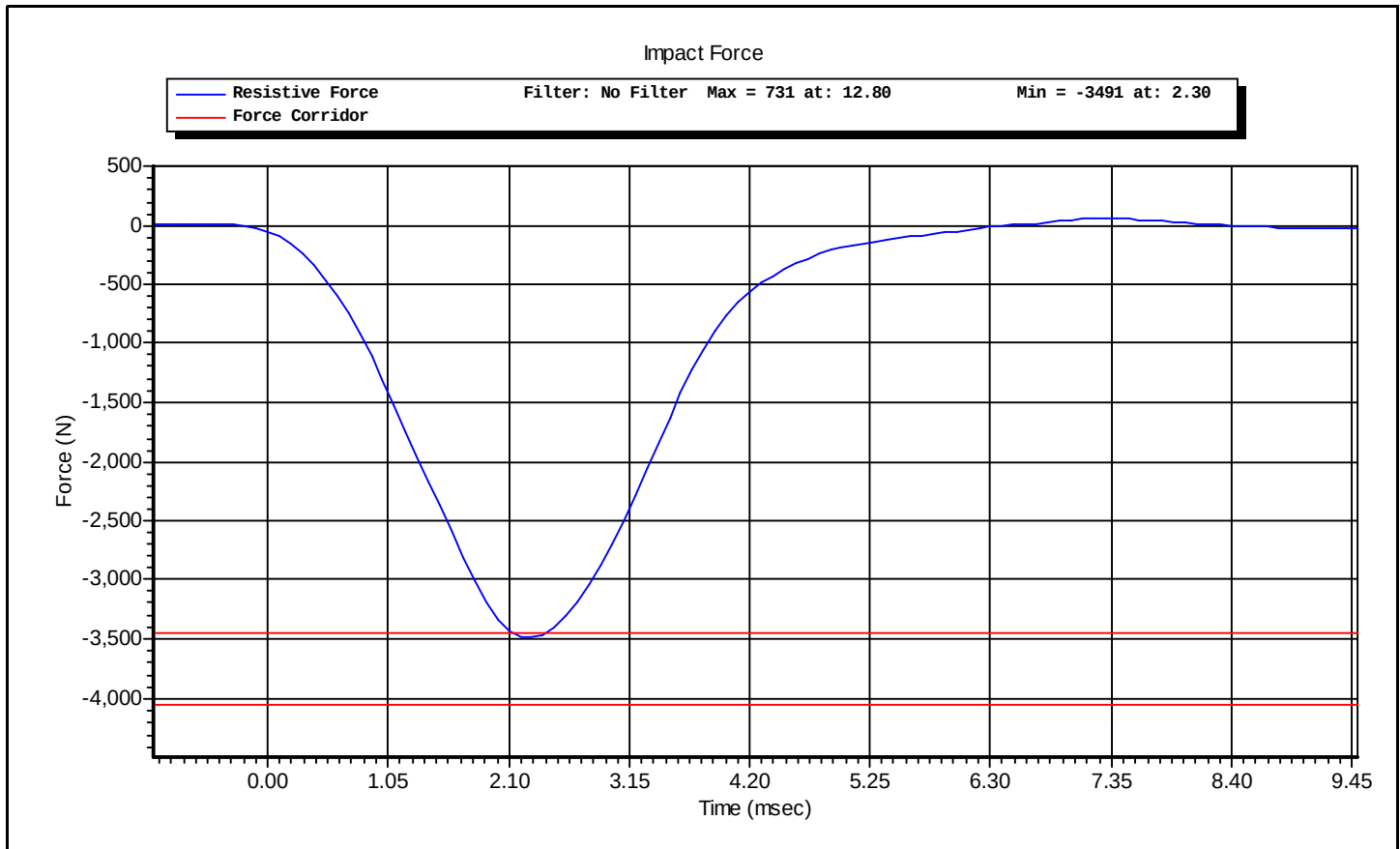


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:23:39 PM



Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**