

REPORT NUMBER: NCAP-CAL-11-014

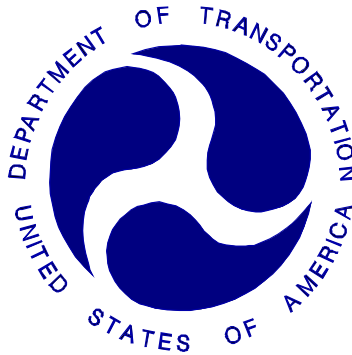
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**General Motors
2011 Chevrolet Silverado
Extended Cab**

NHTSA NUMBER: MB0117

CALSPAN TEST NUMBER: TR2491

**CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
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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Prepared by: _____ Date: _____
Bethany Koetje, Project Engineer

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

FINAL REPORT ACCEPTANCE BY OCWS:

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

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards
Date: _____

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15. Supplementary Notes																																																																					
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Chevrolet Silverado Extended Cab 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 9/28/2010. The impact velocity of the vehicle was 55.8 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 663 mm of Vehicle. The test vehicle's performance is as follows:																																																																					
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD</th> <th colspan="3">Pass. ATD</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>194.8</td> <td>N/A</td> <td>700</td> <td>378.1</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-24</td> <td>mm</td> <td>52</td> <td>-19.5</td> </tr> <tr> <td>Nij</td> <td>n/a</td> <td>1</td> <td>0.25</td> <td>n/a</td> <td>1</td> <td>0.49</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>1126.5</td> <td>Newtons</td> <td>2620</td> <td>1052.2</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-303.5</td> <td>Newtons</td> <td>2520</td> <td>-239.5</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-1957.3</td> <td>Newtons</td> <td>6805</td> <td>-1763.8</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-3291</td> <td>Newtons</td> <td>6805</td> <td>-904.7</td> </tr> </tbody> </table>								Measurement Description	Driver ATD			Pass. ATD			Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	194.8	N/A	700	378.1	Maximum Chest Compression	mm	63	-24	mm	52	-19.5	Nij	n/a	1	0.25	n/a	1	0.49	Neck Tension	Newtons	4170	1126.5	Newtons	2620	1052.2	Neck Compression	Newtons	4000	-303.5	Newtons	2520	-239.5	Left Femur Force	Newtons	10008	-1957.3	Newtons	6805	-1763.8	Right Femur Force	Newtons	10008	-3291	Newtons	6805	-904.7
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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 Standard Frontal NCAP Laboratory Test Procedure.

1.2 TEST PROCEDURE

A load cell barrier consisting of 36 load cells was impacted by a 2011 Chevrolet Silverado Extended Cab at a velocity of 55.8 kph. The test was performed at Calspan on 9/28/2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 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 device (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 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 663 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 and the back of head with the head restraint; both knees contacted the lower dash panel. The passenger's visible contact points were as follows: Face and Upper Torso with Frontal airbag and the back of head with the head restraint; both knees contacted the glove box door 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)	194.8	76.2	91.2	-24	0.25	1126.5	-303.5	-1957.3	-3291.0
Passenger (5 th)	378.1	94.1	109.1	-19.5	0.49	1052.2	-239.5	-1763.8	-904.7

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

TEST VEHICLE INFORMATION

NHTSA No.	MB0117
Make	Chevrolet
Model	Silverado
Body Style	Extended Cab
VIN	1GCRKPEA5BZ126316
Color	Grey
Delivery Date	9/18/2010
Odometer Reading (mi)	164
Odometer Reading (km)	264
Dealer	Bresee Chevrolet
Transmission	Automatic
Final Drive	Rear Wheel
Type/No. Cyl	V8
Engine Disp. (L)	4.8
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	Yes
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	No

TEST VEHICLE OPTIONS

Anti-Lock Brakes	Yes
All-Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
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

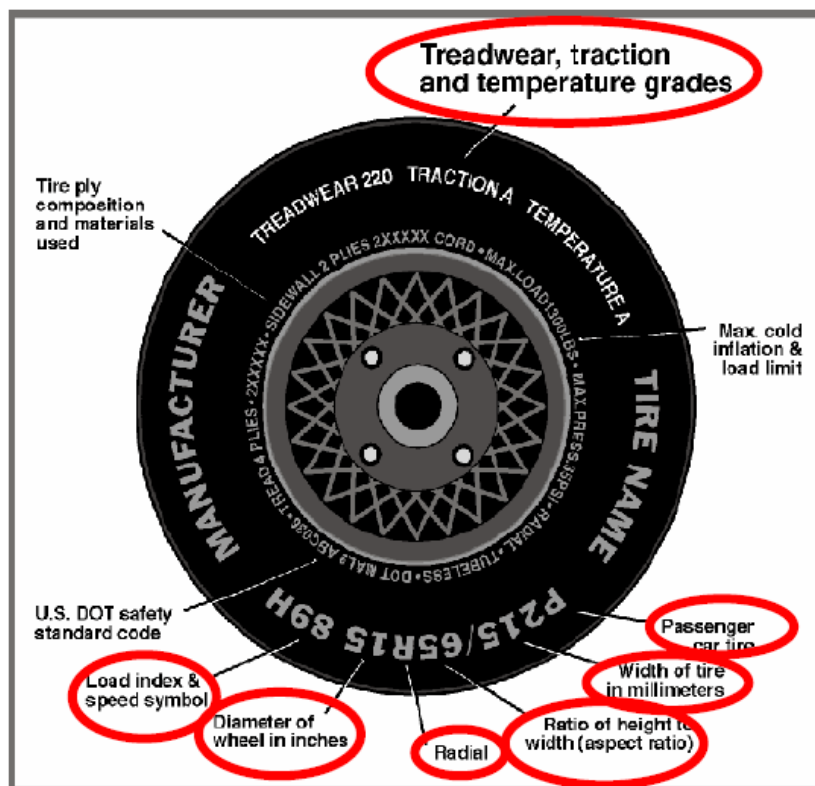
Manufactured By	General Motors	GVWR (kg)	3175
Date of Manufacture	6/2010	GAWR Front (kg)	1792
		GAWR Rear (kg)	1792

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Split Bench	Split Bench		
Number of Occupants	3	3		6
Capacity Wt. (VCW) (kg)				749
Cargo Wt. (RCLW) (kg)				136

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

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	350	350
Cold Pressure (kPa)	310	310
Recommended Tire Size	LT245/70R17CQ	LT245/70R17CQ
Tire Size on Vehicle	LT245/70R17	LT245/70R17
Tire Manufacturer	Transforce AT	Transforce AT
Tire Model	Firestone	Firestone
Treadwear		
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Ply Polyester	2 Ply Polyester
Tire Plies Body	2 Ply Polyester + 2 steel	2 Ply Polyester + 2 steel
Load Index/Speed Symbol	108/104Q	108/104Q
Tire Material		
DOT Safety Code Right	8XP8 TR6 2210	8XP8 TR6 2210
DOT Safety Code Left	8XP8 TR6 2210	8XP8 TR6 2210

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

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	730.5	471.0	1201.5	774.0	566.0	1340
Right	kg	709.5	475.0	1184.5	753.0	572.5	1325.5
Ratio	%	60.3	39.6		57.3	42.7	
Totals	kg	1440.0	946.0	2386.0	1527.0	1138.5	2665.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2386
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	2662.6

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	935	942	1016	1019	1450
As Tested	mm	931	928	991	986	1562
Post Test	mm	964	921	1004	975	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3657
Total Vehicle Length at Left Side	mm	5773
Total Vehicle Length at Centerline	mm	5863
Total Vehicle Length at Right Side	mm	5770
Weight of Ballast in Cargo Area	kg	2665.5
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	90.5

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5836
2	Total Width	1987
3	Bumper Top Height	683
4	Bumper Bottom Height	293
5	Longitudinal Member Top Height	578
6	Distance Between Longitudinal Members	909
7	Longitudinal Member Width	100
8	Engine Top Height	1153
9	Engine Bottom Height	225
10	Engine and Gearbox Width	620
11	Front Bumper-Engine Distance	722
12	Front Shock Absorber Fixing Height	747
13	Bonnet Leading Edge Height	1046
14	Front Shock Absorber Fixing Width	967
15	Front Bumper – Front Axle Distance	1007
16	Front Axle – A Pillar Distance	4829
17	A- Pillar – B-Pillar Distance	0
18	B-Pillar – Rear Axle Distance	-1172
19	B-Pillar – C-Pillar Distance	0
20	Roof Sill Bottom Height	1714
21	Roof Sill Top Height	1800
22	Floor Sill Bottom Height	540
23	Floor Sill Top Height	543

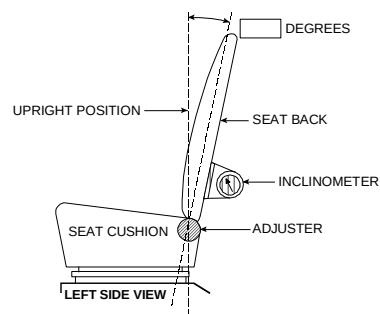
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

NORMAL DESIGN RIDING POSITION

Driver seat: Manual seat back adjustment
Passenger Seat: Manual seat back adjustment
 Adjusted to dummy head level

	Deg
Driver Seat Back Angle	7.6
Passenger Seat Back Angle	10.8

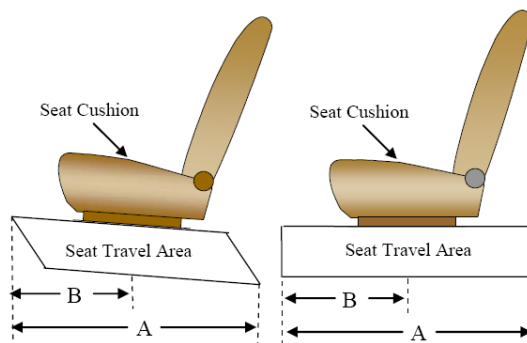


SEAT FORE/AFT POSITIONS

FRONT SEAT ASSEMBLY

Driver's seat manual seat track adjustment with 25 detents, which includes most forward and rearward
 Passenger's seat manual seat rack adjustment with 22 detents, which includes most forward and rearward

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	25	12
Passenger Seat	22	0



SEAT BELT UPPER ANCHORAGES

Driver and Passenger have 3 positions, with upper most detent equal to 0. Placed at mid-point

	Total # of Positions	Placed in Position #
Driver Seat	3	1
Passenger Seat	3	1

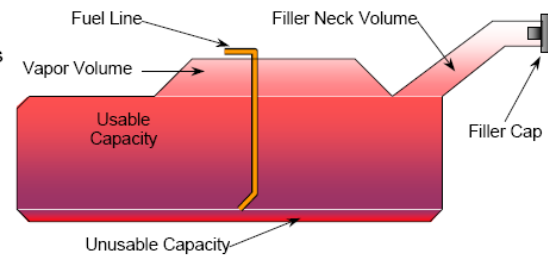
DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	97.5
Usable Capacity of "Optional Tank"	NA
92%-94% of Usable Capacity	89.7-91.7
Actual Amount of Solvent Used	90.5
1/3 of Usable Capacity	32.5

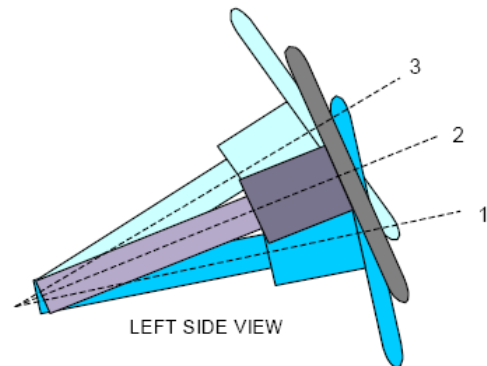
The fuel was evacuated according to the specifications provided in Form 1 by the vehicle manufacturer.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Manual steering column adjustment was adjusted to the midpoint of the tilt range. The steering wheel did not have a telescoping feature.



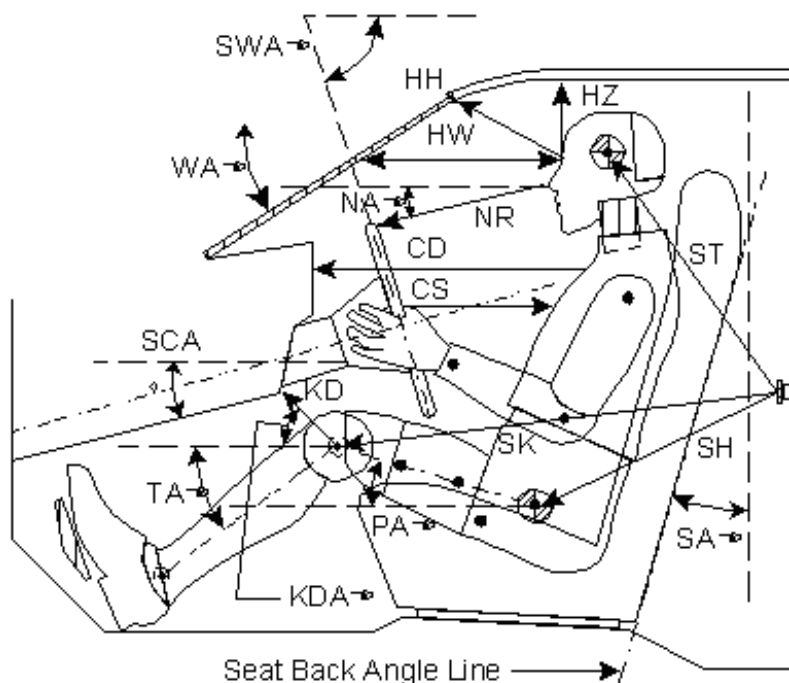
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1		
Geometric center position No. 2	20	
Uppermost position No. 3		
Telescoping Steering Wheel Travel		NA
Test Position	20	NA

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

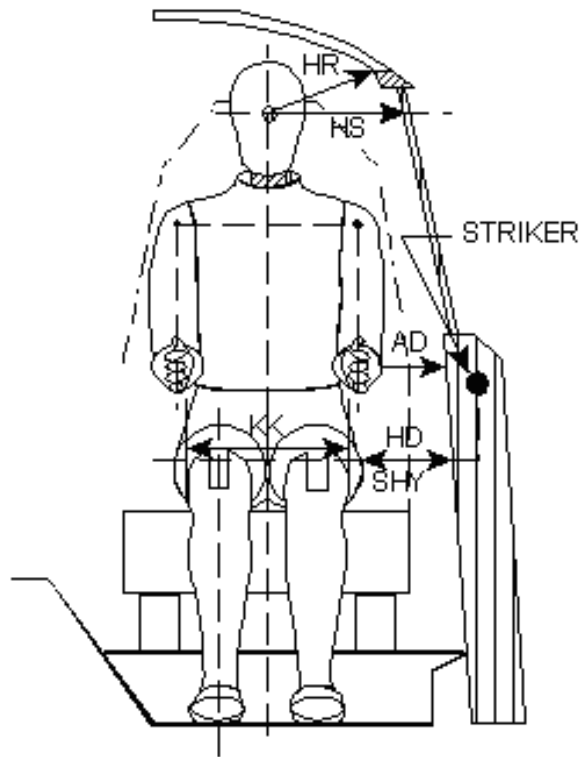


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		35		
SWA°	Steering Wheel Angle		69		
SCA°	Steering Column Angle		22.2		
SA°	Seat Back Angle (on headrest post)		7.6		10.8*
HZ	Head to Roof (Z)	252	0	334	0
HH	Head to Header	415		457	
HW	Head to Windshield	657	90	752	90
NR	Nose to Rim	371	12.5	N/A	N/A
CD	Chest to Dash	580		438	
CS	Chest to Steering Hub	298	90		
RA	Rim to Abdomen	206	90		
KDL	Left Knee to Dash	164	12.8	116	22.0
KDR	Right Knee to Dash	148		119	26.5
PA°	Pelvic Angle		21.5		21.7
TA°	Tibia Angle		-36.8		59.4
SK	Striker to Knee	782	6.3	842	4.2
ST	Striker to Head	776	58	706	58
SH	Striker to H-Point	410	-1.7	489	6

*Head restraint

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

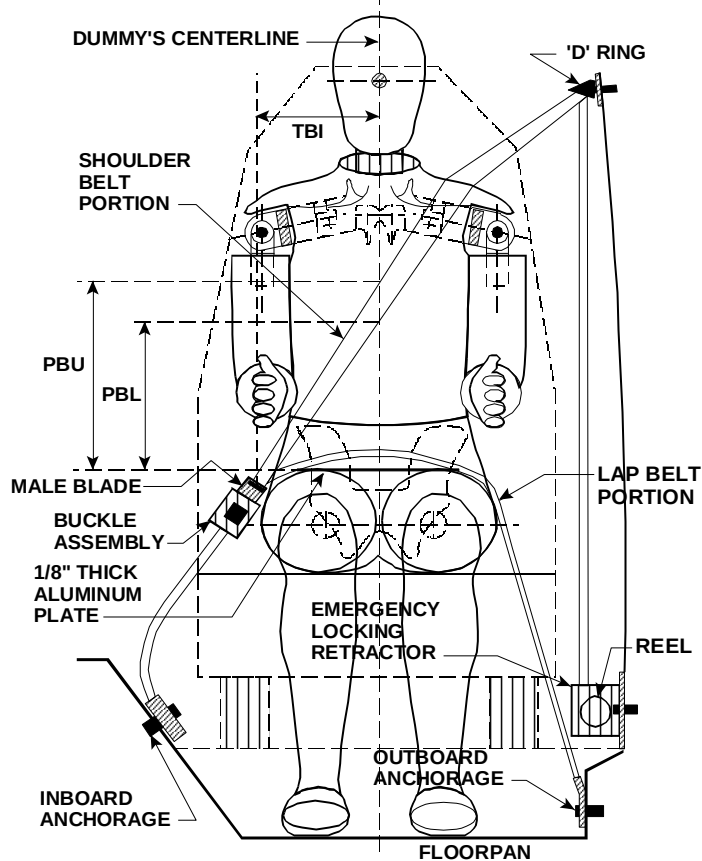


Code	Description	Driver	Passenger
AD	Arm to Door	39	95
HD	H-Point to Door	142	181
HR	Head to Side Header	216	302
HS	Head to Side Window	346	303
KK	Knee to Knee	325	222
SHY	Striker to H-Point (Y Direction)	225	337
AA	Ankle to Ankle	324	171

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	341	310
PBL — Top surface of aluminum plate to belt lower edge	mm	300	251

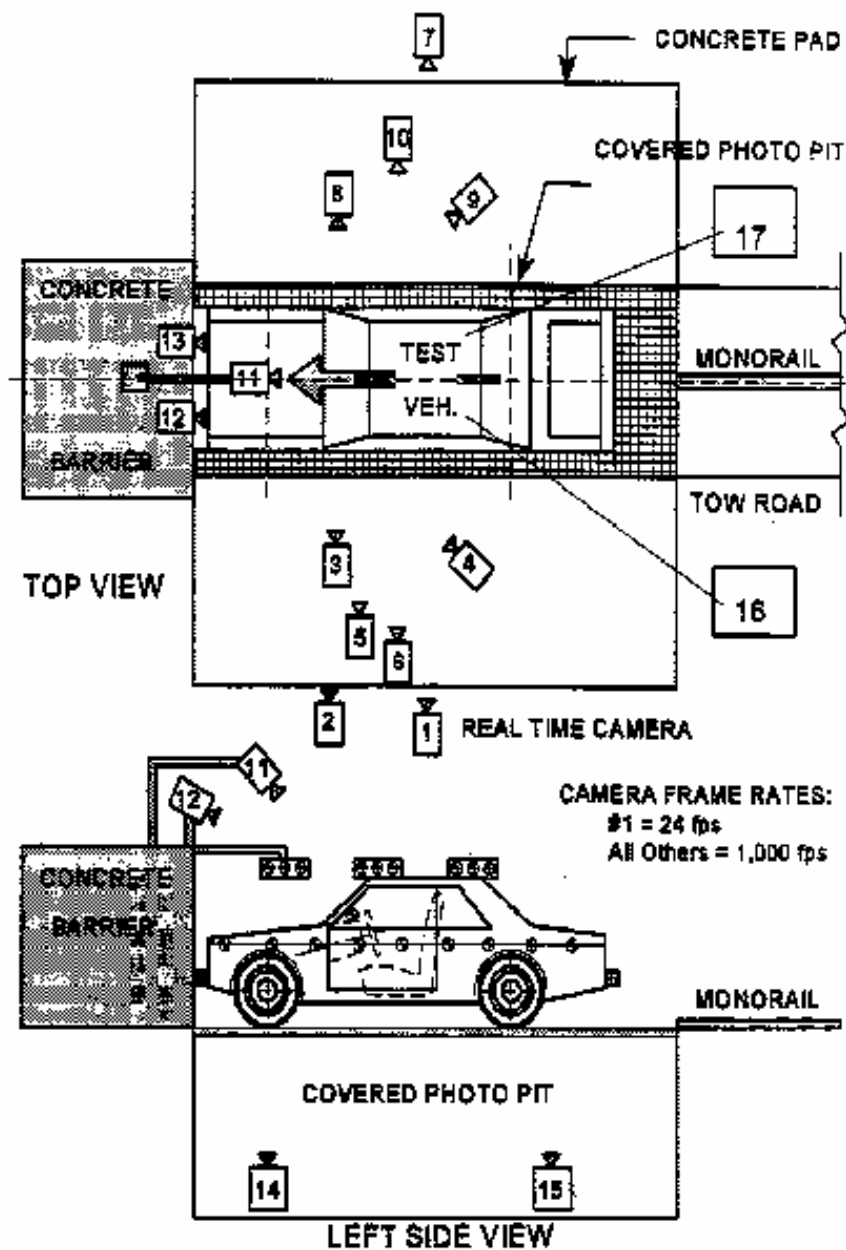
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	870	875
Lap Belt Length as measured on ATD	mm	600	602
Remainder of belt on reel	mm	0	0
Total belt length for continuous webbing systems	mm	1470	1477

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

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

CAMERA LOCATIONS

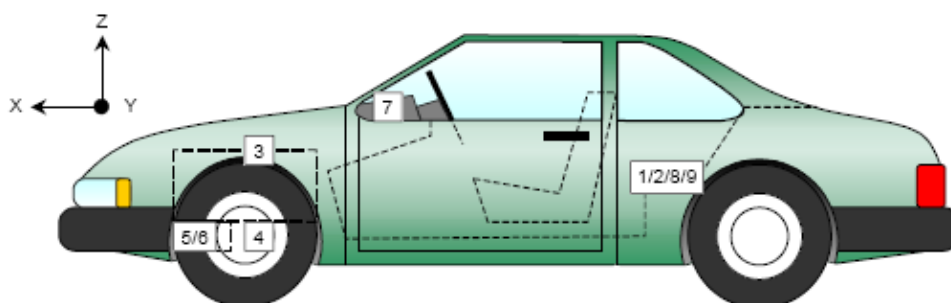
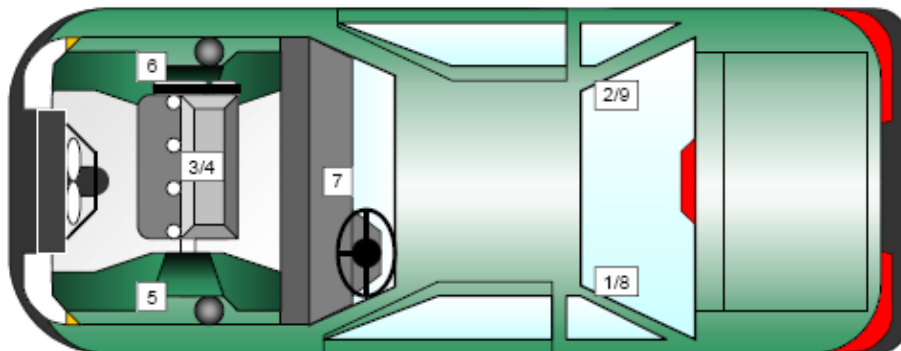
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Camera				-	24
2	Driver Left Side View	1680	1760	1120	50	1000
3	Left Side View	850	790	940	50	1000
4	Overall Right Side	750	3730	1890	50	1000
5	Steering Column (Bottom)	710	1955	1205	28 - 70	1000
6	Steering Column (Top)	710	1955	1825	24 - 70	1000
7	Driver and Interior View	550	3730	1890	50	1000
8	Right Side View	1200	1270	940	50	1000
9	Right Passenger View	370	1910	1170	50	1000
10	Pass. And Interior View	240	3870	1790	50	1000
11	Passenger Front View	620	-92	1987	25	500
12	Driver Front View	620	-92	1987	25	500
13	Windshield View	0	-530	3374	25	500
14	Pit View of Engine	0	615	-3048	12.5	1000
15	Pit View of Fuel Tank	0		-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 Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	5625	-705	568
2	Right Rear X-Member X	5645	730	568
3	Engine Top X	2927	14	569
4	Engine Bottom X	2927	14	569
5	Left Brake Caliper X	7775	579	516
6	Right Brake Caliper X	2927	14	569
7	Instrument Panel X	7782	-533	504
8	Left Rear X-Member Z	5625	-705	568
9	Right Rear X-Member Z	5645	730	568

Reference Points:

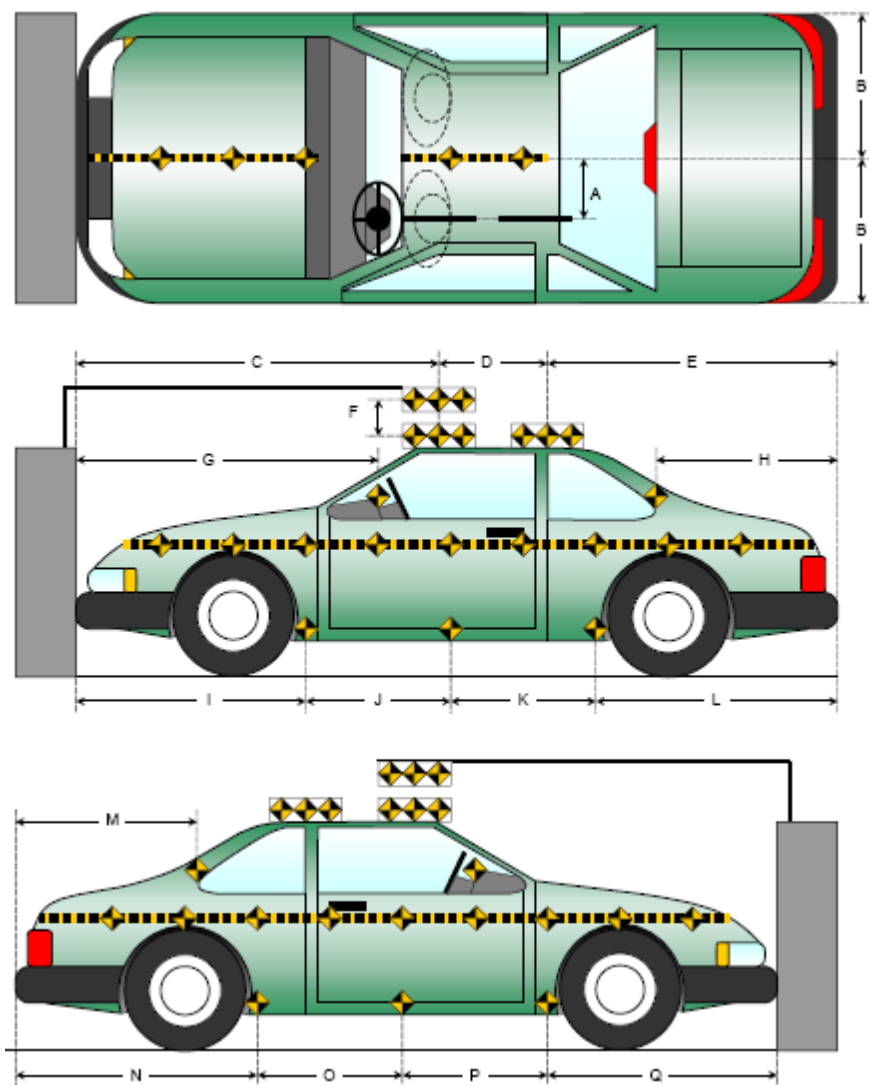
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

Item	Value
A	460
B	785
C	2200
D	1219
E	2417
F	
G	1902
H	2349
I	1527
J	967
K	964
L	2377
M	2349
N	2377
O	3333
P	973
Q	1530

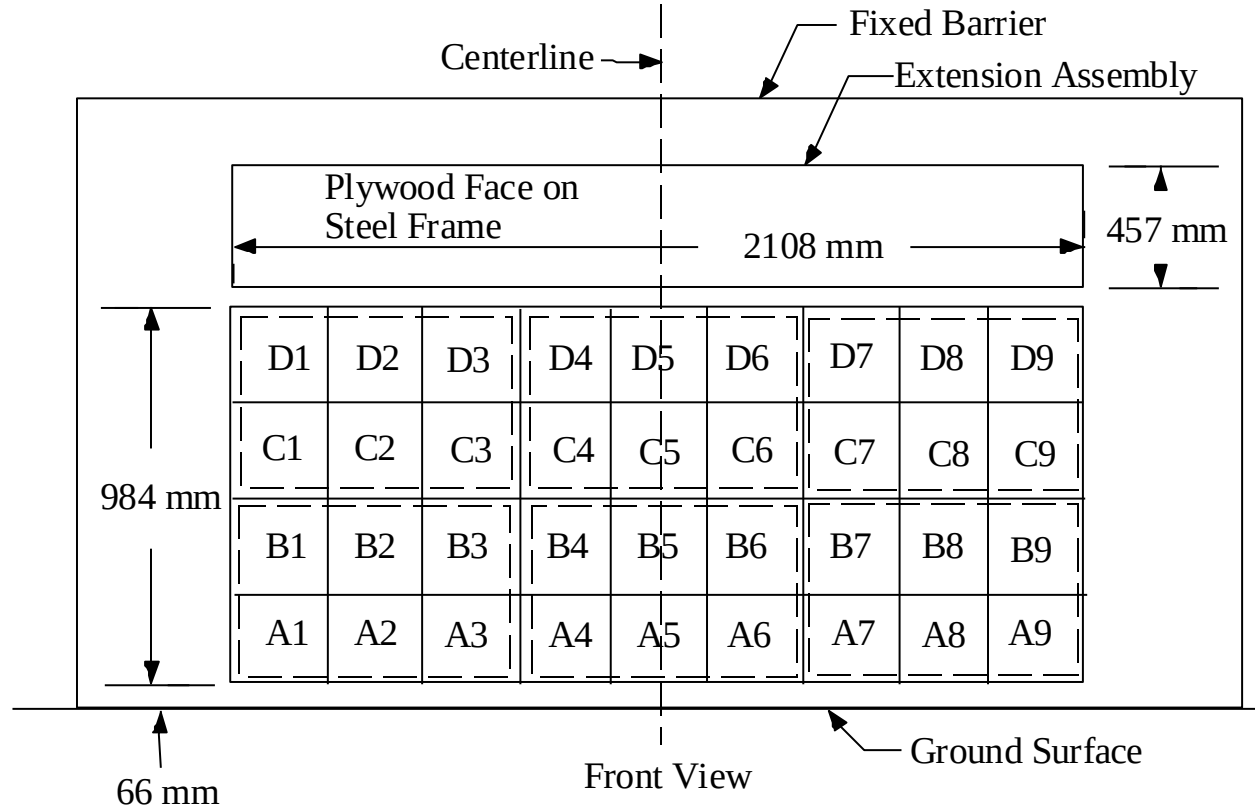
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

INSTRUMENTATION

Driver Dummy Channels	42
Passenger Dummy Channels	42
Belt load cells	4
Vehicle Structure Accelerometers	8
Barrier load cells	36
Total	132

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 Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

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	Unlocked	Unlocked
Front Door Opening	Closed, operable	Closed, operable
Rear Door Opening	Closed, operable	Closed, Operable
Seat Track Shift (mm)	9 mm	13 mm
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

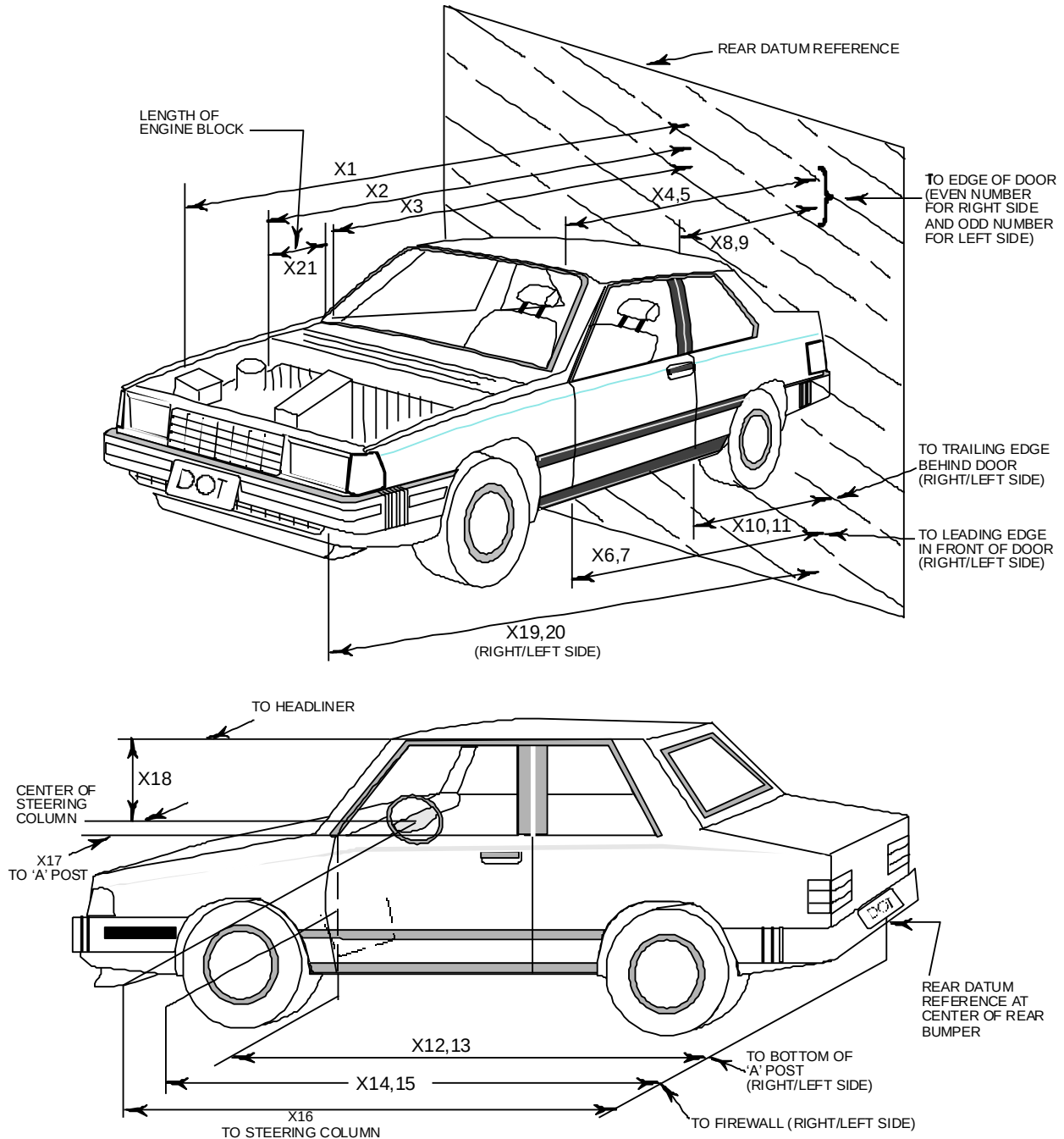
Measured Parameter	Units	Value
Left Side	mm	626
Center	mm	687
Right Side	mm	708
Average	mm	674

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	NA	NA	NA	NA

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5836	5172	663
2	Rear Surface of Vehicle (RSOV) to Front of Engine	5114	4979	135
3	RSOV to Firewall	4640	4627	13
4	RSOV to Upper Leading Edge of Right Door	4282	4278	4
5	RSOV to Upper Leading Edge of Left Door	4285	4279	6
6	RSOV to Lower Leading Edge of Right Door	4235	4249	-14
7	RSOV to Lower Leading Edge of Left Door	4226	4245	-18
8	RSOV to Upper Trailing Edge of Right Door	3089	3083	6
9	RSOV to Upper Trailing Edge of Left Door	3090	3084	7
10	RSOV to Lower Trailing Edge of Right Door	3077	3088	-12
11	RSOV to Lower Trailing Edge of Left Door	3076	3093	-17
12	RSOV to Bottom of "A" Post of Right Side	4242	4235	7
13	RSOV to Bottom of "A" Post of Left Side	4244	4233	12
14	RSOV to Firewall, Right Side	4591	4576	15
15	RSOV to Firewall, Left Side	4592	4583	8
16	RSOV to Steering Column	3777	3783	-6
17	Center of Steering Column to "A" Post	293	292	1
18	Center of Steering Column to Headliner	446	443	3
19	RSOV to Right Side of Front Bumper	5770	5179	591
20	RSOV to Left Side of Front Bumper	5773	5188	584
21	Length of Engine Block	458	446	12
RD	RSOV to Right Side of Dash Panel	3956	3957	-1
CD	RSOV to Center of Dash Panel	0	0	0
LD	RSOV to Left Side of Dash Panel	3962	3958	4

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

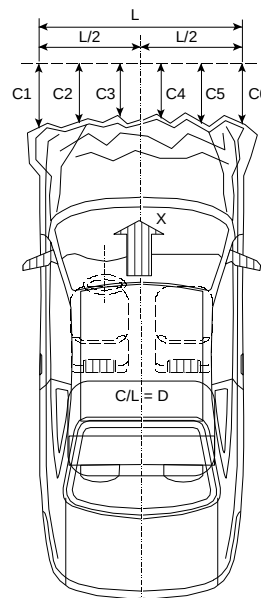
Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

VEHICLE INFORMATION

VIN	1GCRKPEA5BZ126316	Wheelbase (mm)	3657
Vehicle Size Category	Four Door Pickup	Test Weight (kg)	2666

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): 55.8
 Velocity Change (km/h): 62.45
 Time of Separation (msec): 218



CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
 Midpoint of Damage: 861
 Damage Region Length (mm): 1722
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	5728	5224	504
C2	Crush zone 2 at left side	mm	5794	5216	578
C3	Crush zone 3 at left side	mm	5823	5194	628
C4	Crush zone 4 at right side	mm	5822	5188	635
C5	Crush zone 5 at right side	mm	5793	5204	589
C6	Crush zone 6 at right side	mm	5726	5192	534
L	C1 to C6	mm	1484	1460	24

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

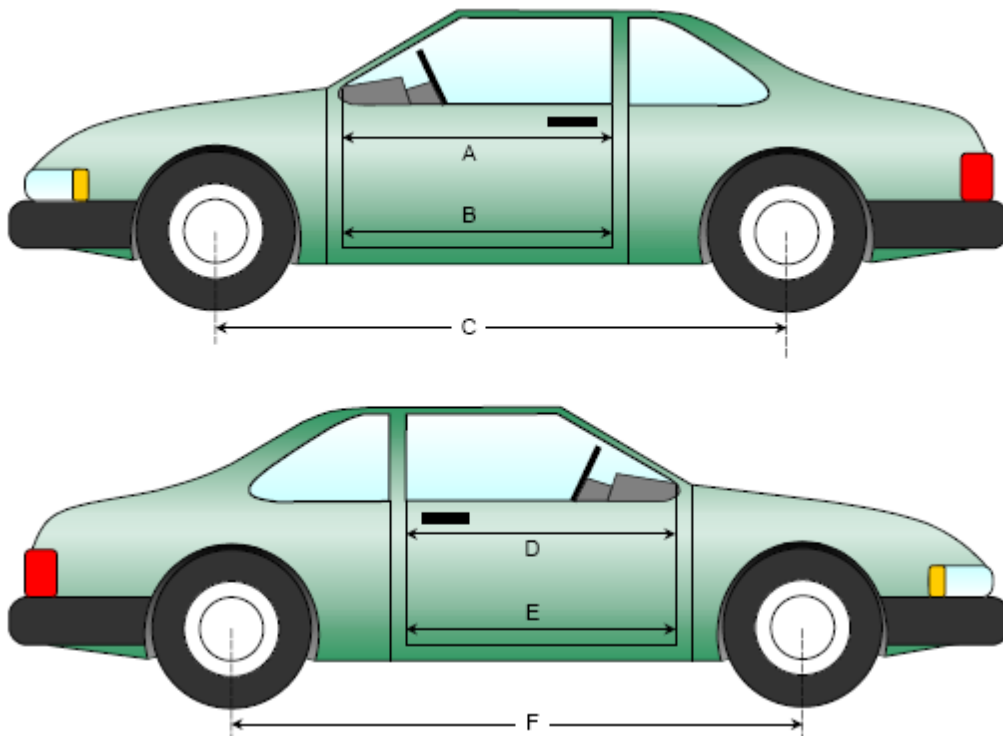
Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1146	1144	-2
B	Left Side Lower	mm	1134	1131	-3
D	Right Side Upper	mm	1148	1142	-6
E	Right Side Lower	mm	1135	1129	-6

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3656	3631	-25
F	Right Side Wheelbase	mm	3657	3624	-33



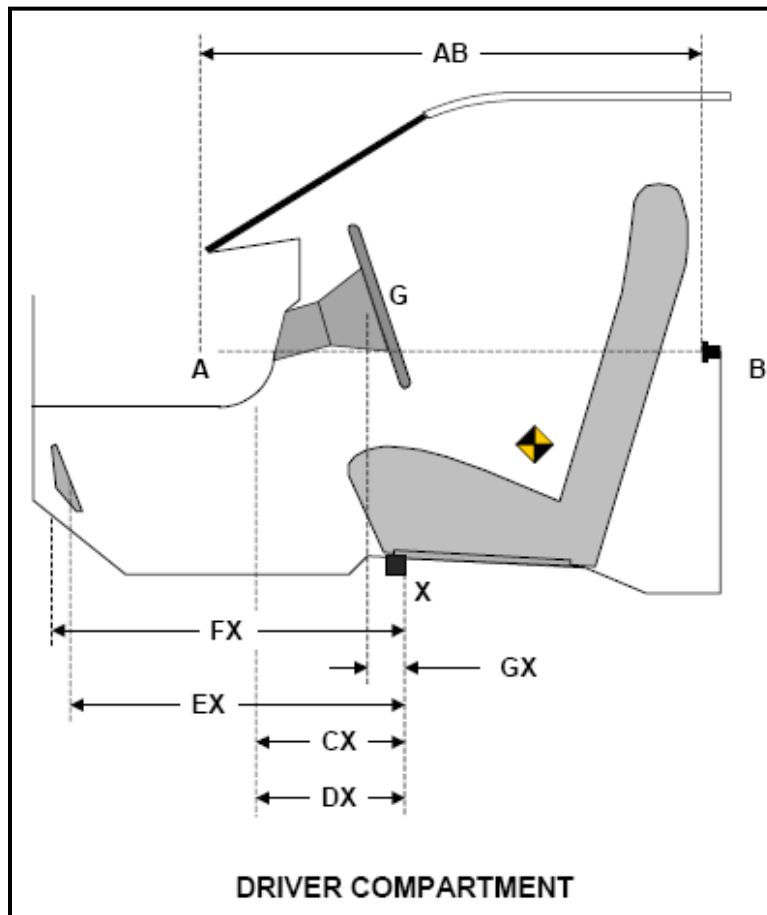
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

DRIVER COMPARTMENT INTRUSION

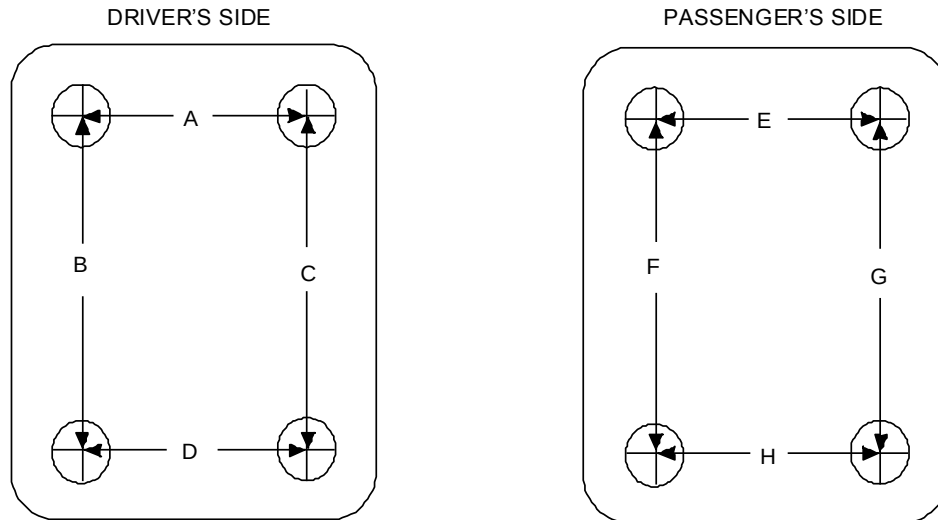
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	878	867	-11
CX	Left Knee Bolster to X	mm	302	304	2
DX	Right Knee Bolster to X	mm	292	289	-3
EX	Brake Pedal to X	mm	518	510	-8
FX	Foot Rest to X	mm	NA	NA	NA
GX	Center of Steering Column Wheel Hub to X	mm	81	78	-4

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	493	494	1
B	397	392	-5
C	357	362	5
D	476	473	-3
E	429	426	-3
F	328	320	-8
G	321	320	-1
H	420	419	-1

All units in millimeters

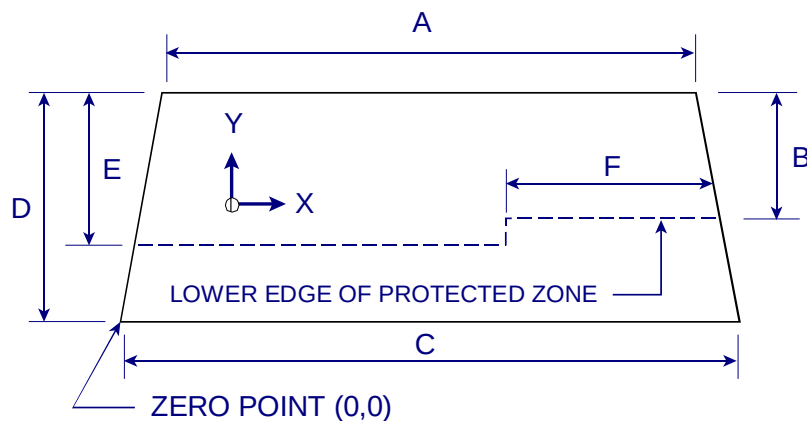
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	2011 Chevrolet Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010

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	2278	2278	100
Right Side	2278	2278	100
Total	4556	4556	100



Item	Units	Value
A	mm	1382
B	mm	429
C	mm	1726
D	mm	724
E	mm	489
F	mm	646
G	Mm	23

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 Silverado Extended Cab</u>	NHTSA No:	<u>MB0117</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>9/28/2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

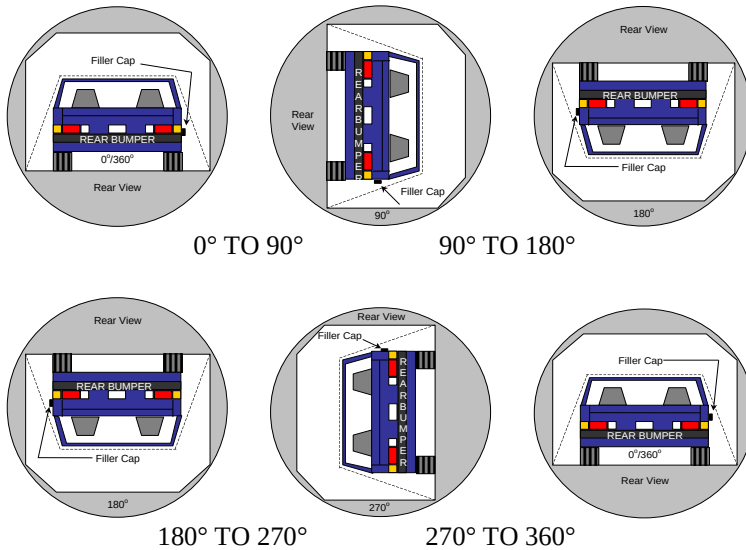
Temperature at Time of Impact: 22 °C Test Time: 4:00pm

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 Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



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°	1:04	5:00	6:04
90° to 180°	1:04	5:00	6:04
180° to 270°	1:03	5:00	6:03
270° to 360°	1:09	5:00	6:09

FMVSS 301 SPILLAGE TABLE

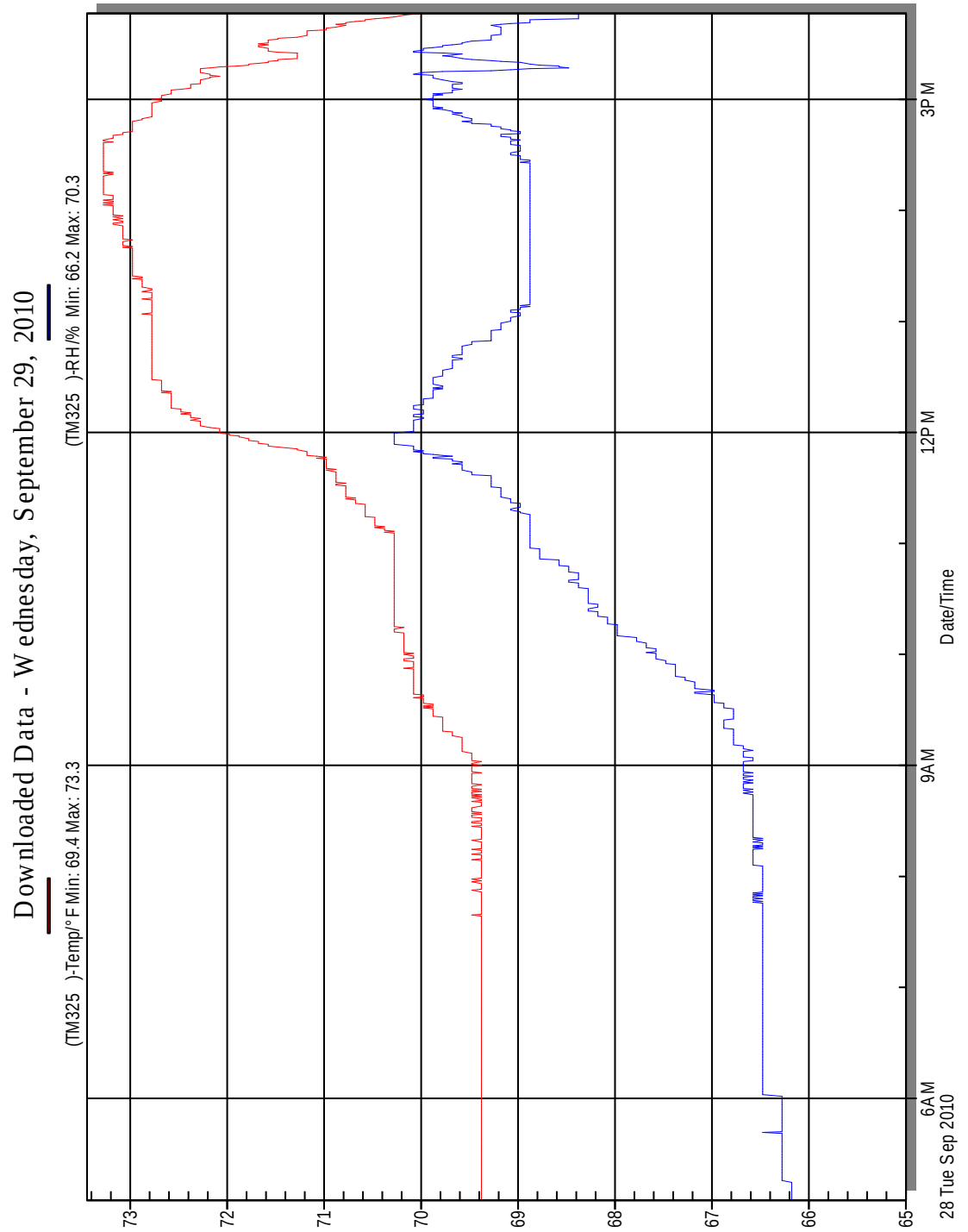
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	NA		
90° to 180°	0	NA		
180° to 270°	0	NA		
270° to 360°	0	NA		

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 Silverado Extended Cab	NHTSA No:	MB0117
Test Program:	Frontal NCAP	Test Date	9/28/2010



APPENDIX A
PHOTOGRAPHS

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44	Pre-test View of the Steering Column Shear Capsule	A-27
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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

Photo Not Available

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

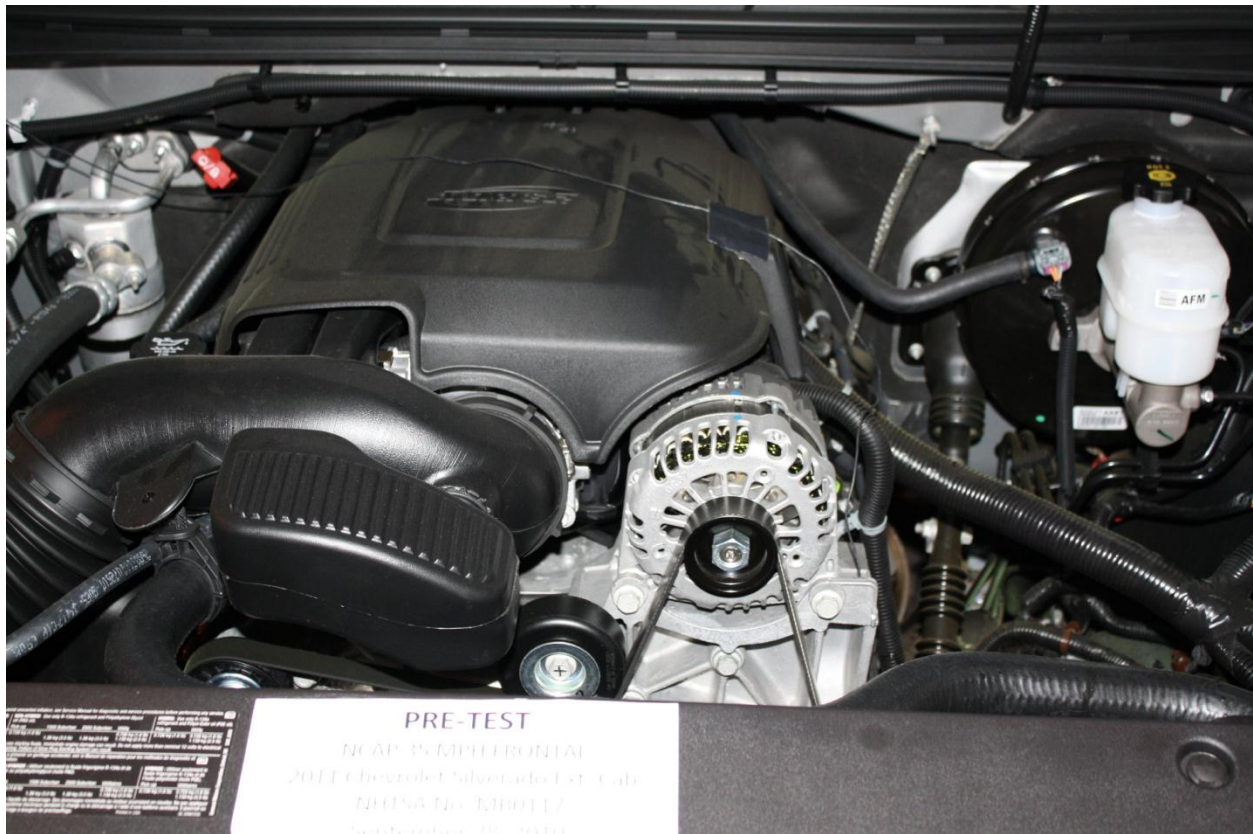


Figure A-19: Pre-Test Engine Compartment View



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

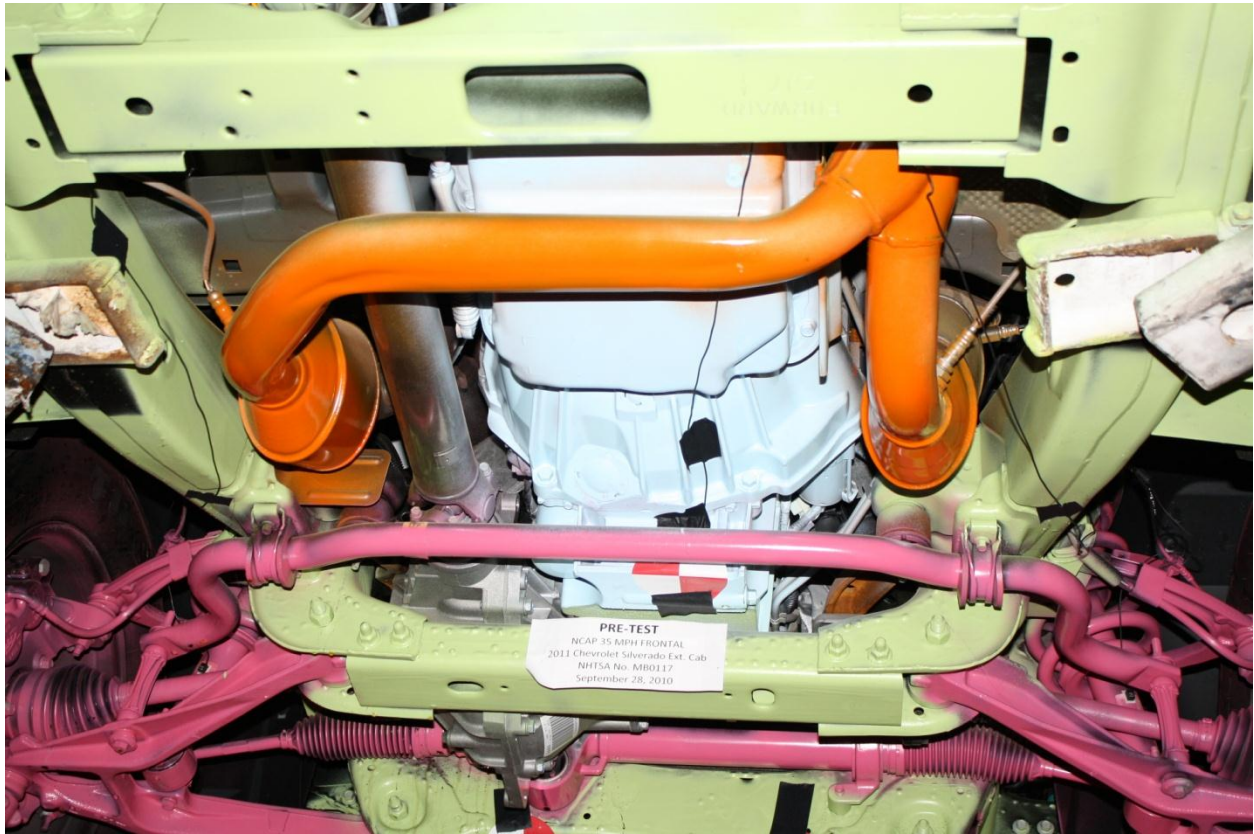


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View

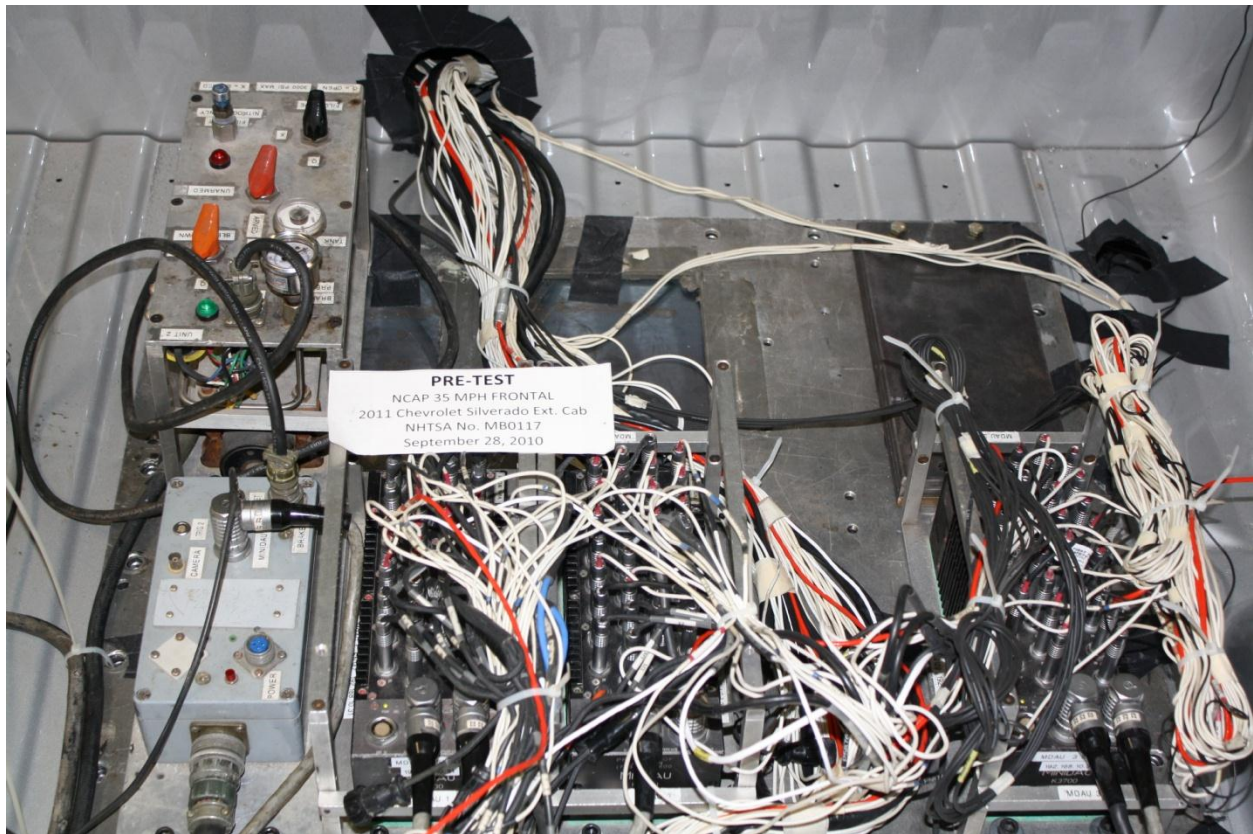


Figure A-27: Pre-Test Dummy Cable Routing

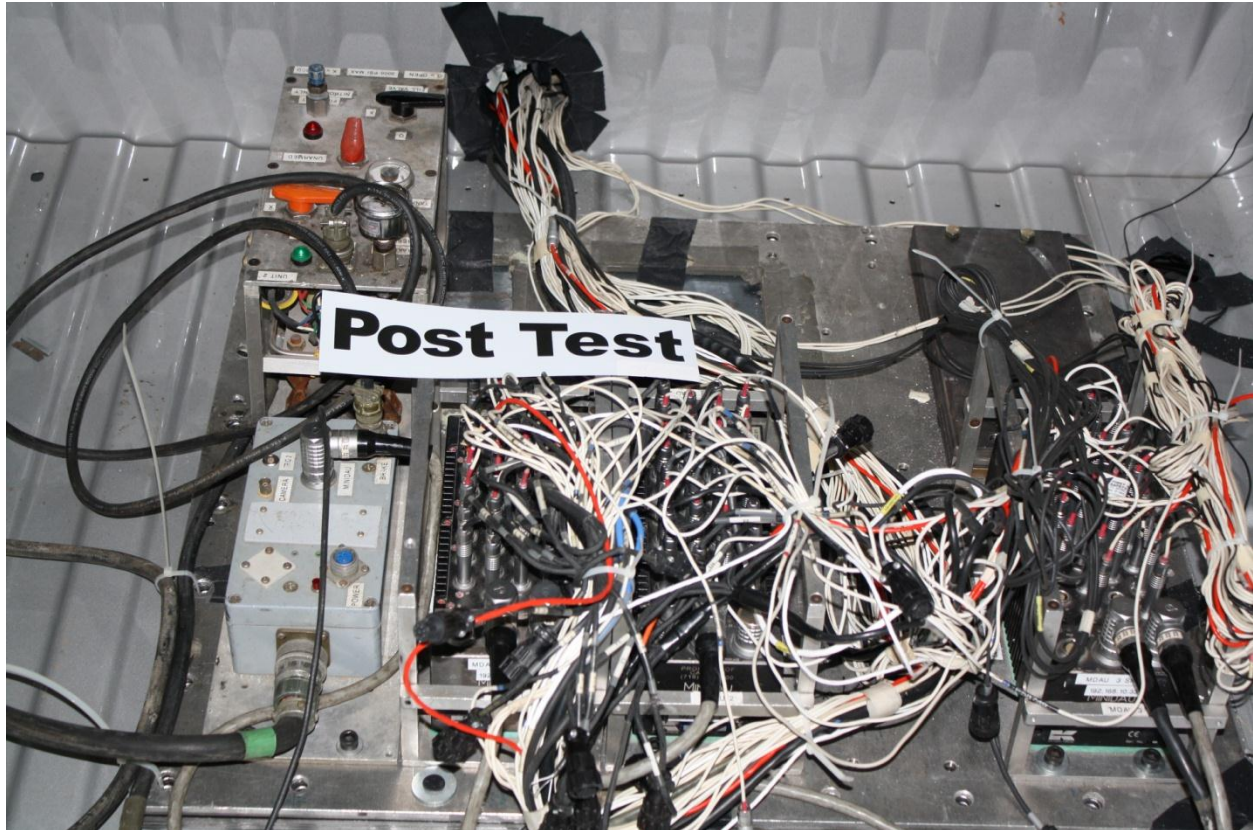


Figure A-28: Post-Test Dummy Cable Routing



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

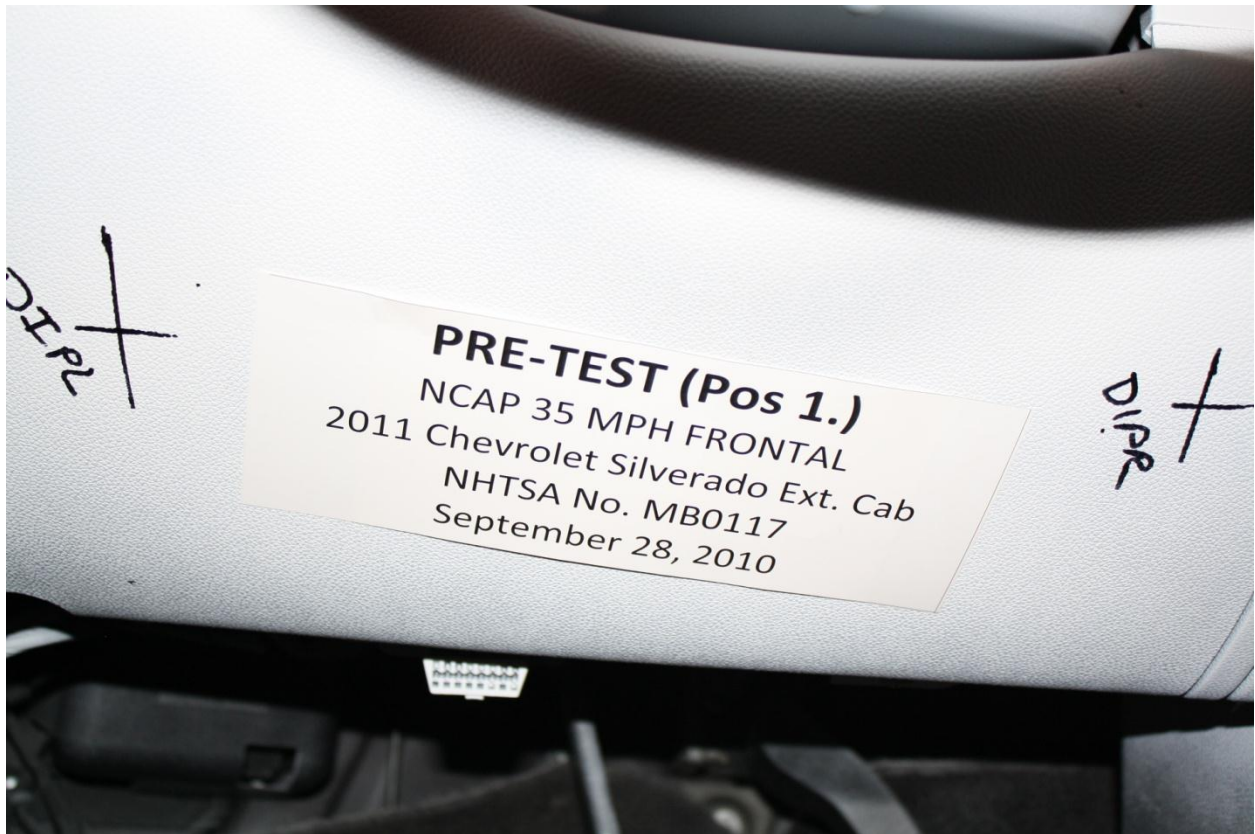


Figure A-39: Pre-Test Driver's Side Knee Bolster



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 Diver Dummy Contact with Airbag

Photo Not Available

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

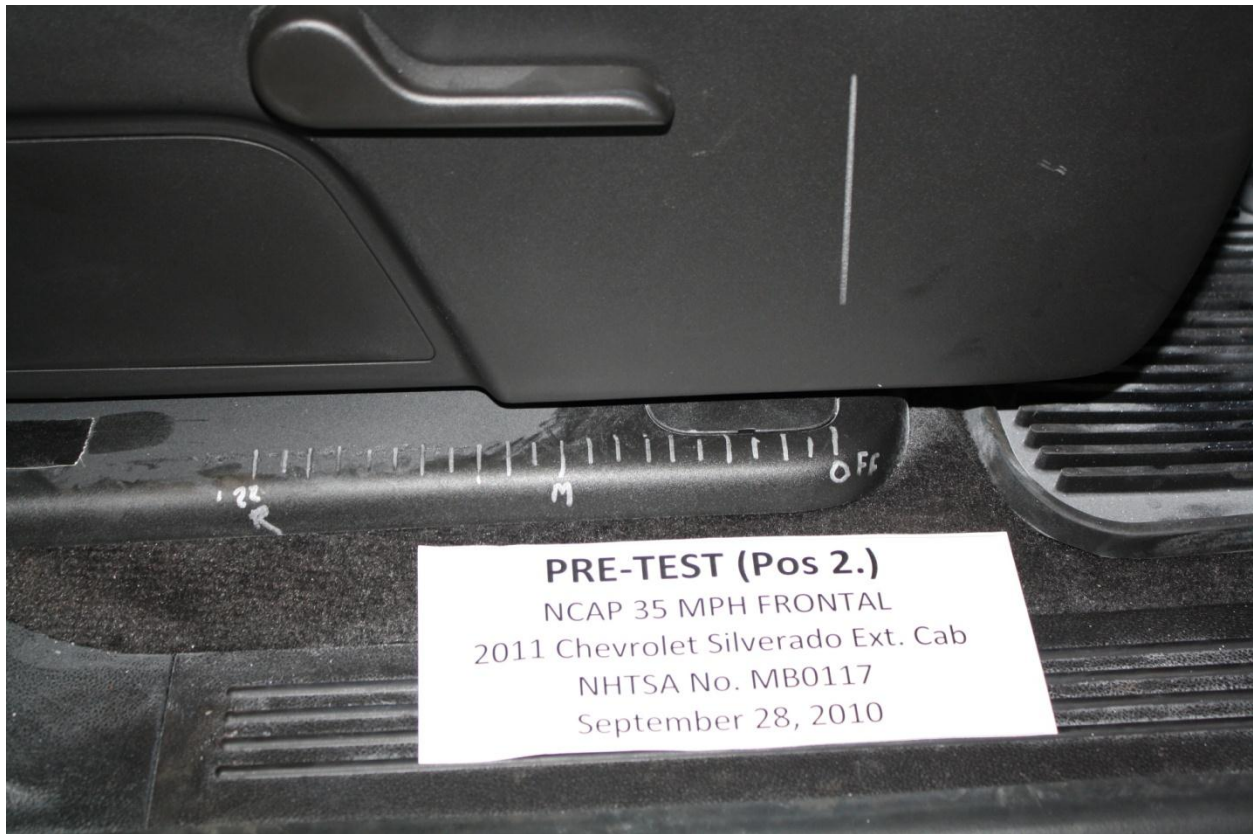
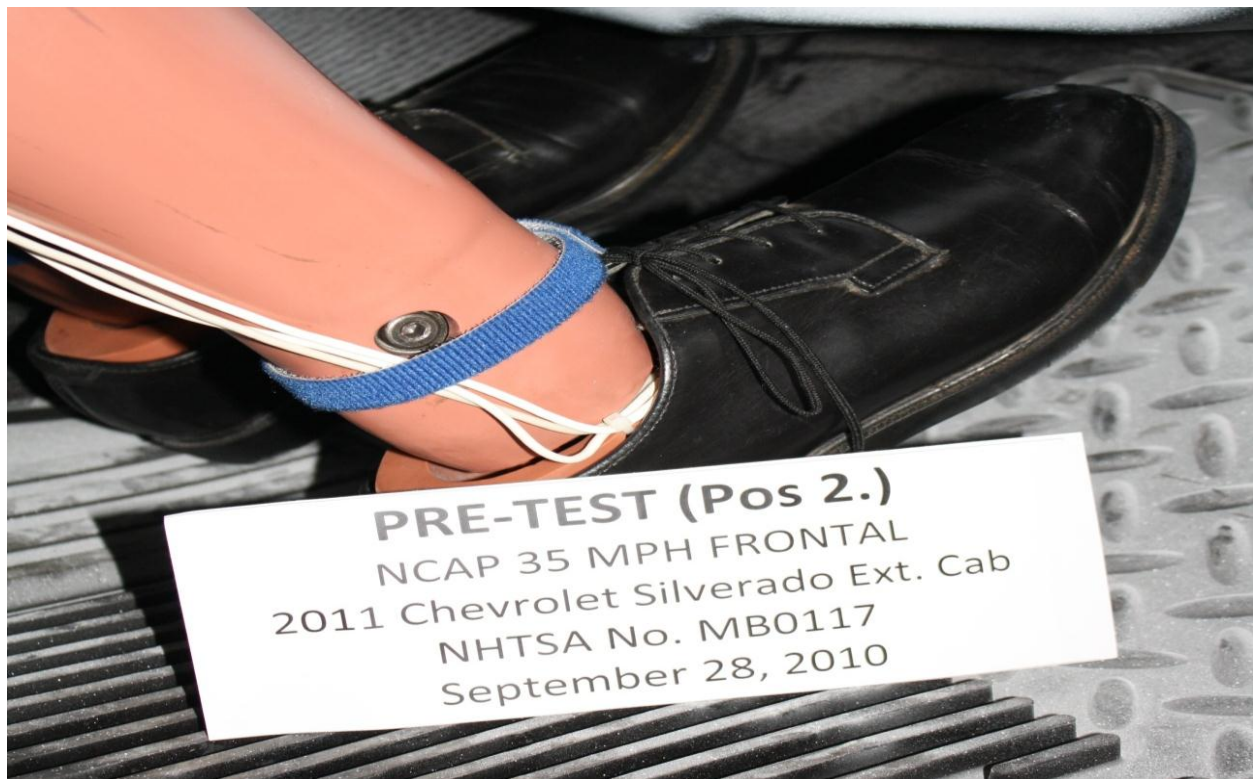


Figure A-52: Pre-Test Passenger's Seat Fore-Aft Markings



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



PRE-TEST (Pos 2.)
NCAP 35 MPH FRONTAL
2011 Chevrolet Silverado Ext. Cab
NHTSA No. MB0117
September 28, 2010

Figure A-54: Pre-Test Passenger Dummy Feet



Post Test

Figure A-55: Post-Test Passenger Dummy Feet

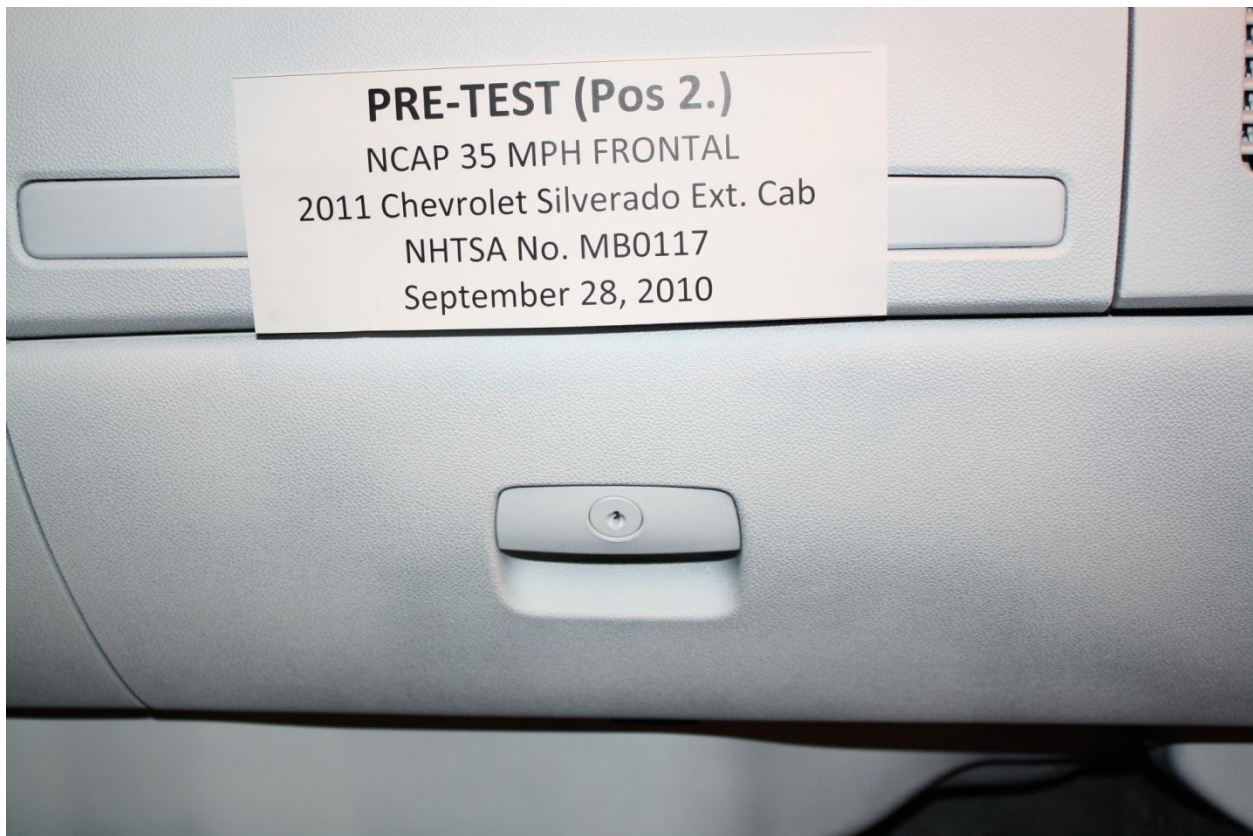


Figure A-56: Pre-Test Passenger's Side Knee Bolster



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

Photo Not Available

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

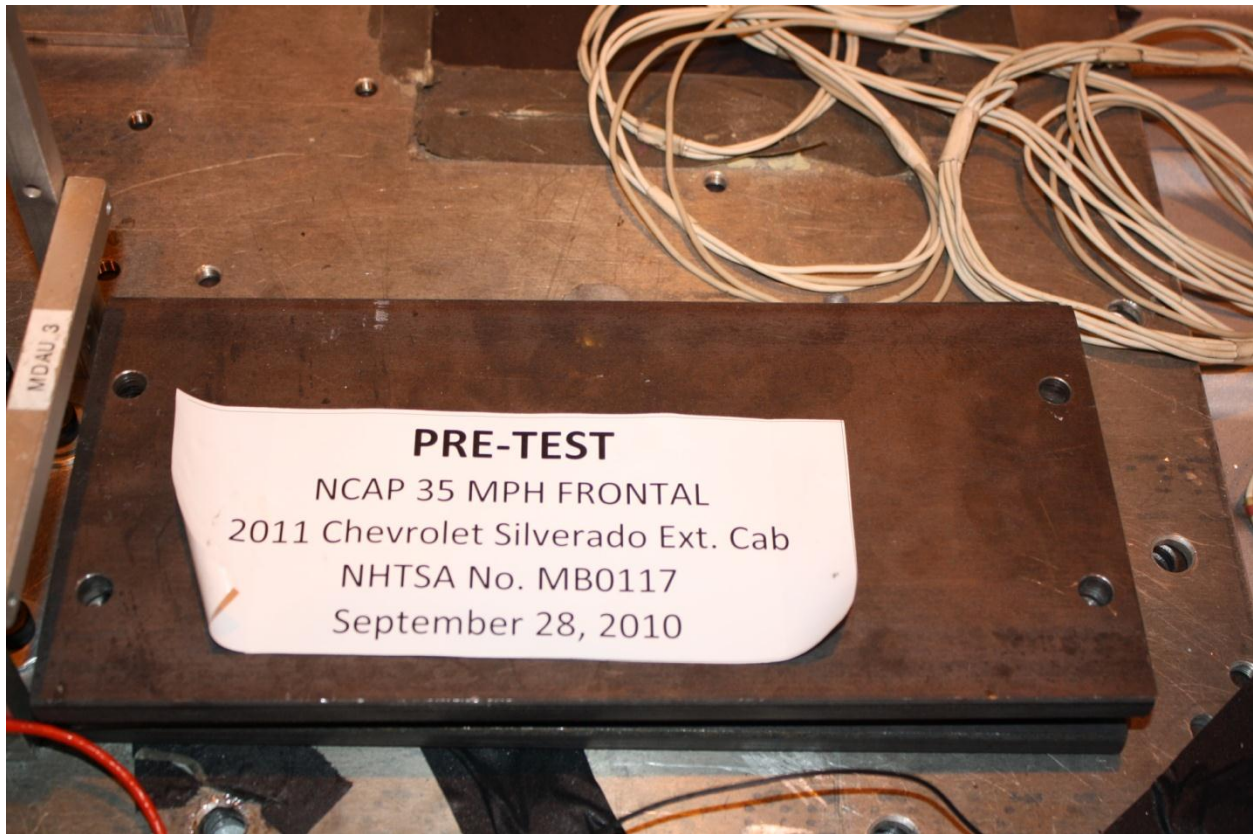


Figure A-61: Photograph of Ballast Installed Vehicle

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

2011 SILVERADO 1500 4WD EXT CAB WT

EXTERIOR: SHEER SILVER METALLIC
INTERIOR: DARK TITANIUM
VORTED 4.8L V8 SFI ENGINE
4-SPD AUTOMATIC TRANSMISSION

STANDARD EQUIPMENT

5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS

MECHANICAL

- VORTED 4.8L V8
- 4-SPEED AUTO TRANSMISSION
- COIL-UPFR-SHOCK (FRONT) SUSP
- AXLE-17.4-SPD REAR DRIVING SUSP
- 288 SMOOTH RIDE SUSPENSION
- BOXED FRAME DESIGN W/ HYPERFORMED TECHNOLOGY
- 115 AMP ALTERNATOR
- POWER RACK AND PINION STEERING

SAFETY & SECURITY

- 4-WHEEL ABS W/ DYNAMIC REAR PROPORTIONING
- DUAL STAGE DRIVER'S AIR BAGS
- AIR BAGS W/ PASS SENSING SYSTEM
- HEAD CURTAIN SIDE AIR BAGS W/

ROLL-OVER PROTECTION

- SEAT-MOUNTED SIDE-IMPACT AIRBAGS DRIVER & RIGHT-FRONT PASS
- DAYTIME RUNNING LAMPS
- AUTO HEADLAMPS W/ FLASH-TO-PASS
- STABILITY CONTROL
- TIRE PRESSURE MONITOR SYSTEM (DOES NOT APPLY TO SPARE TIRE)

EXTERIOR

- CHROME REAR BUMPER
- 170 DEGREE OPENING REAR DOORS
- 17" HALLIDAY SPARE
- ALL-SEASON TIRES
- FRONT RECOVERY HOOKS
- FOLDING OUTSIDE MIRRORS
- CARGO BOX ILLUMINATION
- SOLAR-RAY TINTED GLASS

INTERIOR

- AIR CONDITIONING
- 40/20/40 SPLIT BENCH FRONT SEAT
- 4-LEVEL SPLIT BENCH SEATS W/ DR. LUMBAR & LOCKING STORAGE

40/40 SPLIT REAR SEATING

- DUAL GLOVE BOX STORAGE
- AM/FM STEREO WITH SEEK & SCAN
- DRIVER INFO CENTER DISPLAY
- INTERMITTENT WIPERS
- 4-GAUGE CLUSTER W/ TACHOMETER
- 12-VOLT AUX POWER OUTLET
- TILT STEERING WHEEL
- RUBBERIZED VINYL FLOOR COVERING

OTHER

- BATTERY RUN DOWN PROTECTION
- OIL LIFE MONITORING SYSTEM
- 24 HOUR ROADSIDE ASSISTANCE

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE	\$23,475.00
OPTIONS ESTIMATED TO THE MANUFACTURER'S SUGGESTED RETAIL PRICE	
STANDARD EQUIPMENT EXCLUDED	
17" ALL-TERRAIN BW TIRES	200.00
CARPETING, COLOR-KEYED	100.00

Visit us at www.chevy.com

HEAVY DUTY SUSPENSION	\$6.00
GVW RATING - 7000 LBS	INC.
REAR AXLE 3.42 RATIO	INC.
TOTAL OPTIONS	\$395.00
TOTAL VEHICLE & OPTIONS	\$23,870.00
DESTINATION CHARGE	\$95.00
TOTAL VEHICLE PRICE*	\$30,955.00

For 1 MB0117 Rec 8/19 164 miles
test drive 9/28

EPA Fuel Economy Estimates

GASOLINE CITY MPG 13 Expected range for most drivers 10 to 16 MPG	FLEXIBLE FUEL VEHICLE* GASOLINE - ETHANOL (E85) Estimated Annual Fuel Cost \$2,601 based on 15,000 miles at \$2.00 per gallon of GASOLINE	GASOLINE HIGHWAY MPG 18 Expected range for most drivers 14 to 22 MPG
---	---	--

Combined GASOLINE Fuel Economy This Vehicle 15

10 to 22 All STANDARD PICKUP TRUCKS

GOVERNMENT SAFETY RATINGS

Frontal Crash Star ratings based on the risk of injury in a frontal impact. (NHTSA test per 40 CFR 101.10) (see comparison to other vehicles of similar size and weight)	Driver Passenger Not Rated Not Rated	Not Rated Not Rated
Side Crash Star ratings based on the risk of injury in a side impact.	Front seat Not Rated Rear seat Not Rated	Not Rated Not Rated
Rollover Star ratings based on the risk of rollover in a single vehicle crash.		
Star ratings range from 1 to 5 stars (★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236		

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 61%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: MEXICO 34%

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

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
 ROANOKE, VA U.S.A.
COUNTRY OF ORIGIN:
 ENGINE: UNITED STATES
 TRANSMISSION: MEXICO

2011 General Motors LLC
 MSRP PRICE: \$30,955.00

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

OFFER NO. 10888888 - DEALER CODE 8
 SALES MODEL CODE 000000
 DEALER NO. 000000
 FINAL ASSEMBLY POINT: U.S.A.
 VIN: 1GCRKPE662125516
 (SEE BOTTOM FOR DETAILS)
 BRESKE CHEVROLET CO. INC.
 PO BOX 664
 LIVERPOOL, NY 13088-0664

RO
 1FA1014675

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

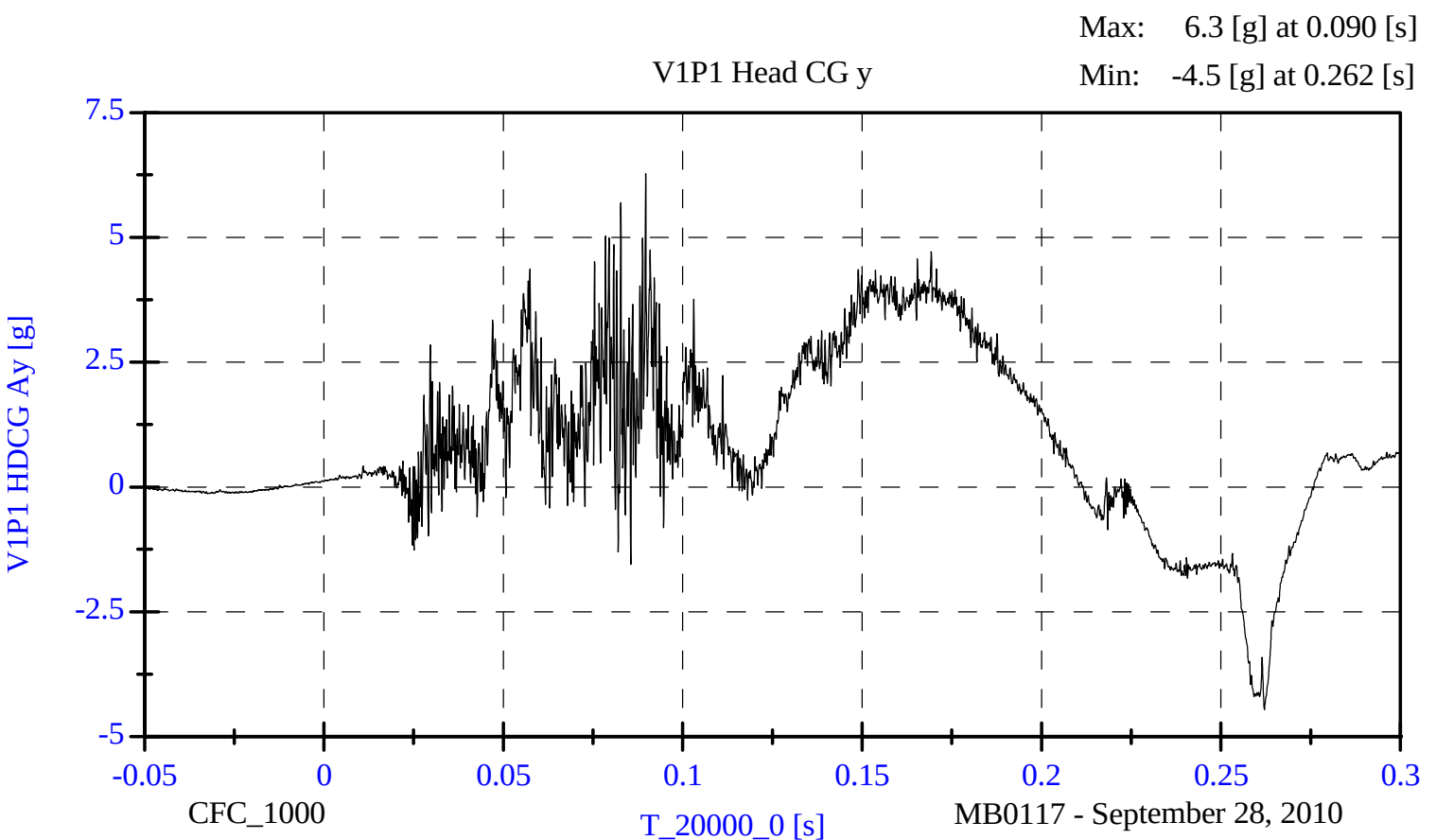
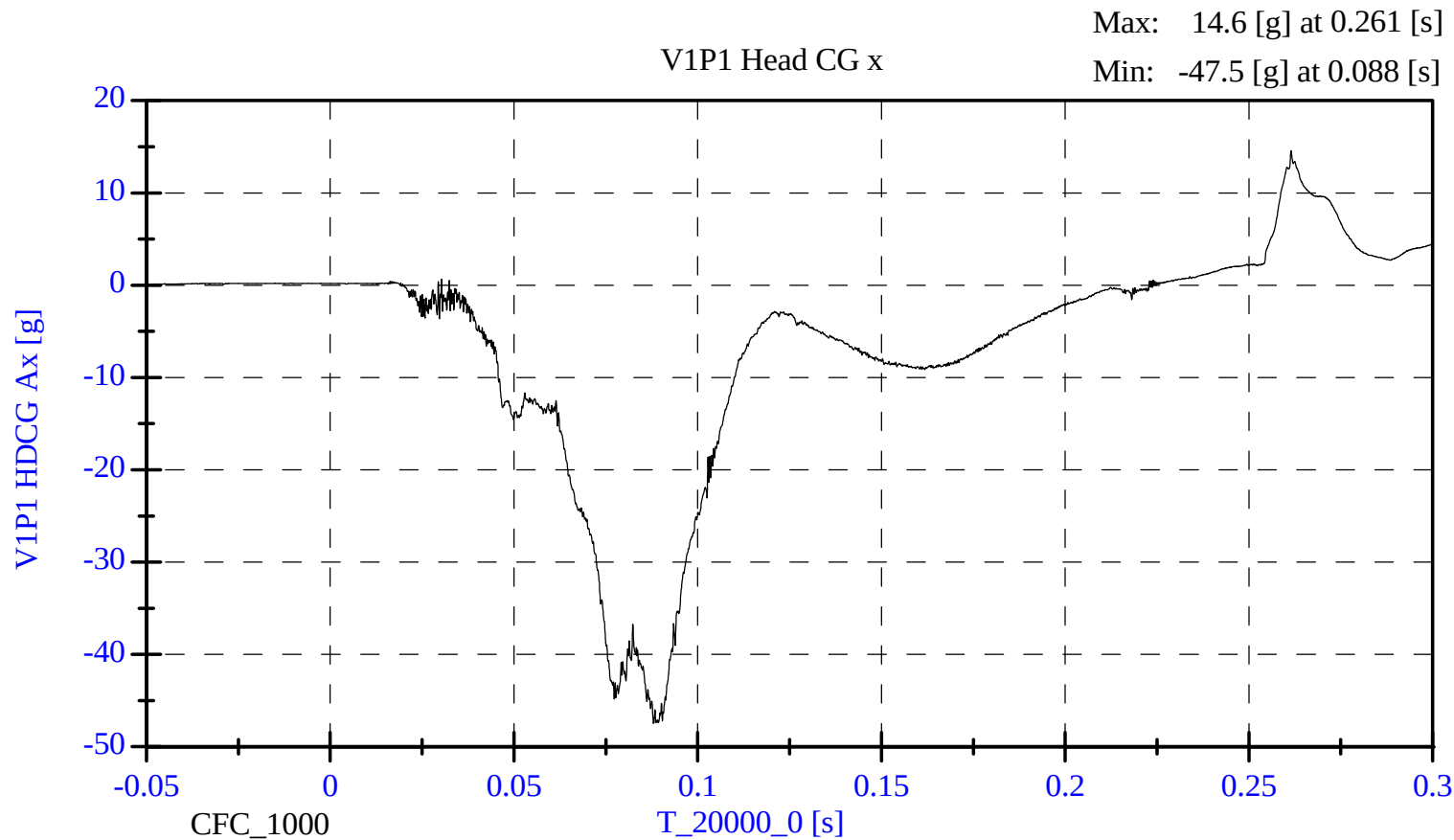
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection 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

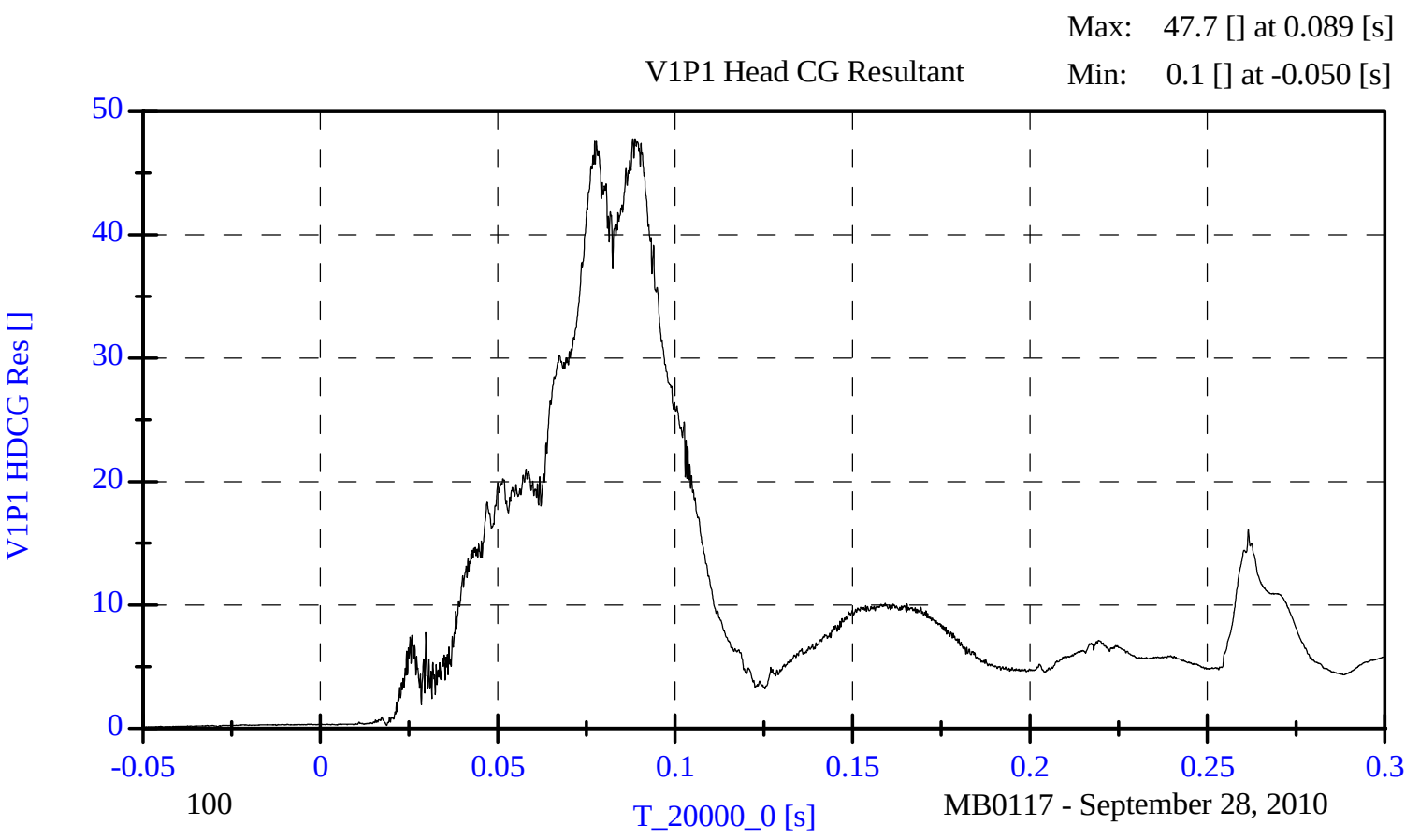
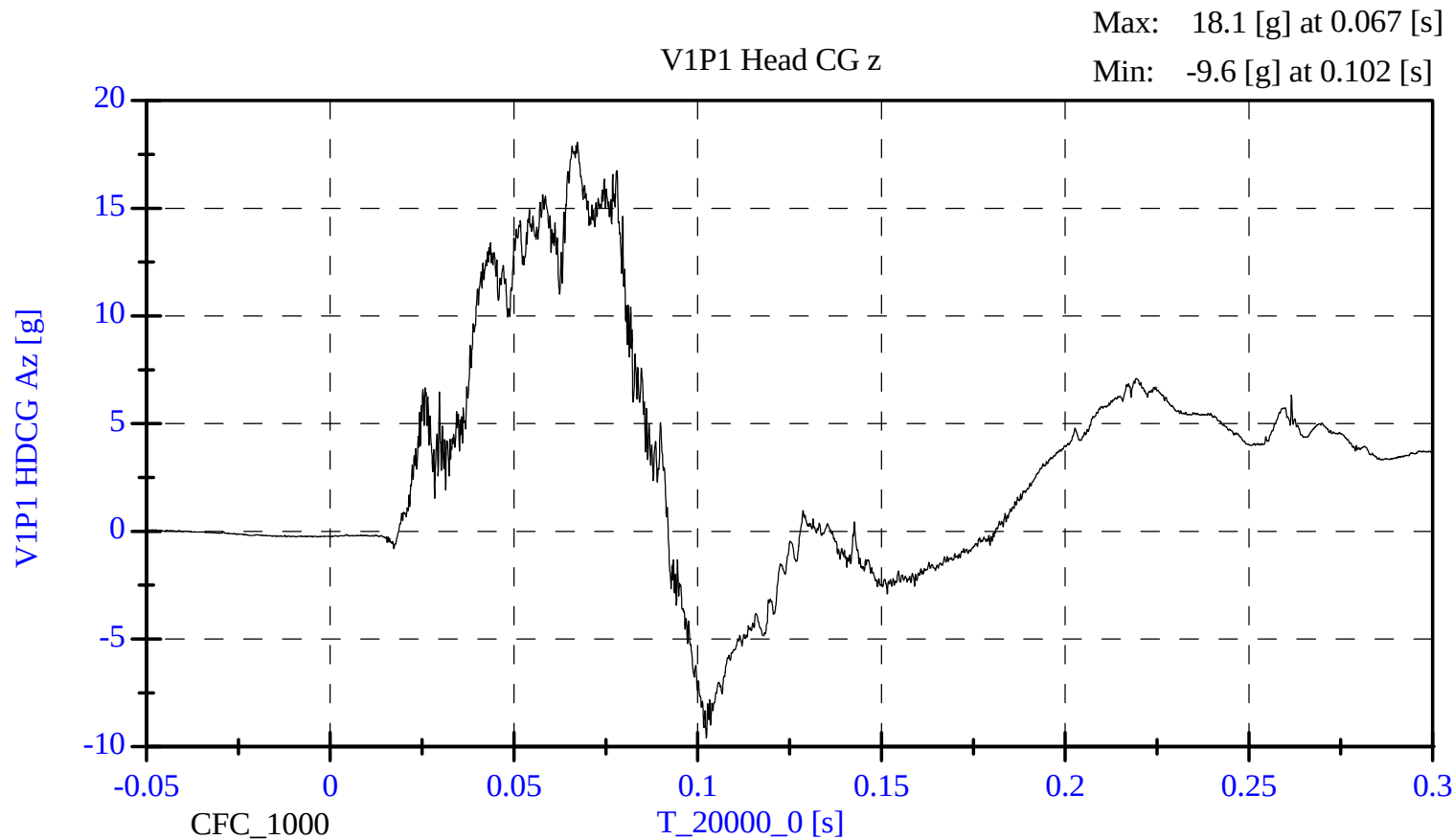
30	Passenger Right Femur Force vs. Time	B-19
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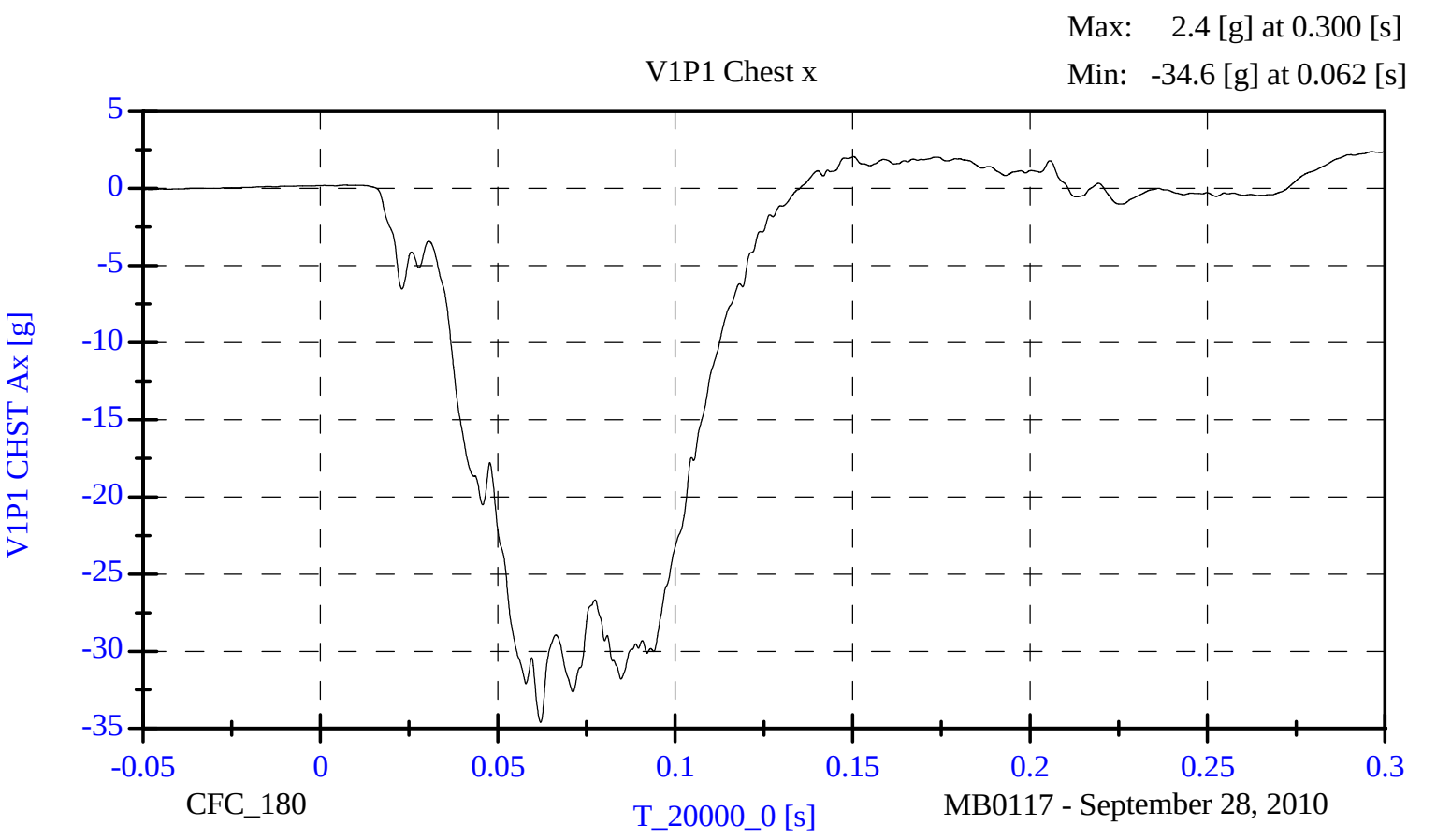
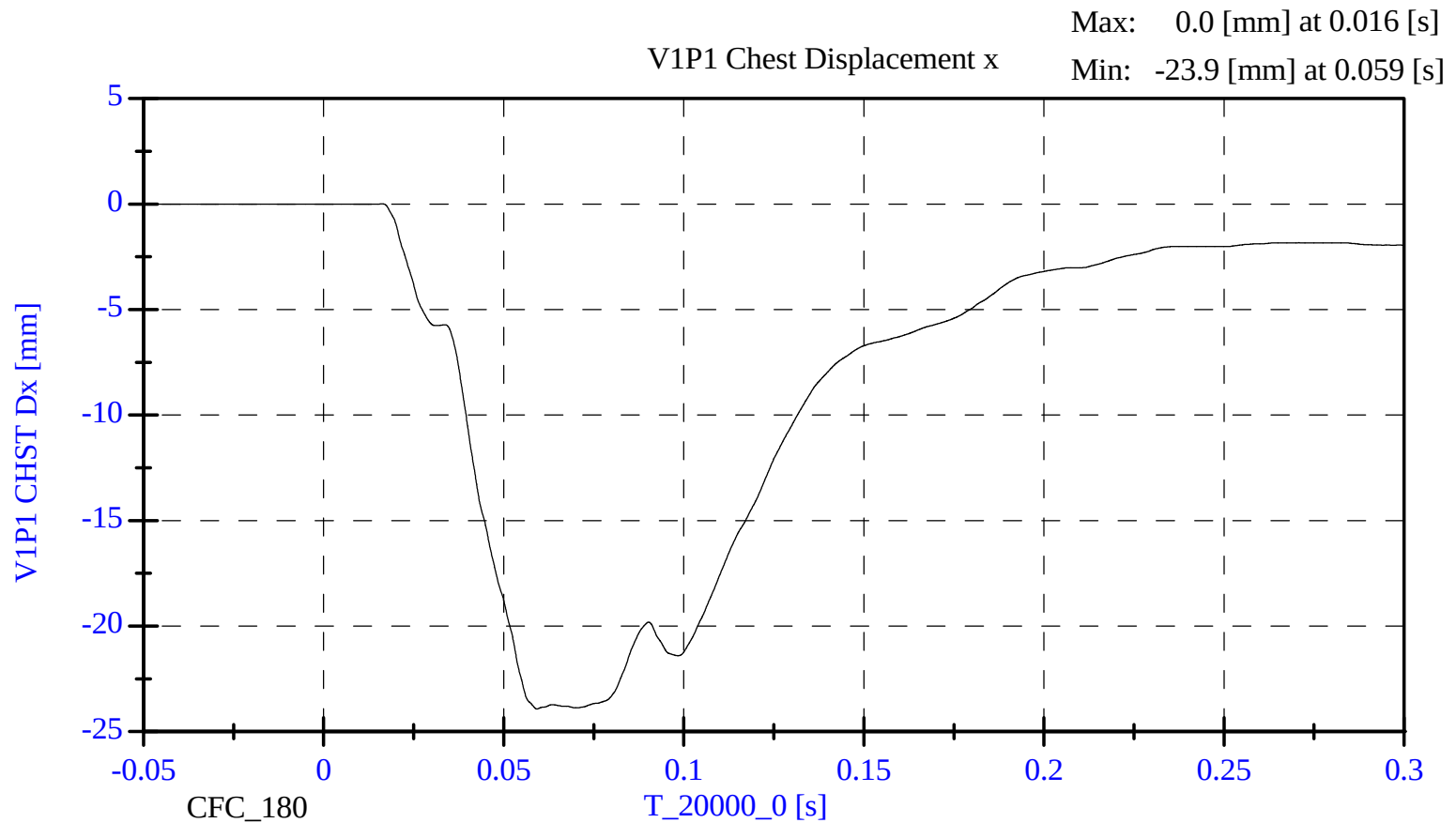
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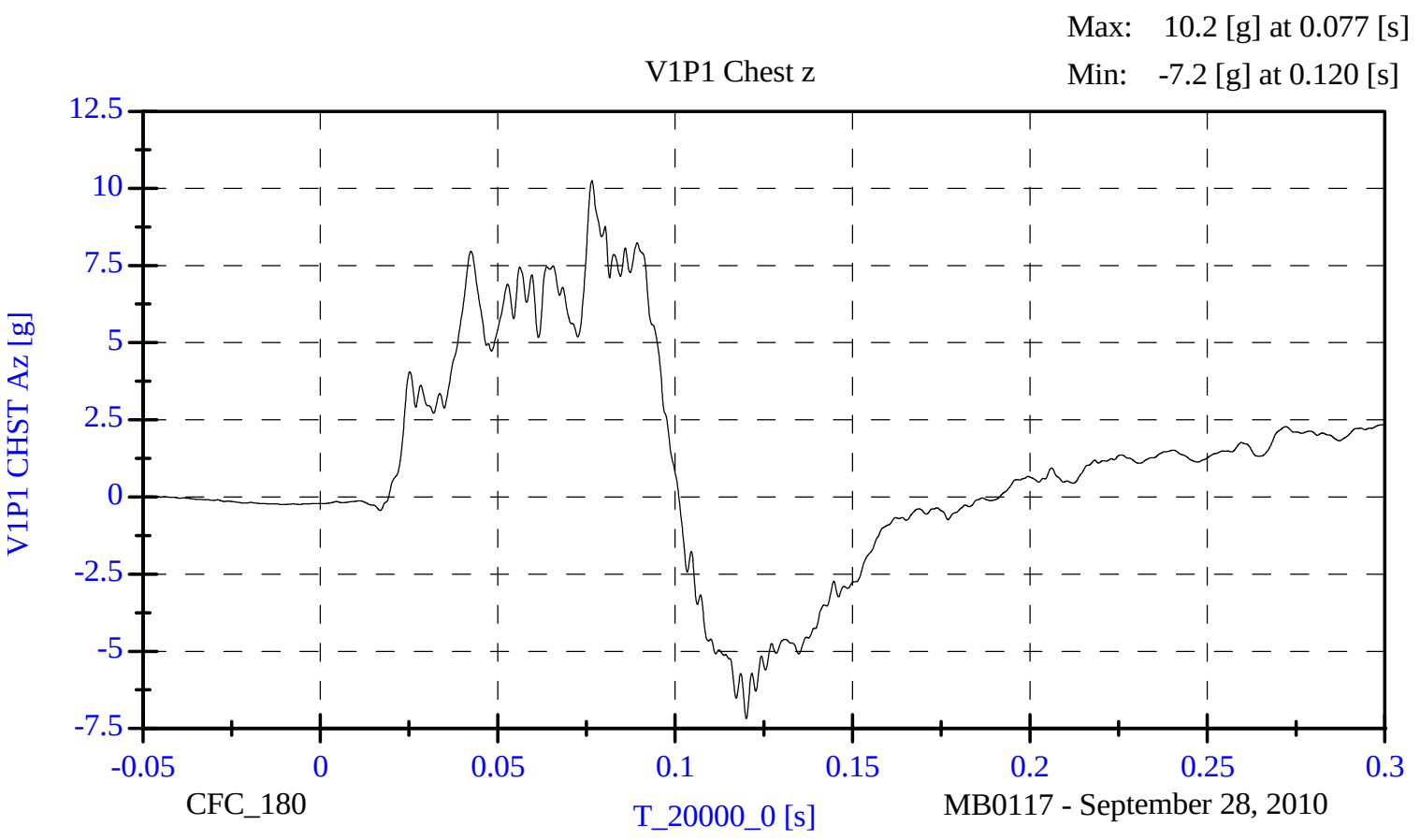
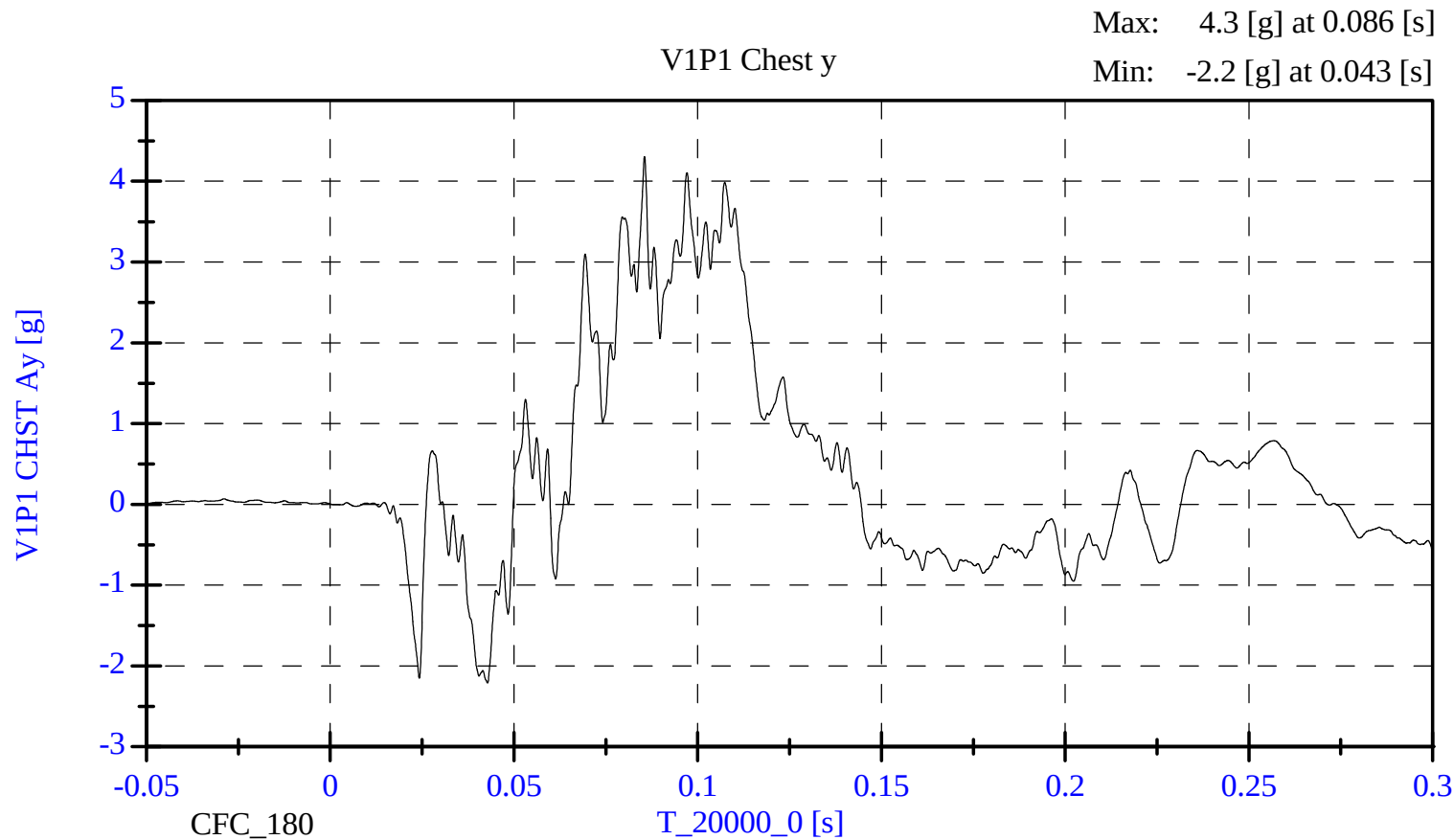
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 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest 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

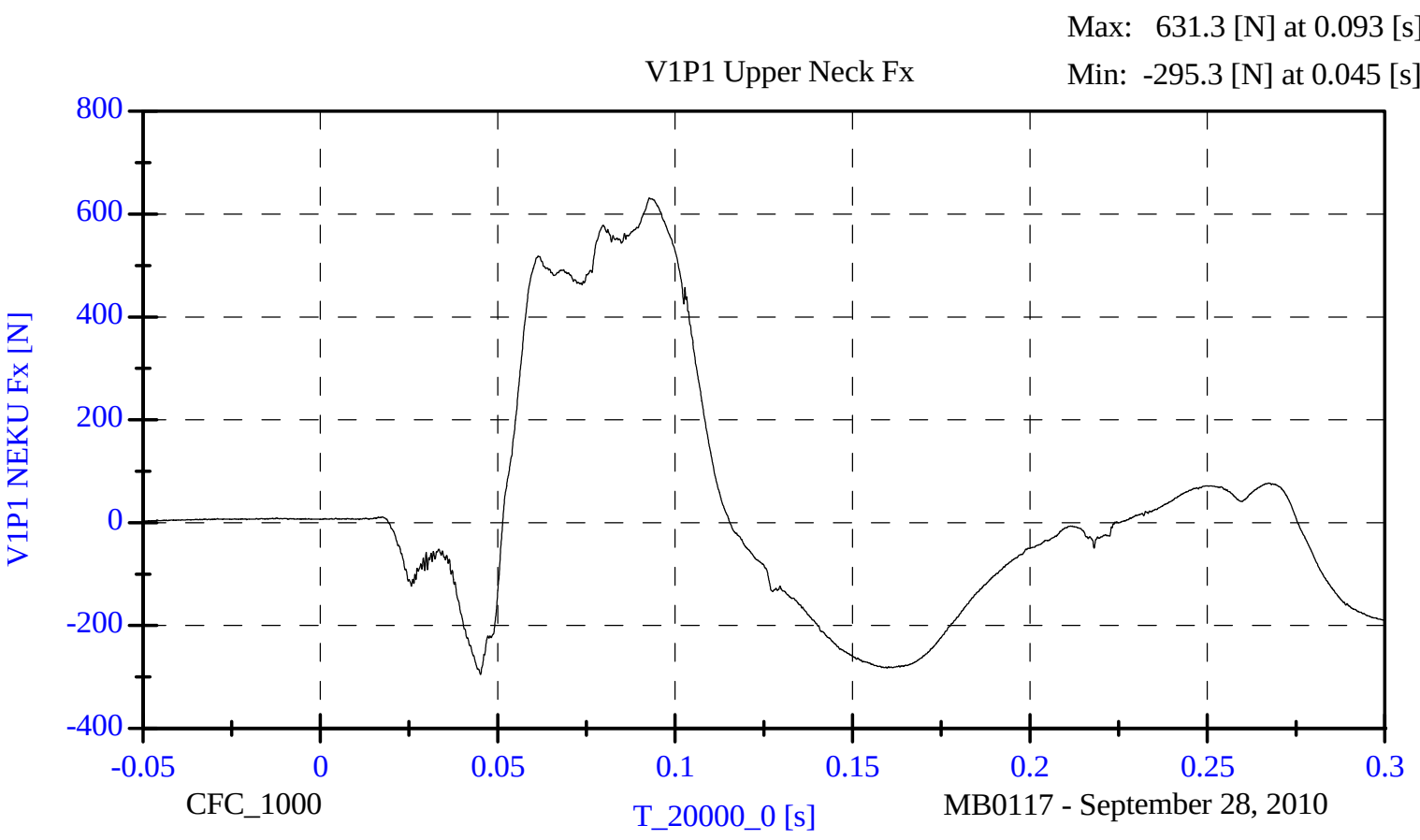
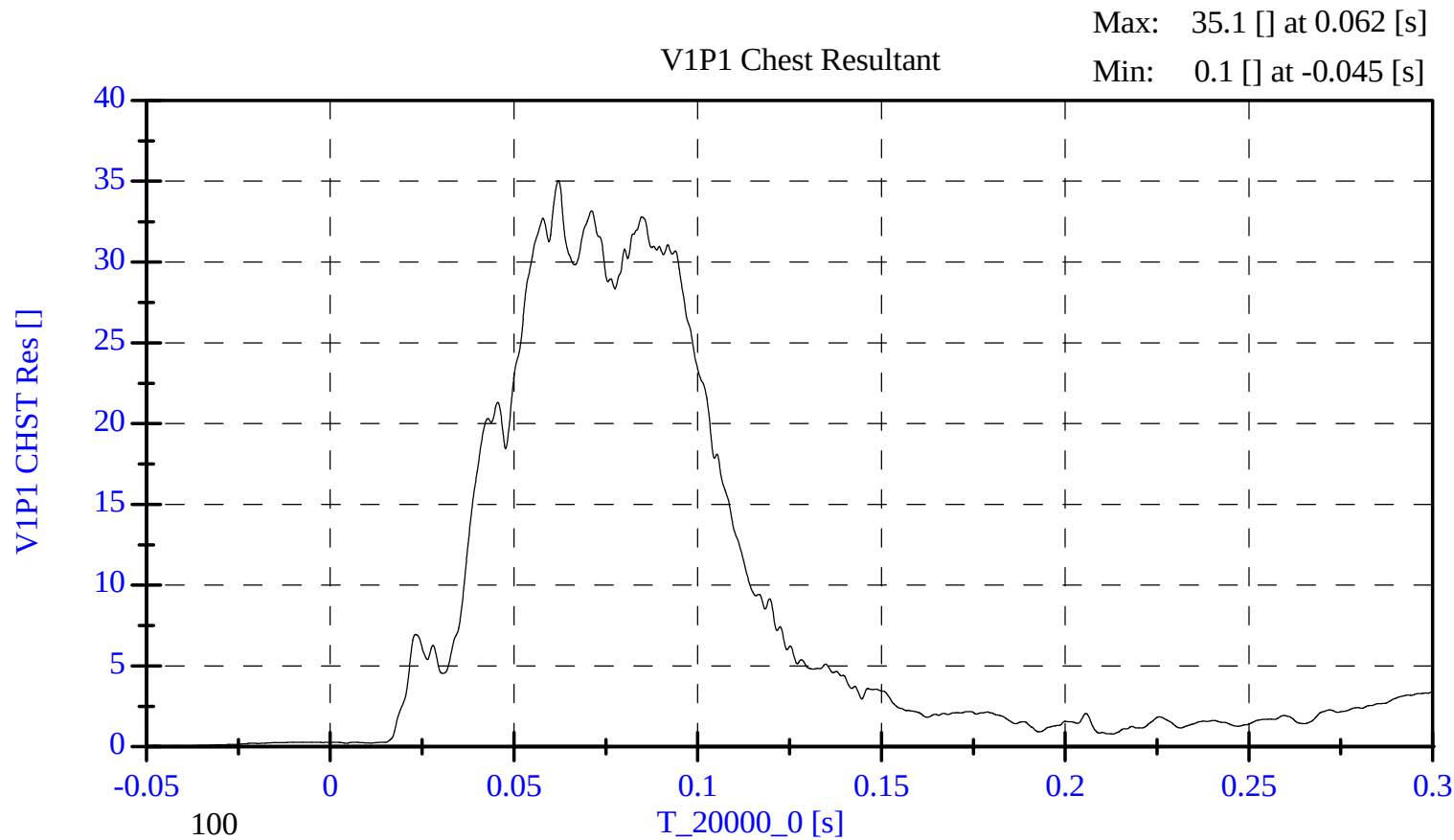


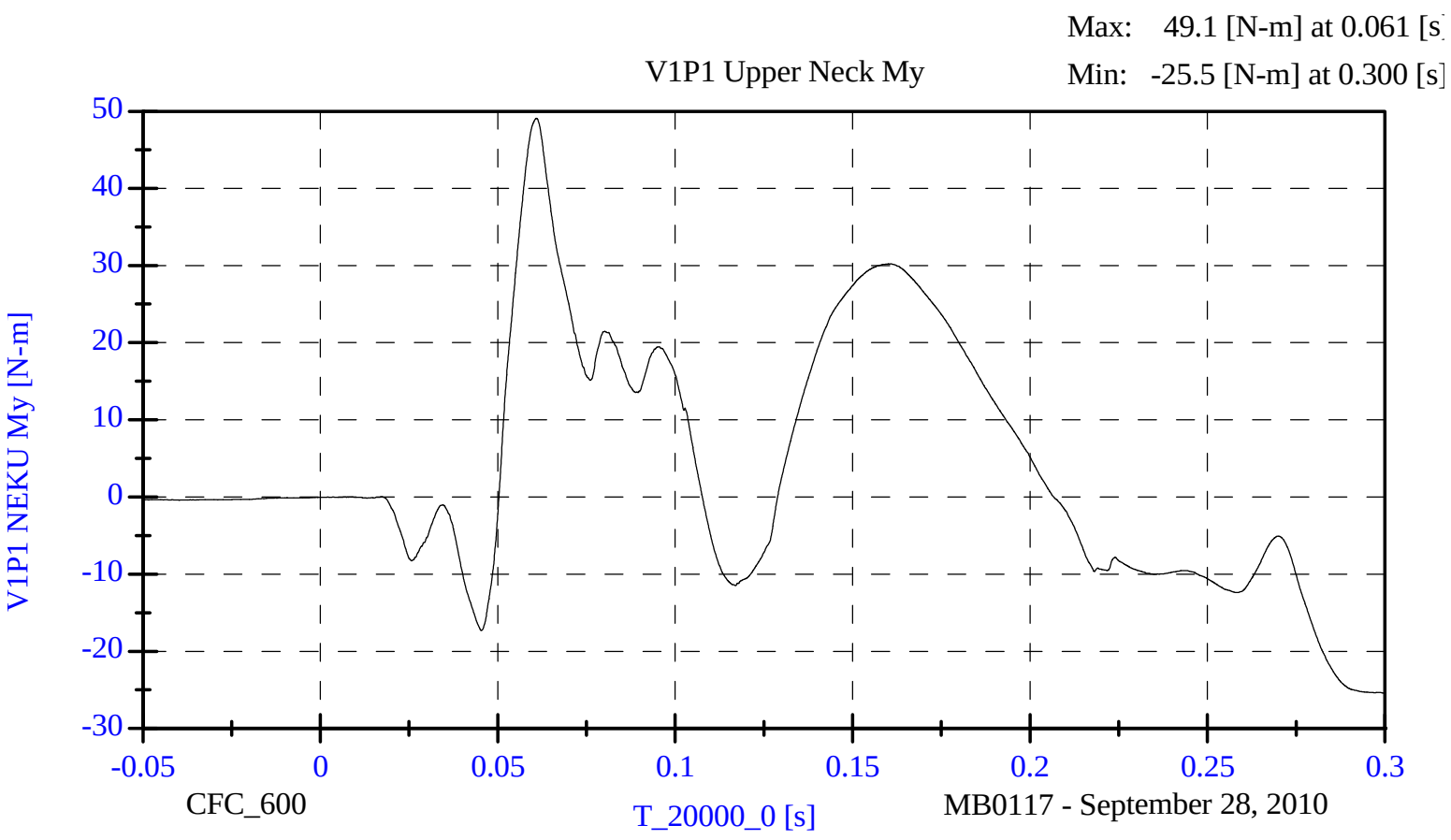
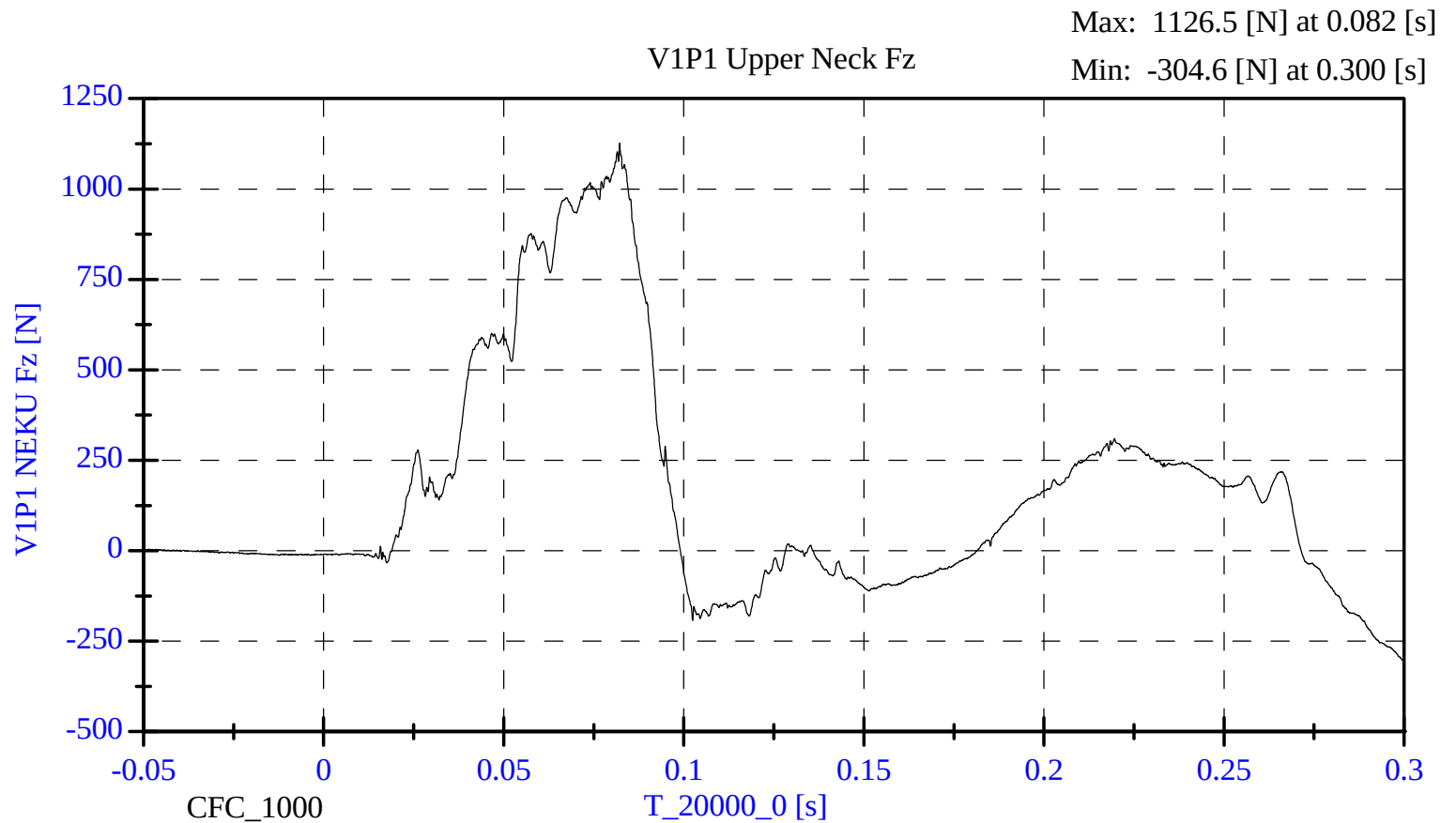


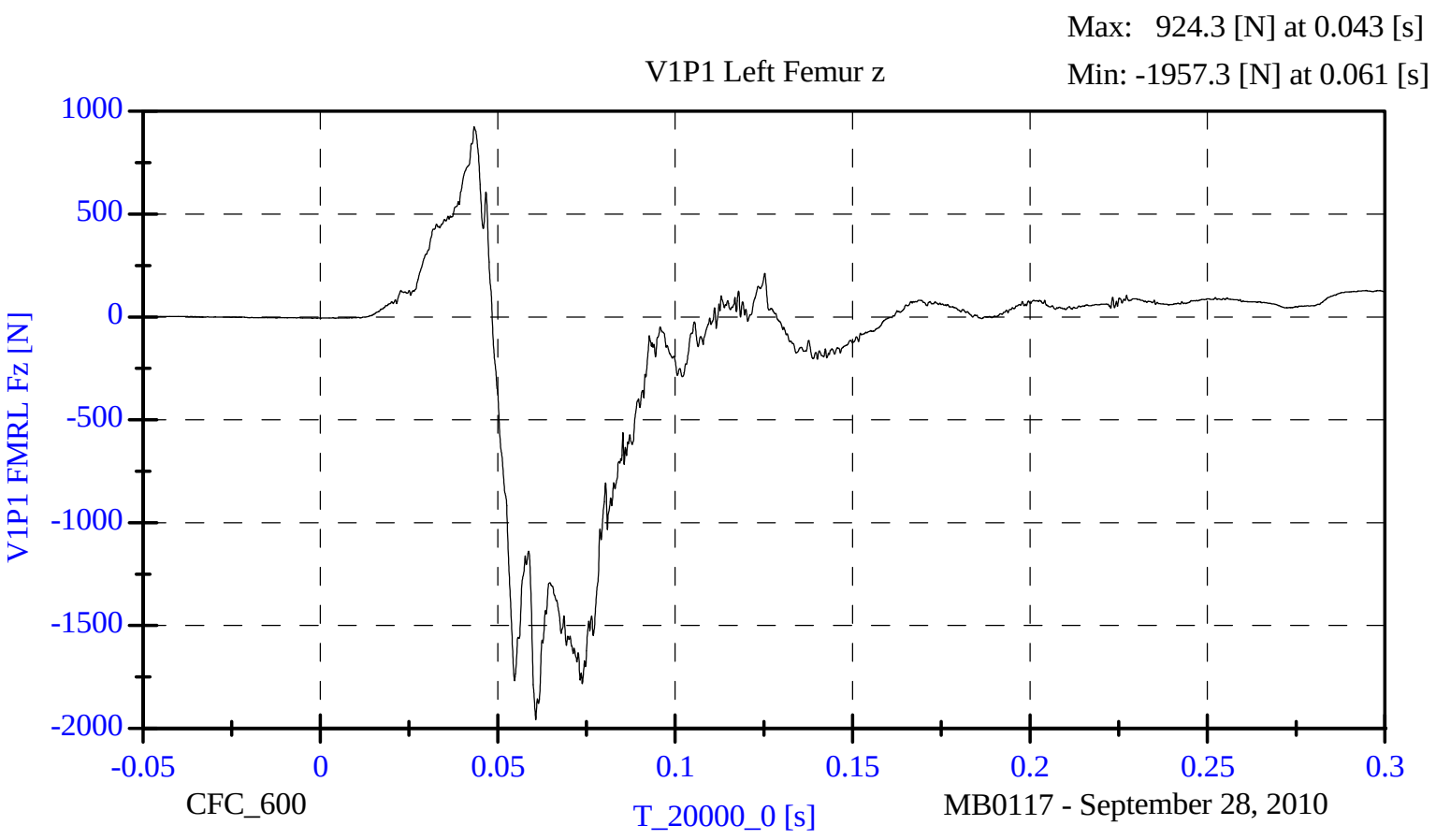
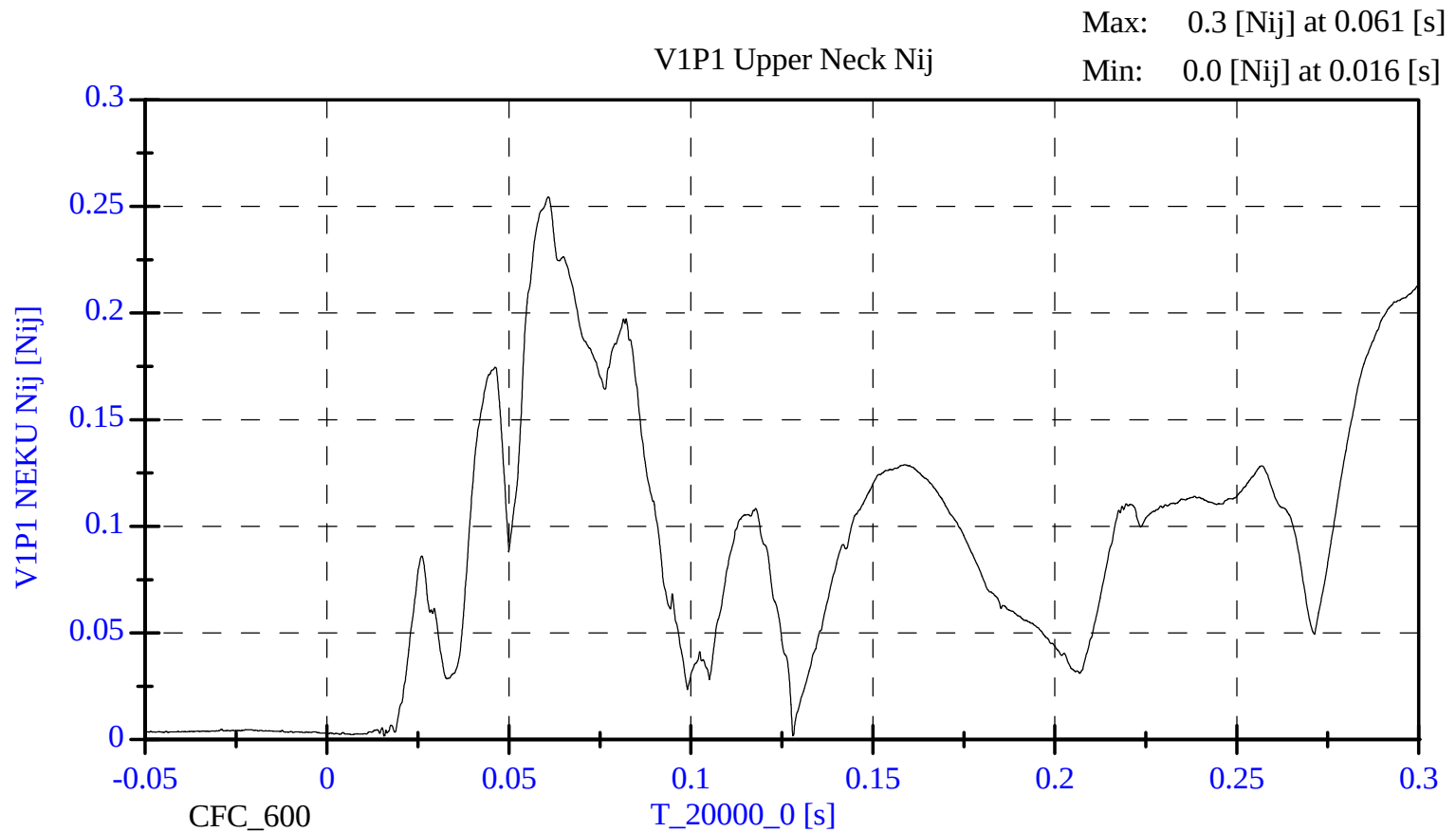


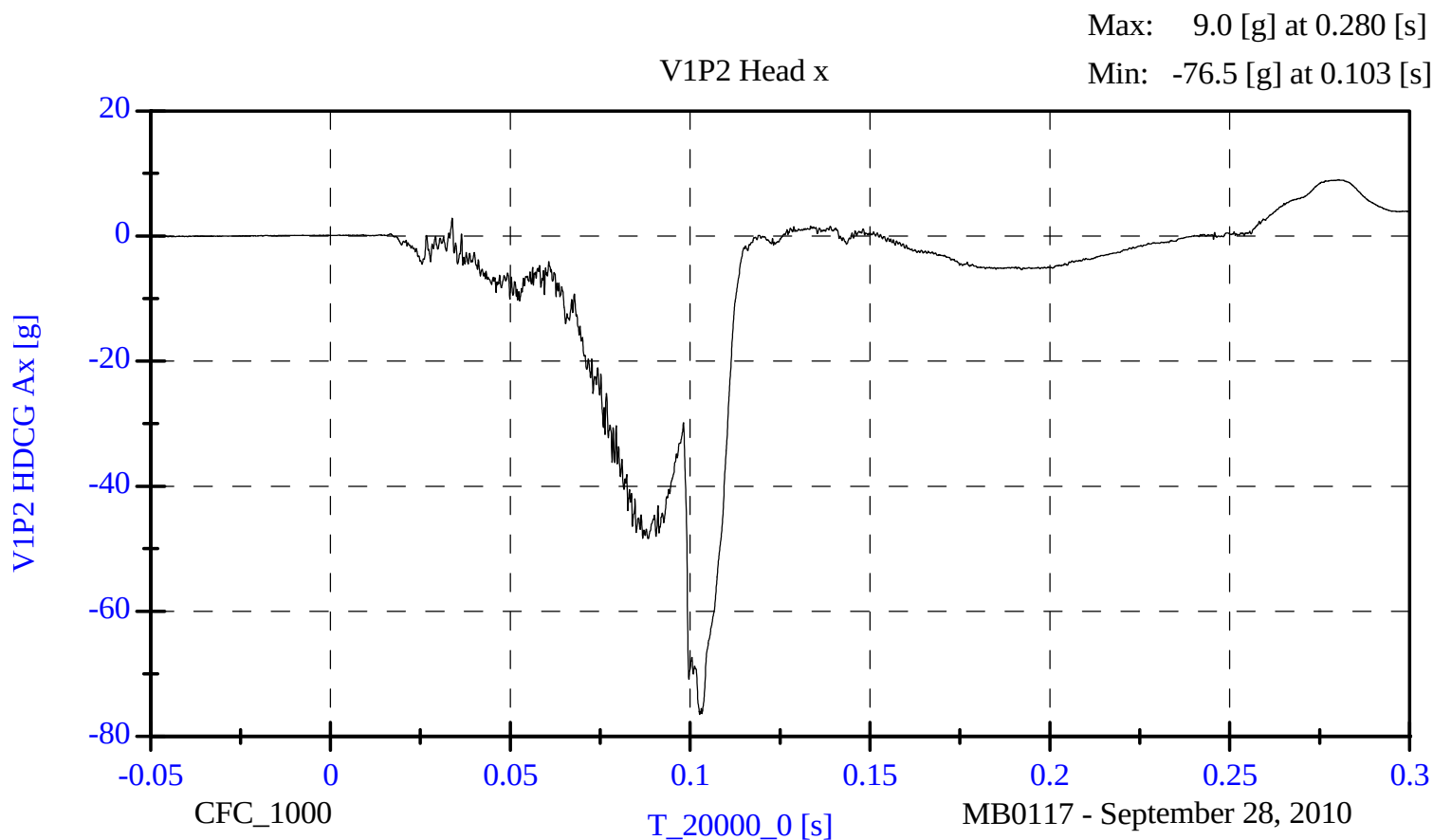
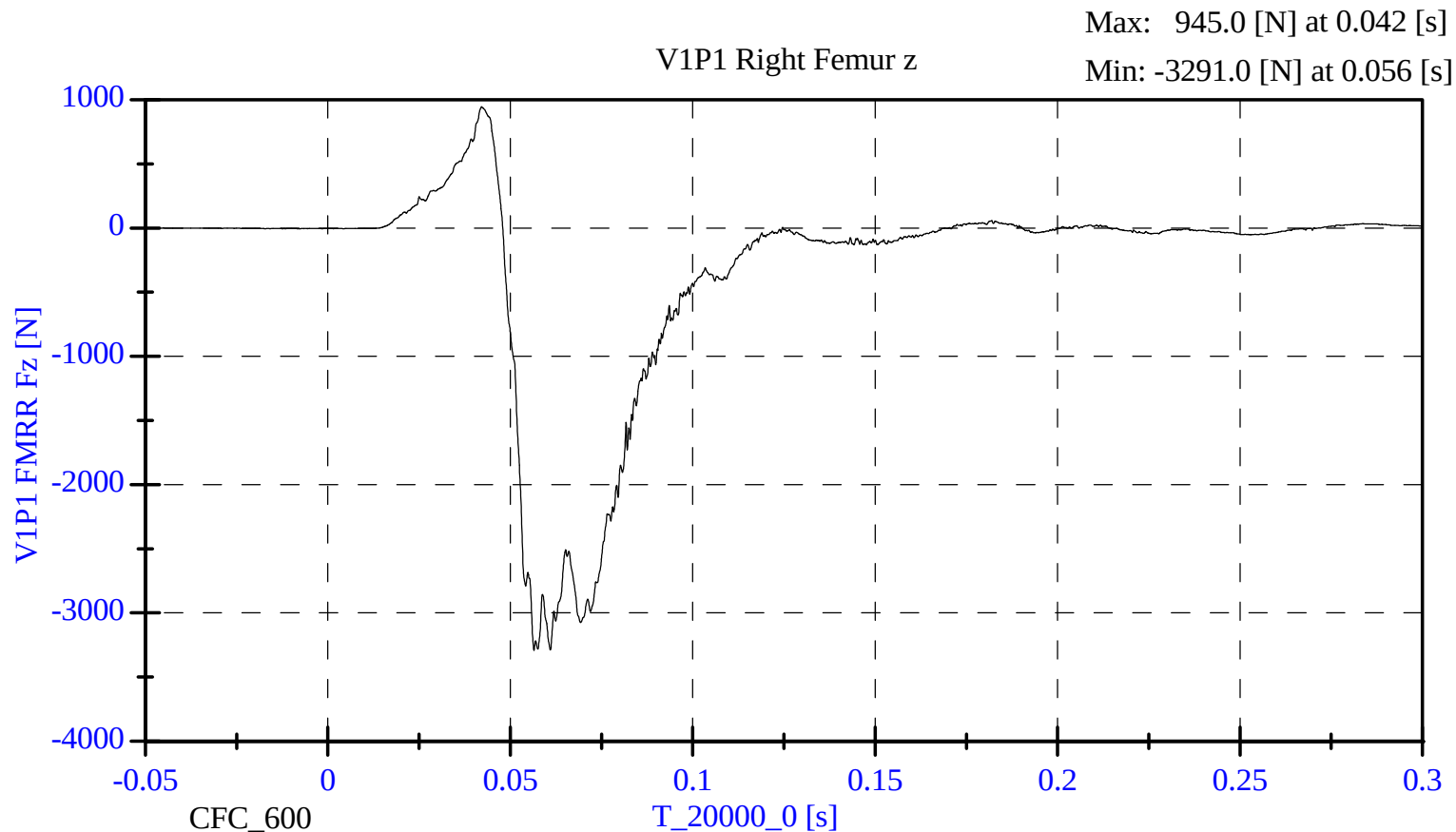


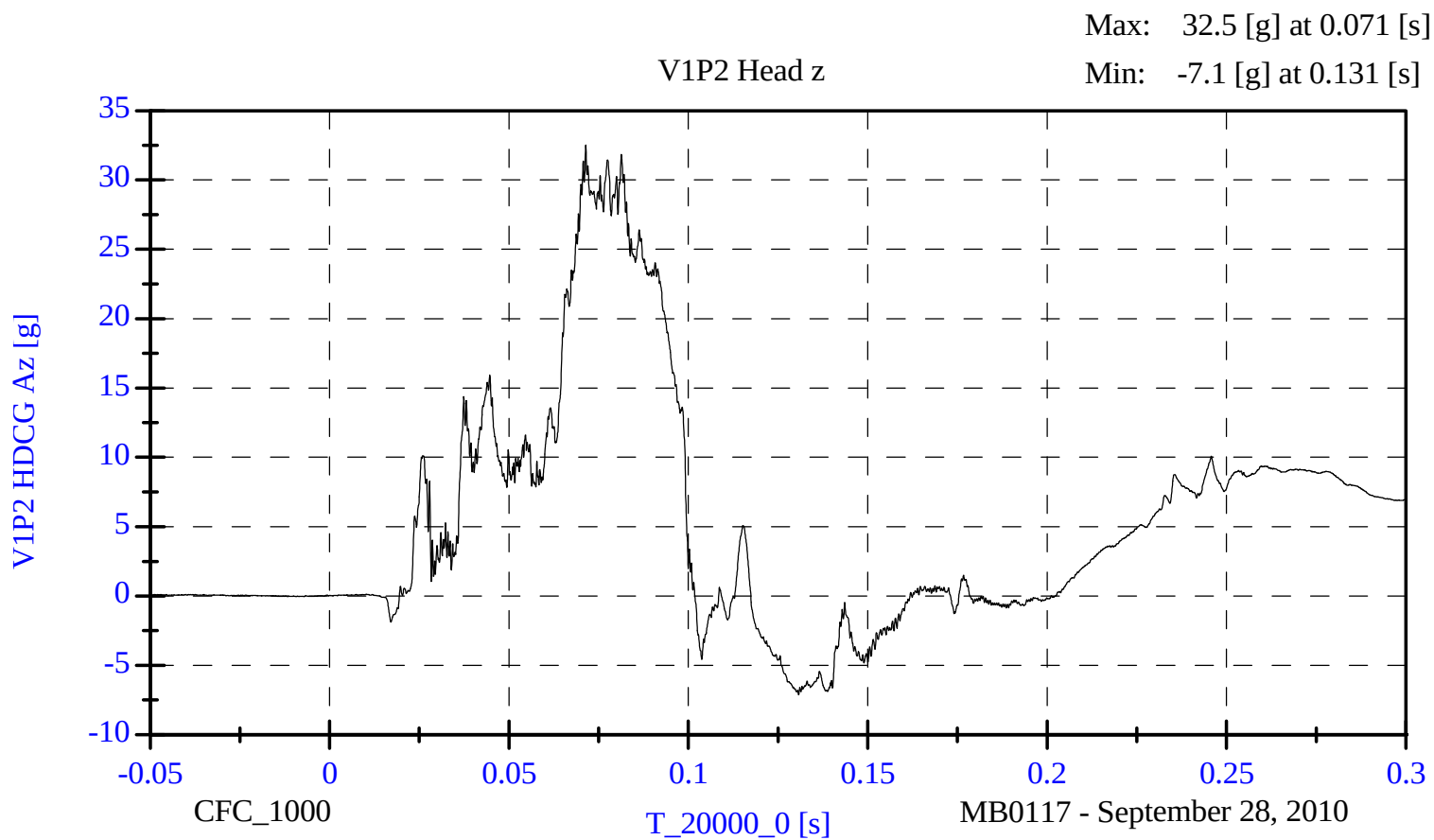
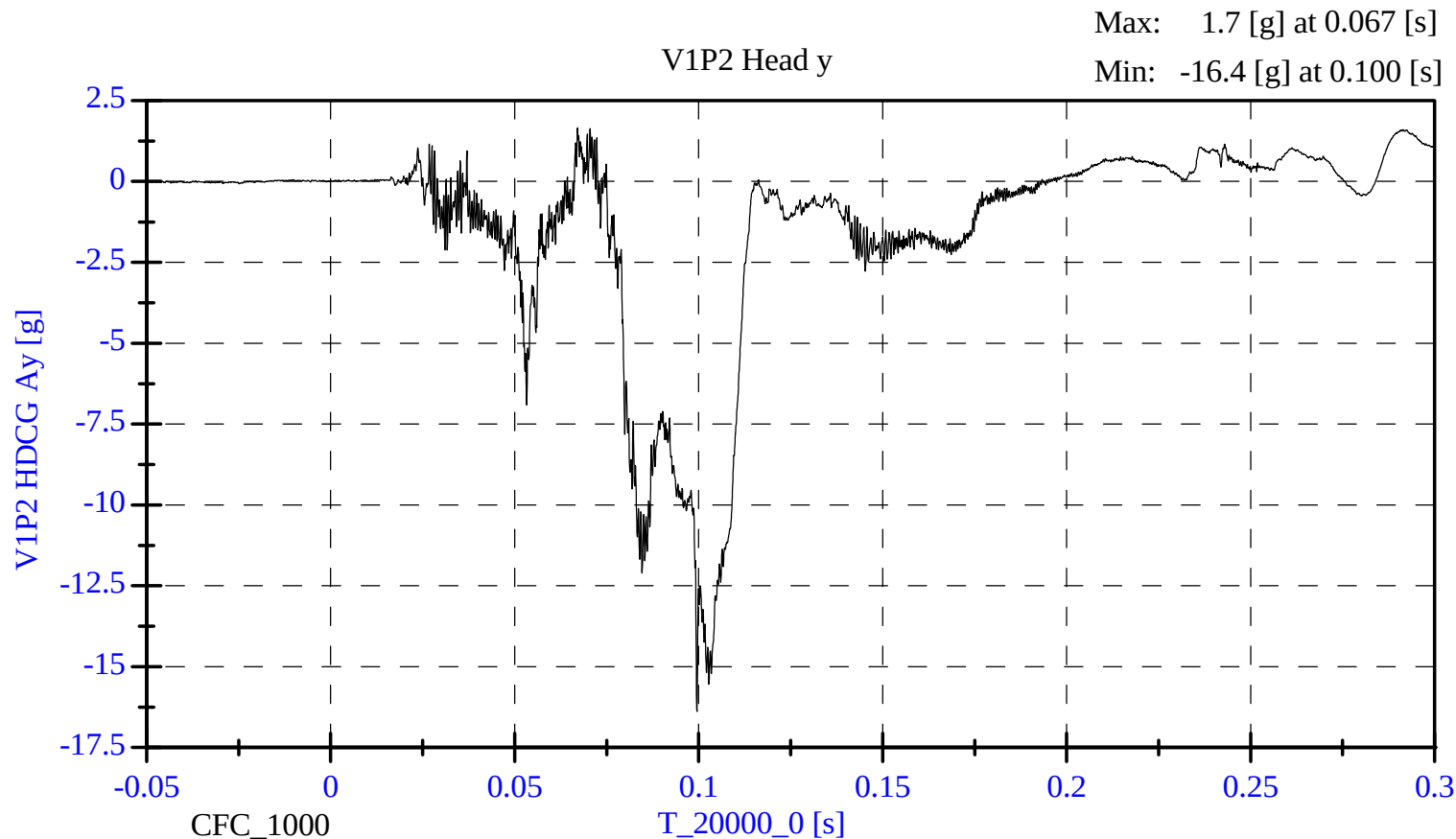
MB0117 - September 28, 2010



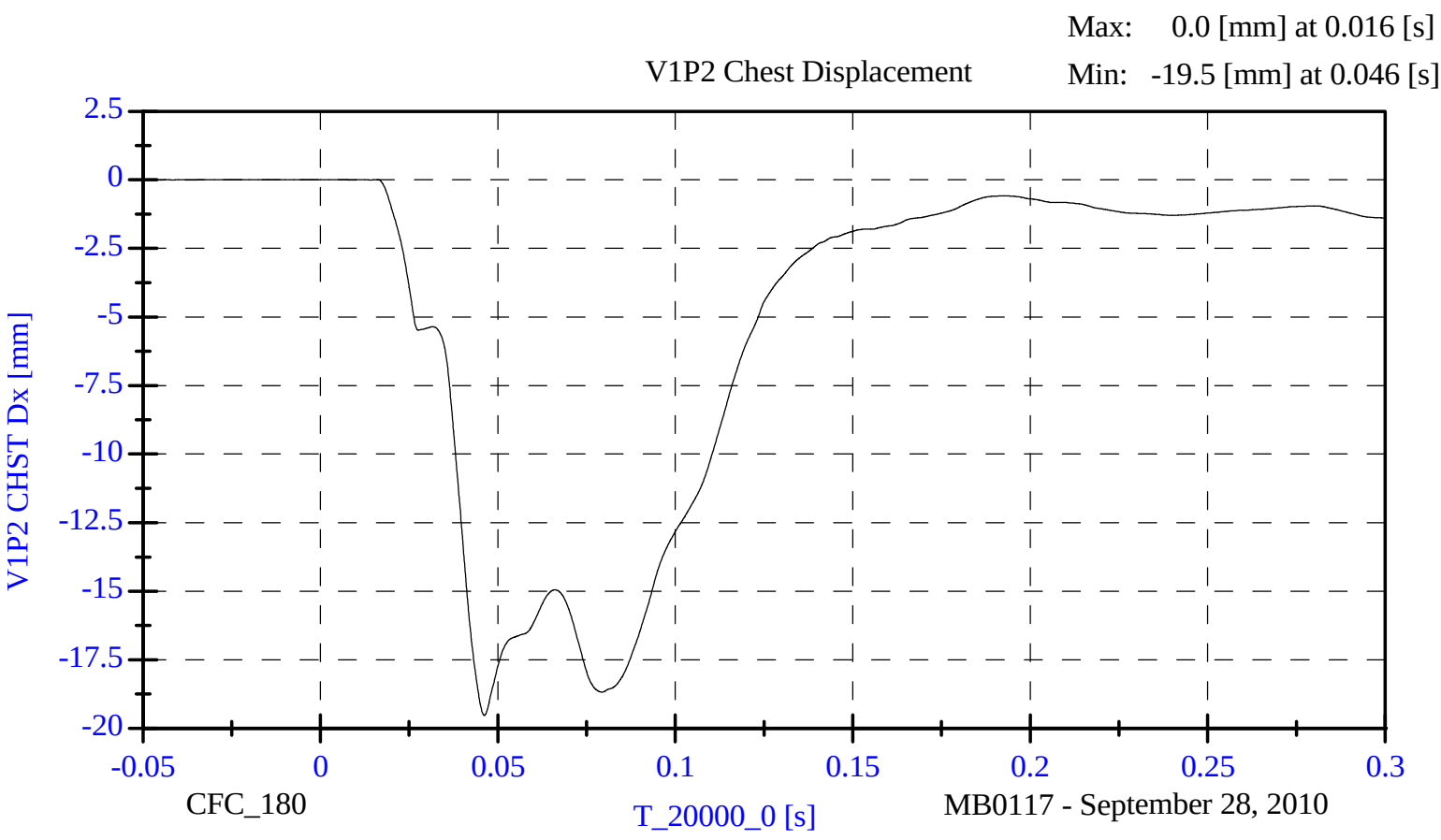
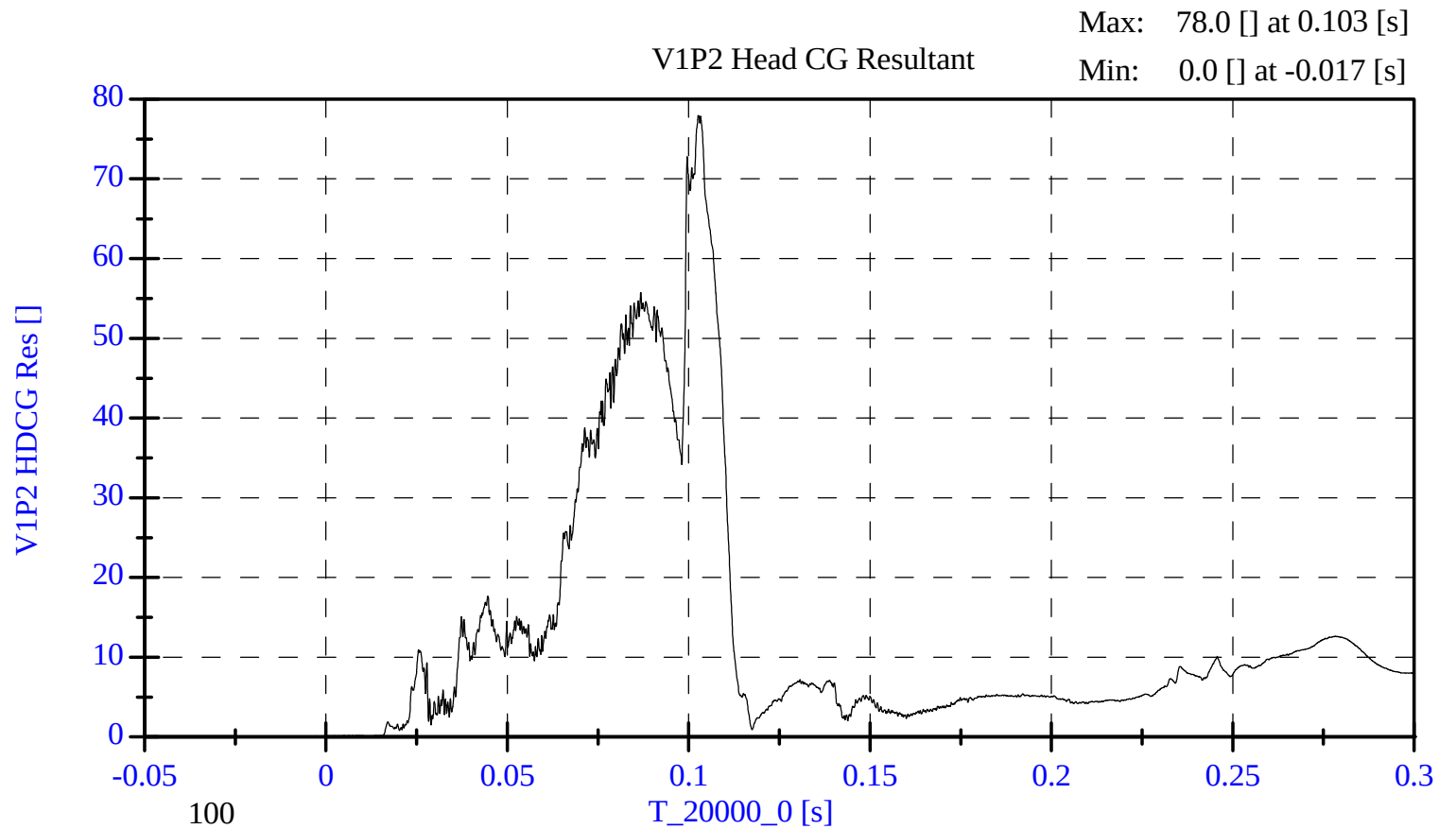


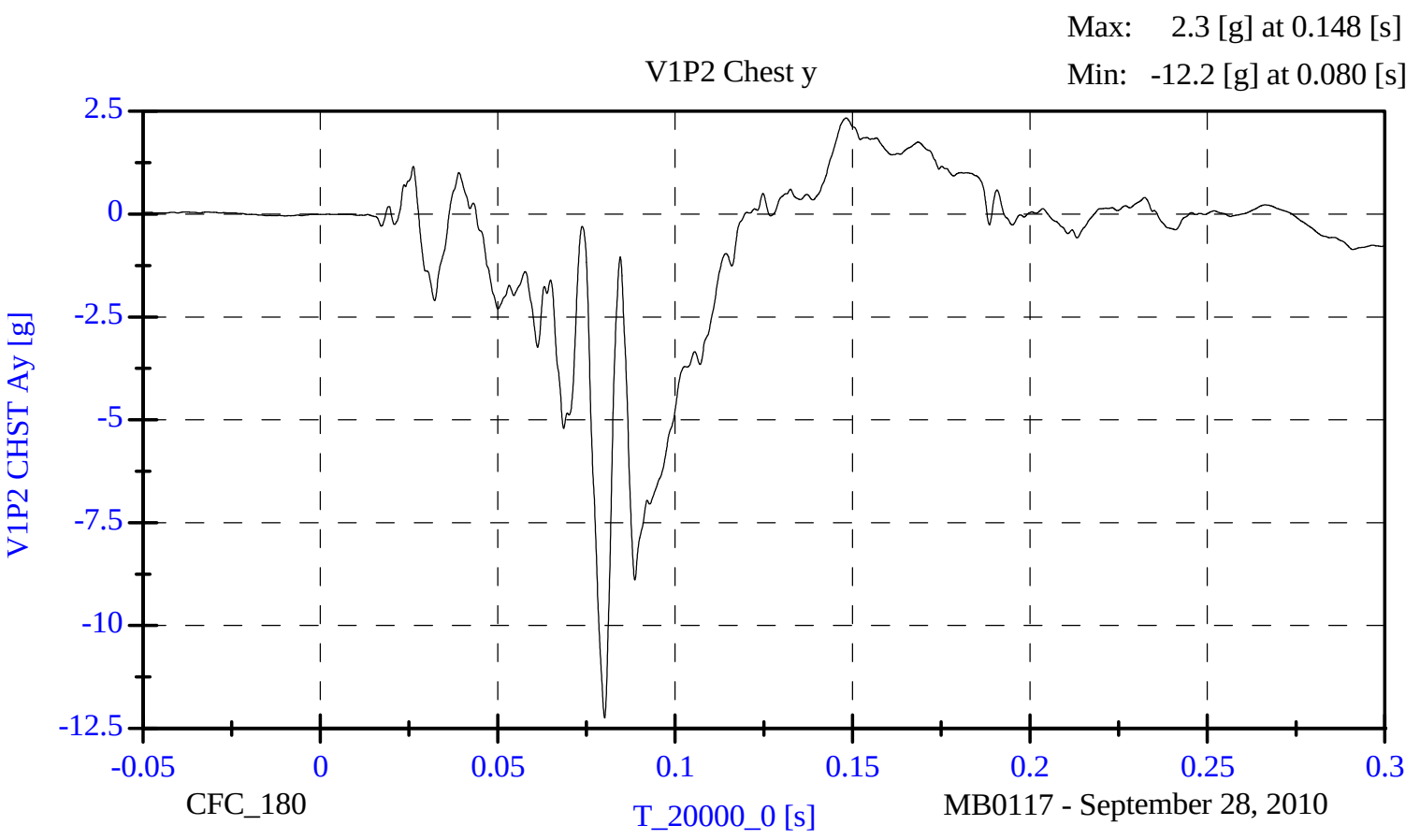
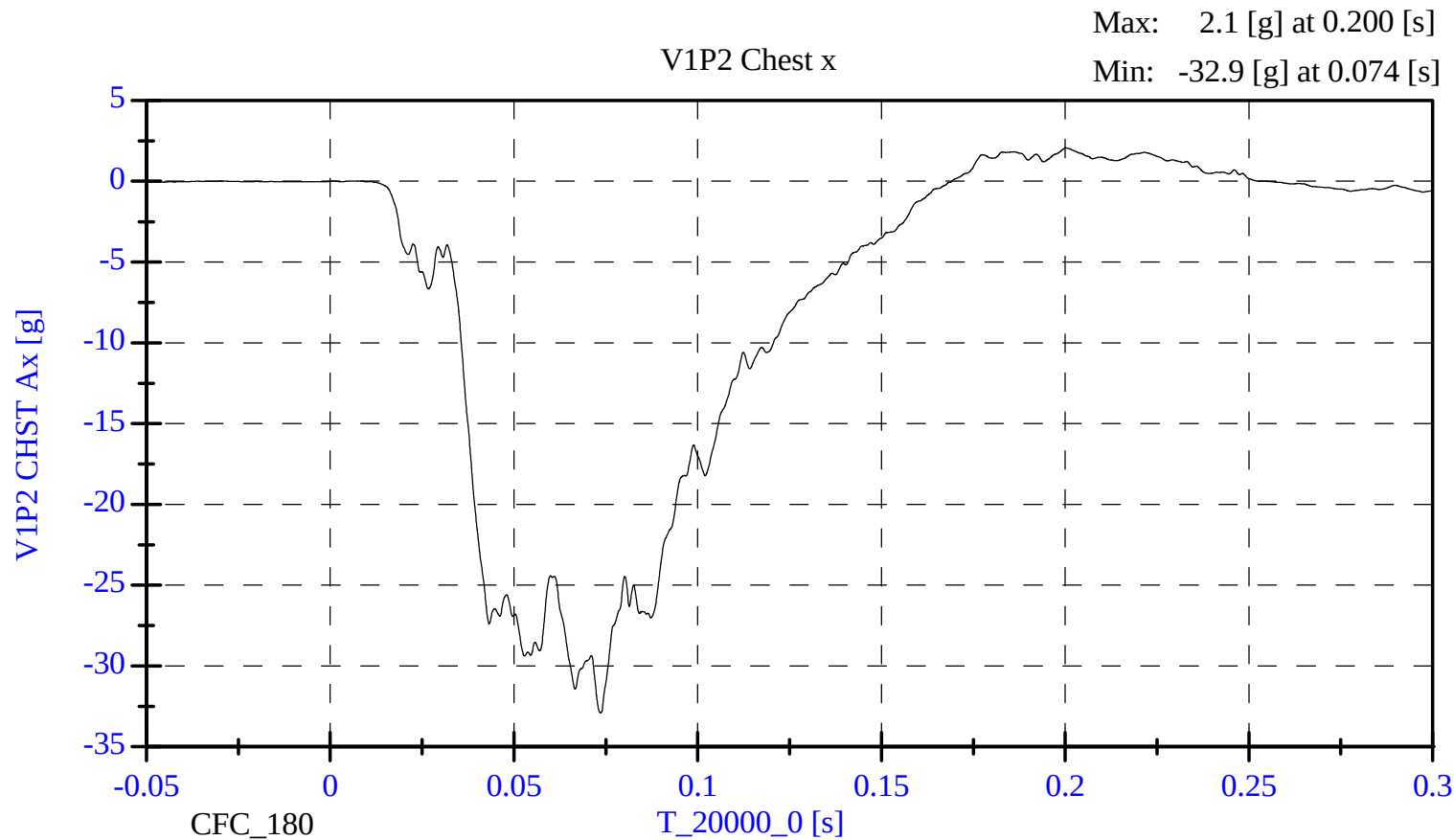


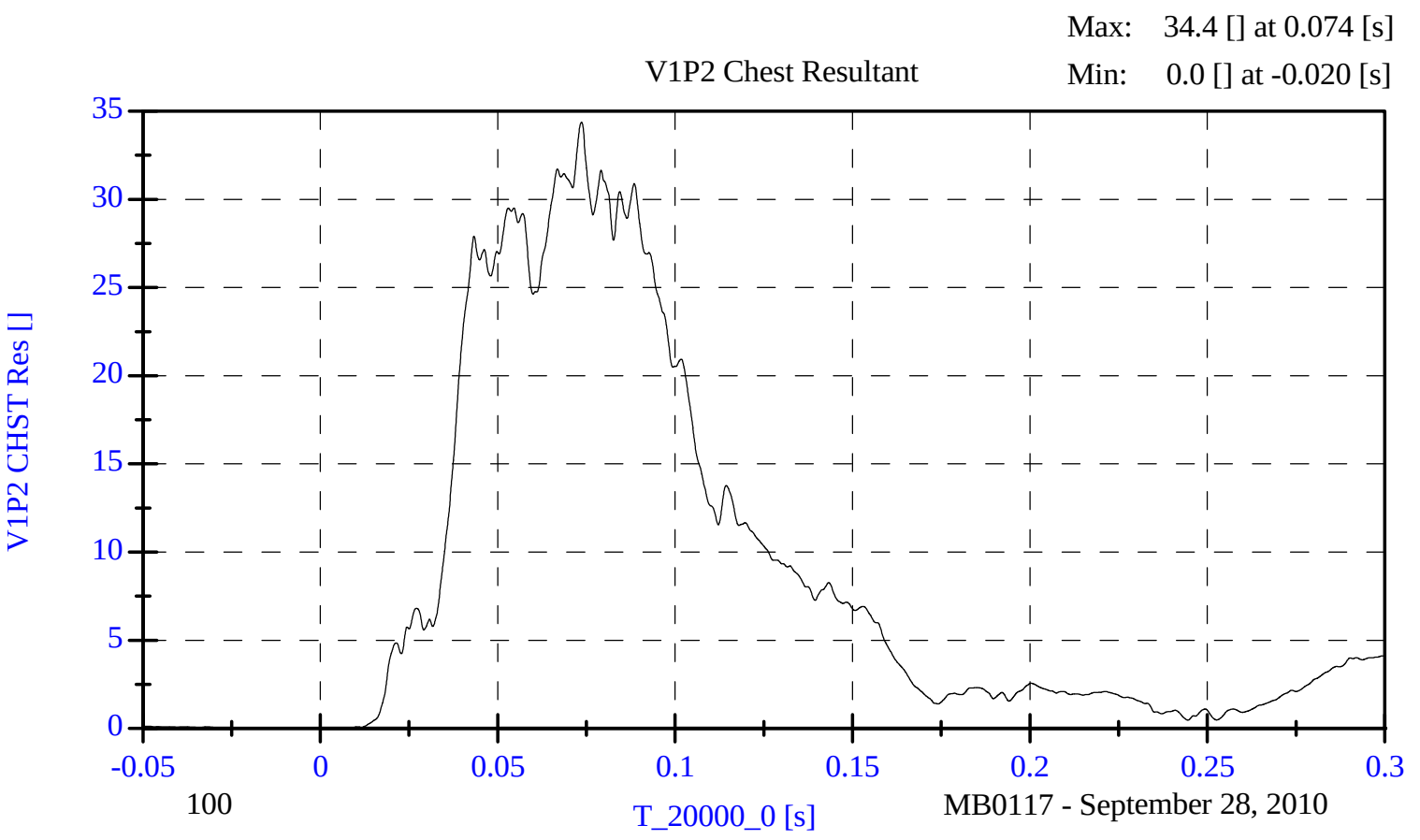
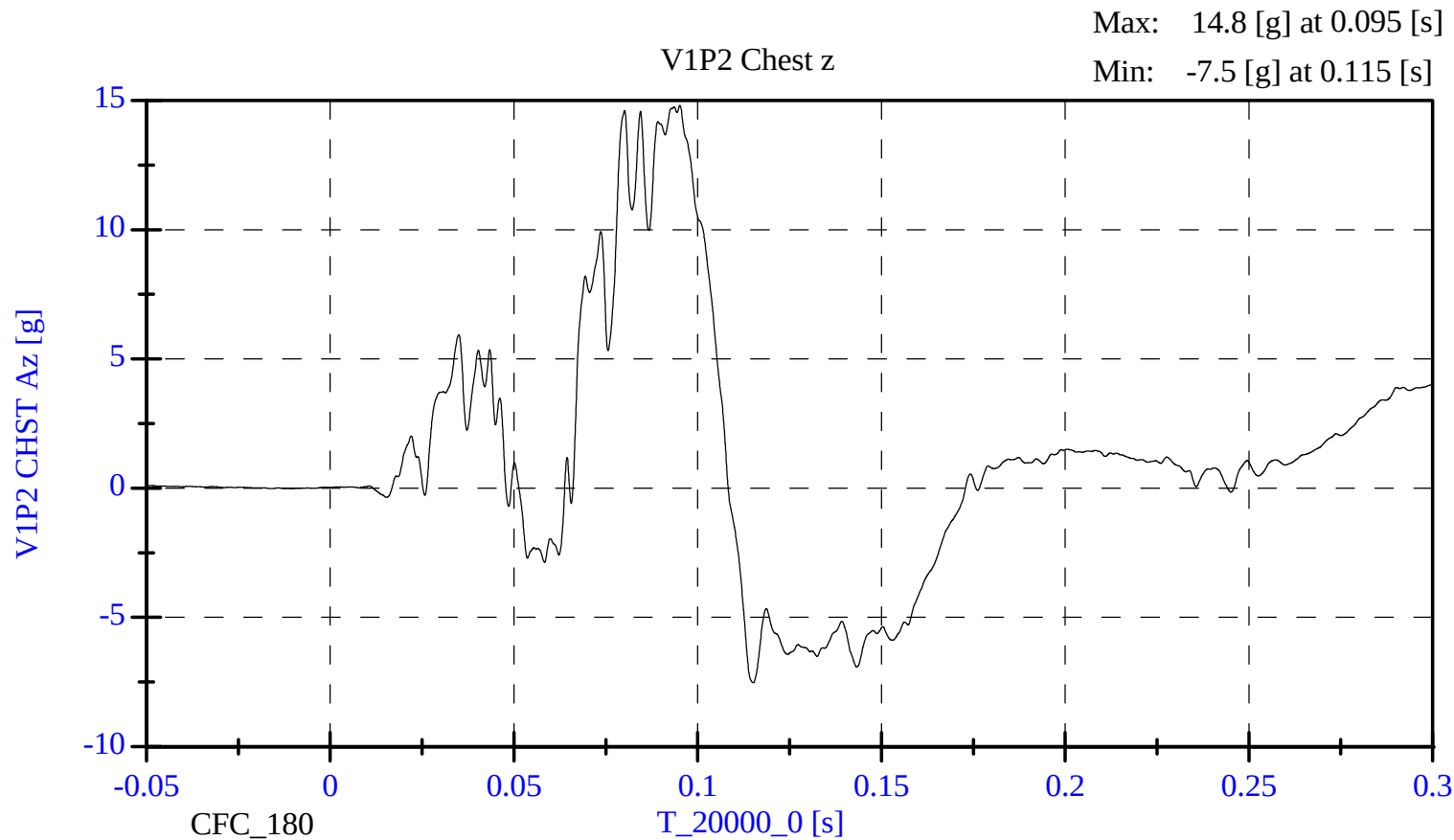


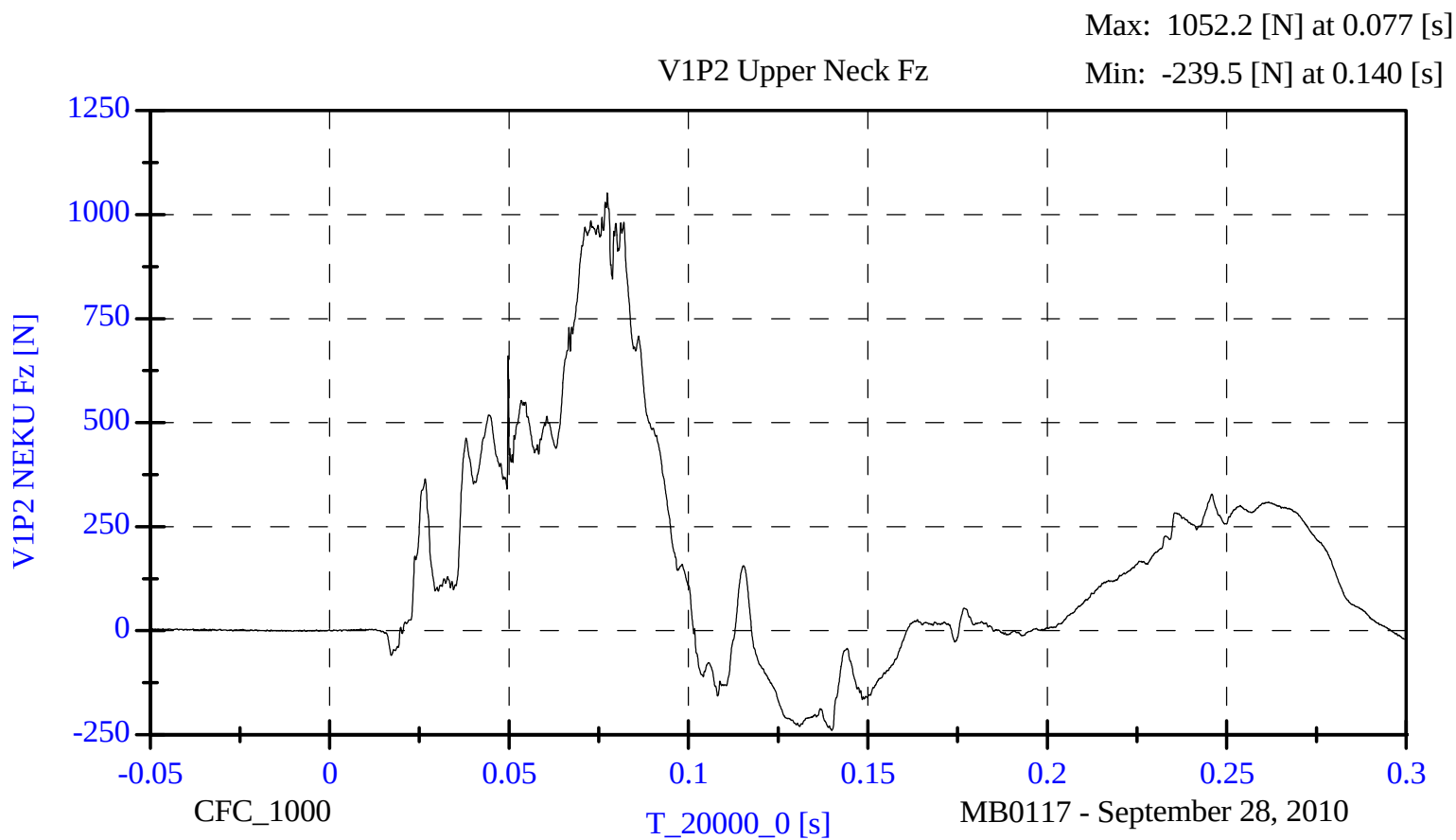
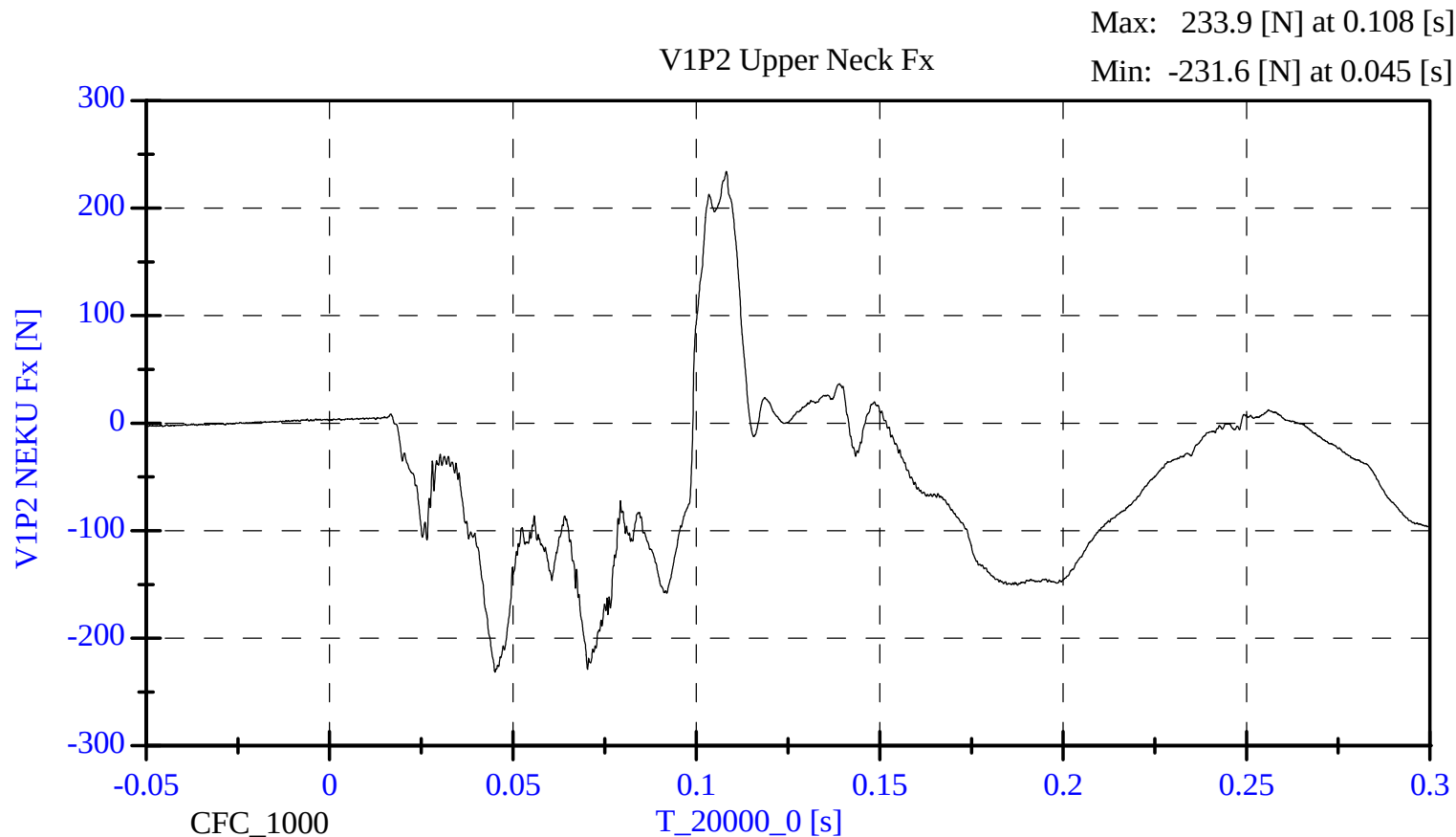


MB0117 - September 28, 2010

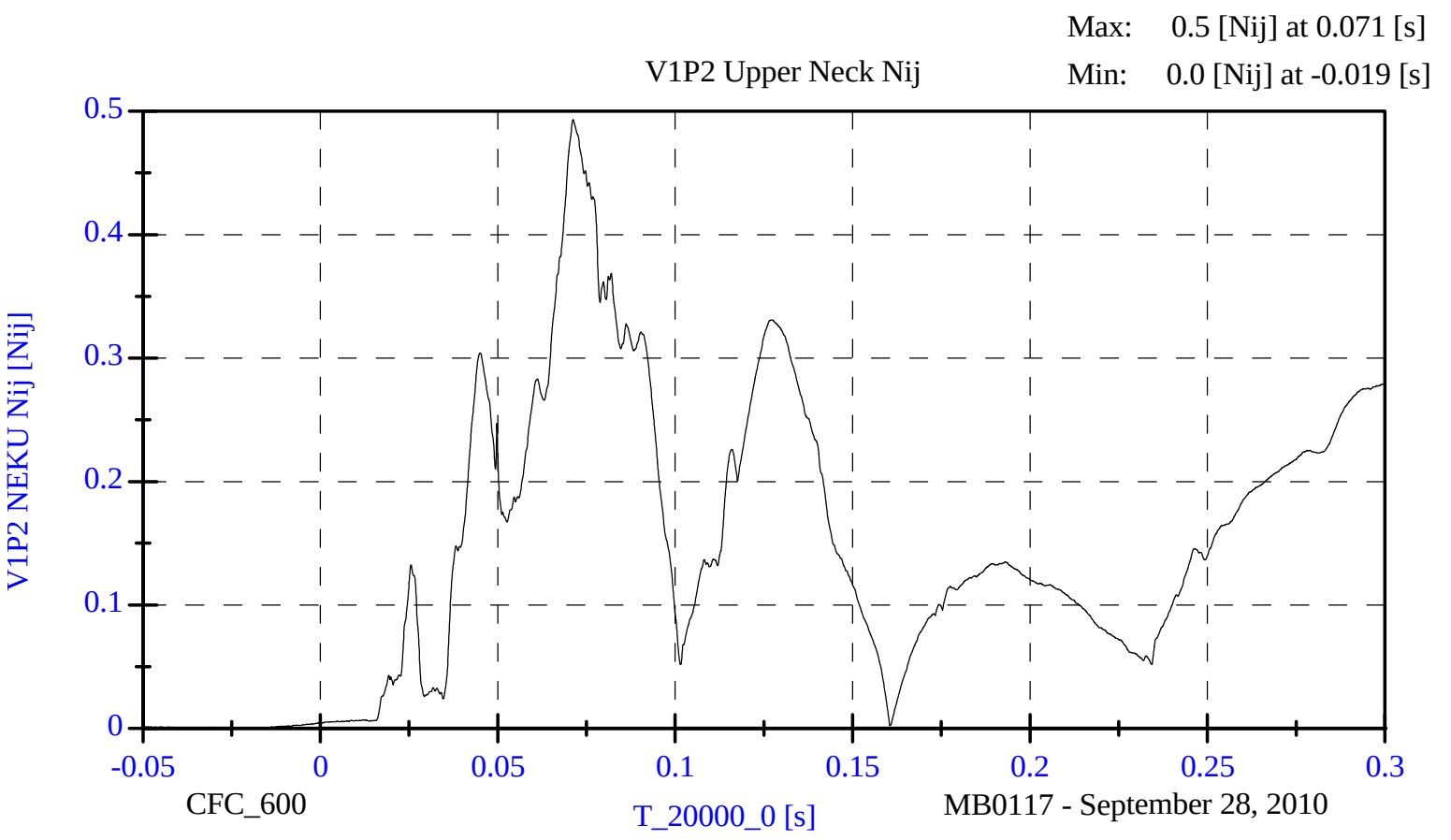
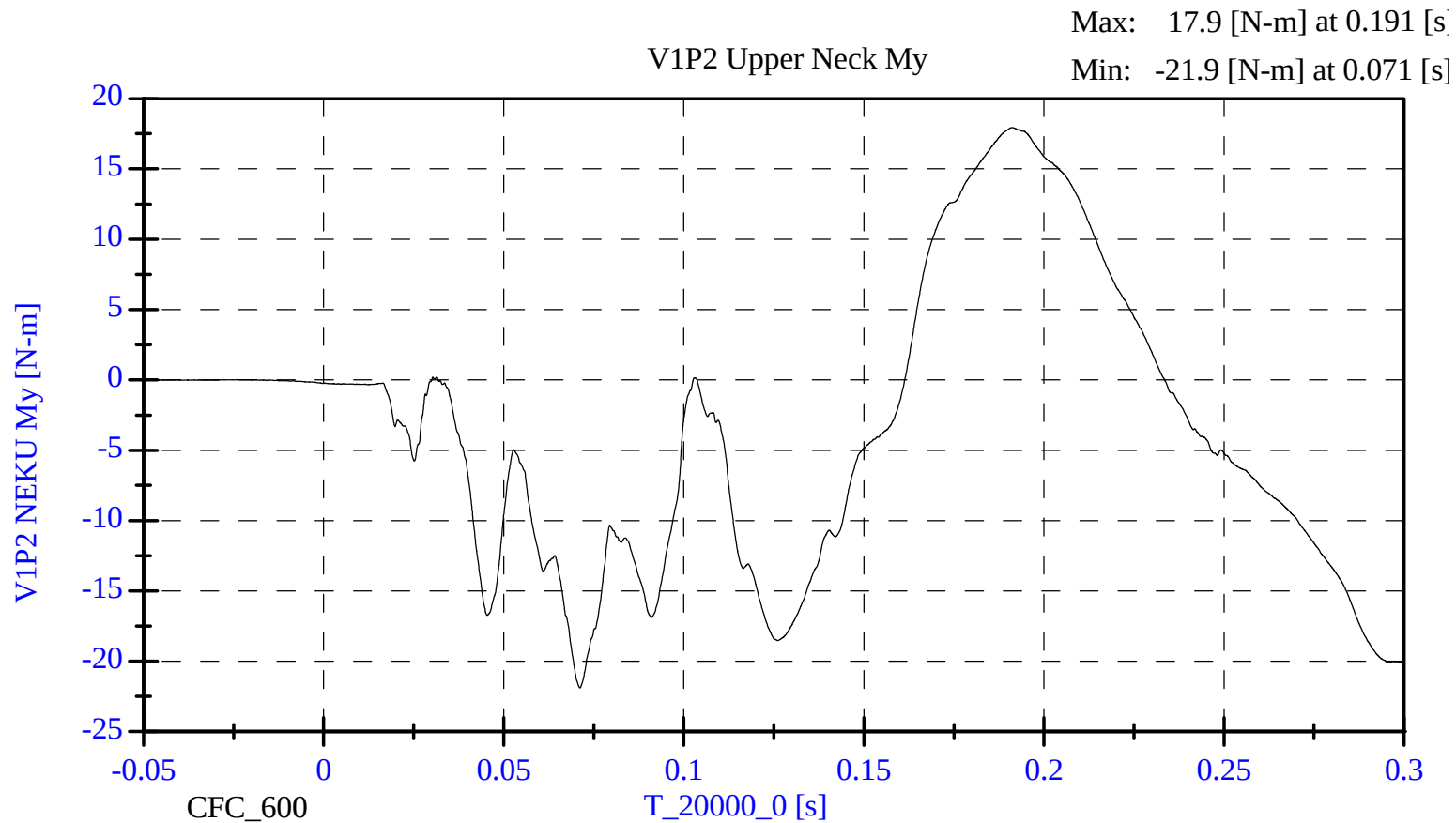


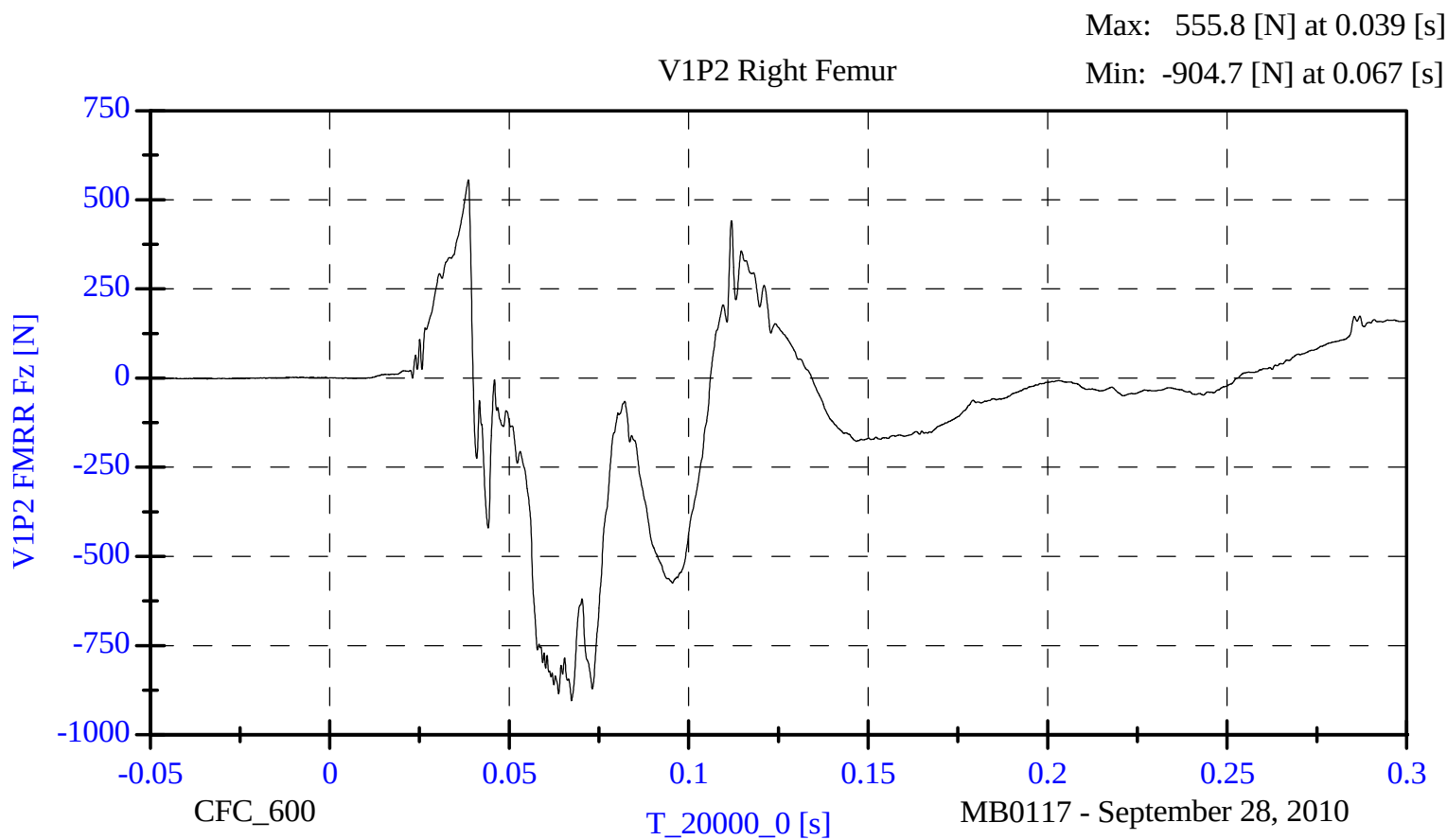
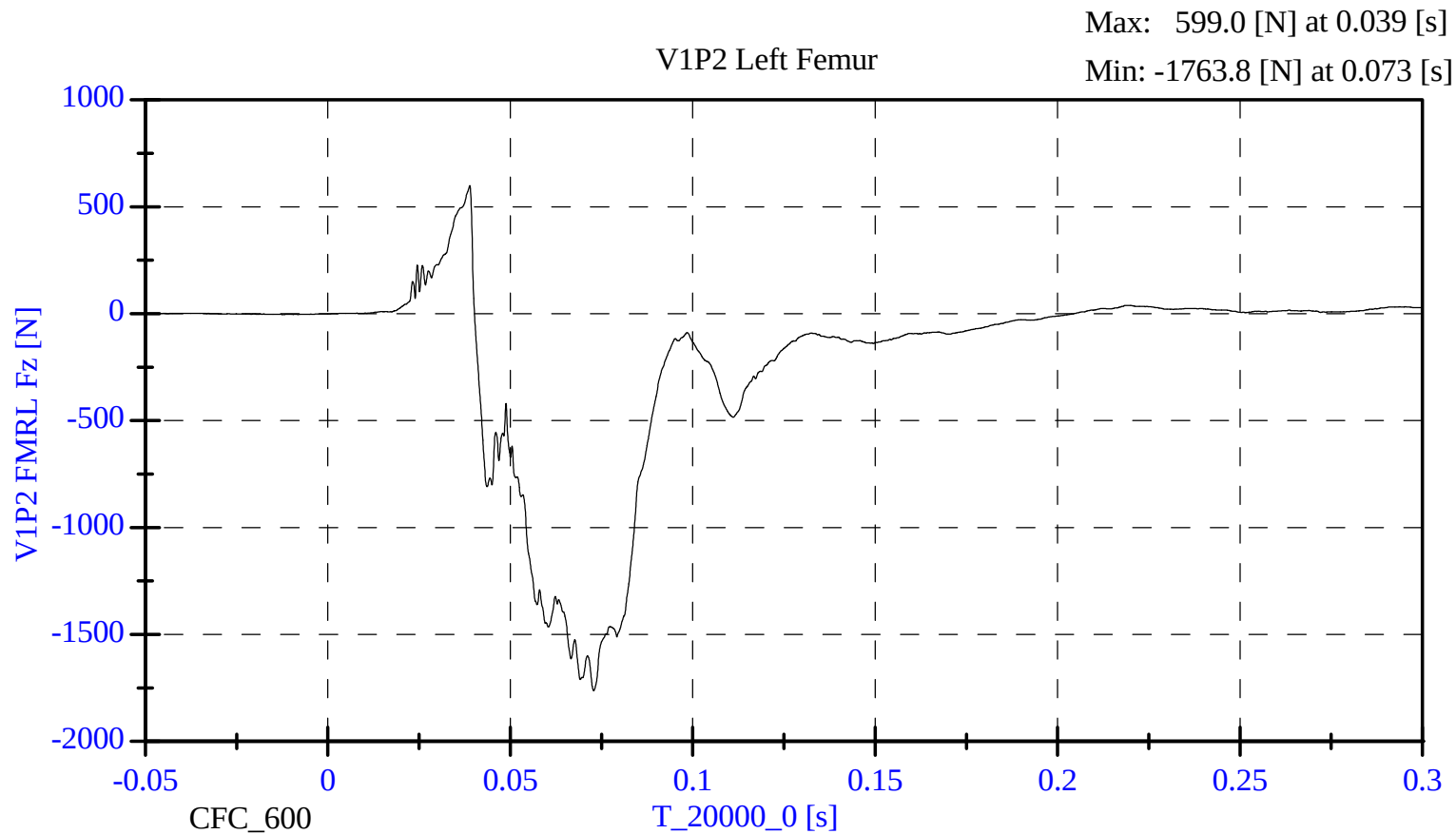






MB0117 - September 28, 2010





APPENDIX C

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

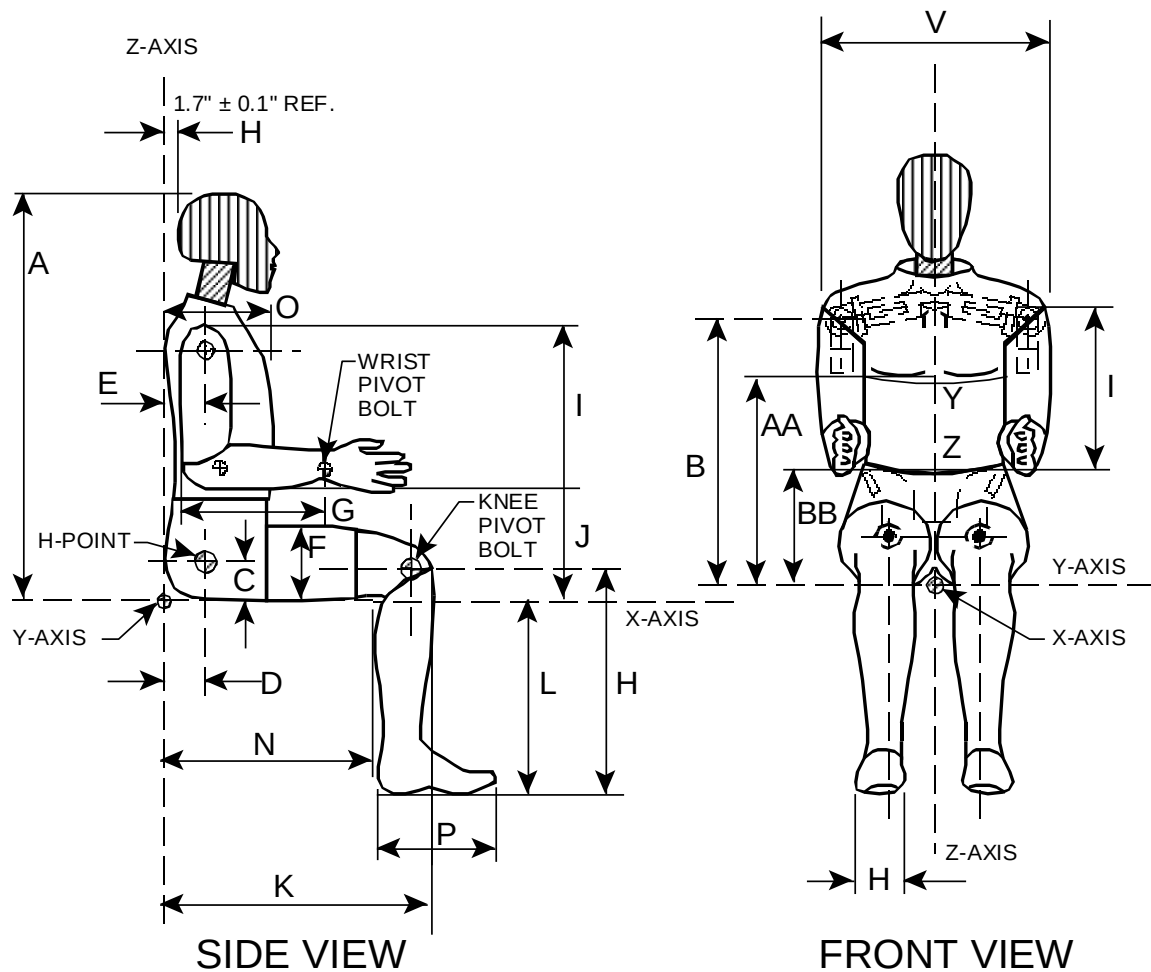
The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	61	
#2/Right Front Passenger	273	

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: 61

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



www.calspan.com

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:	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**

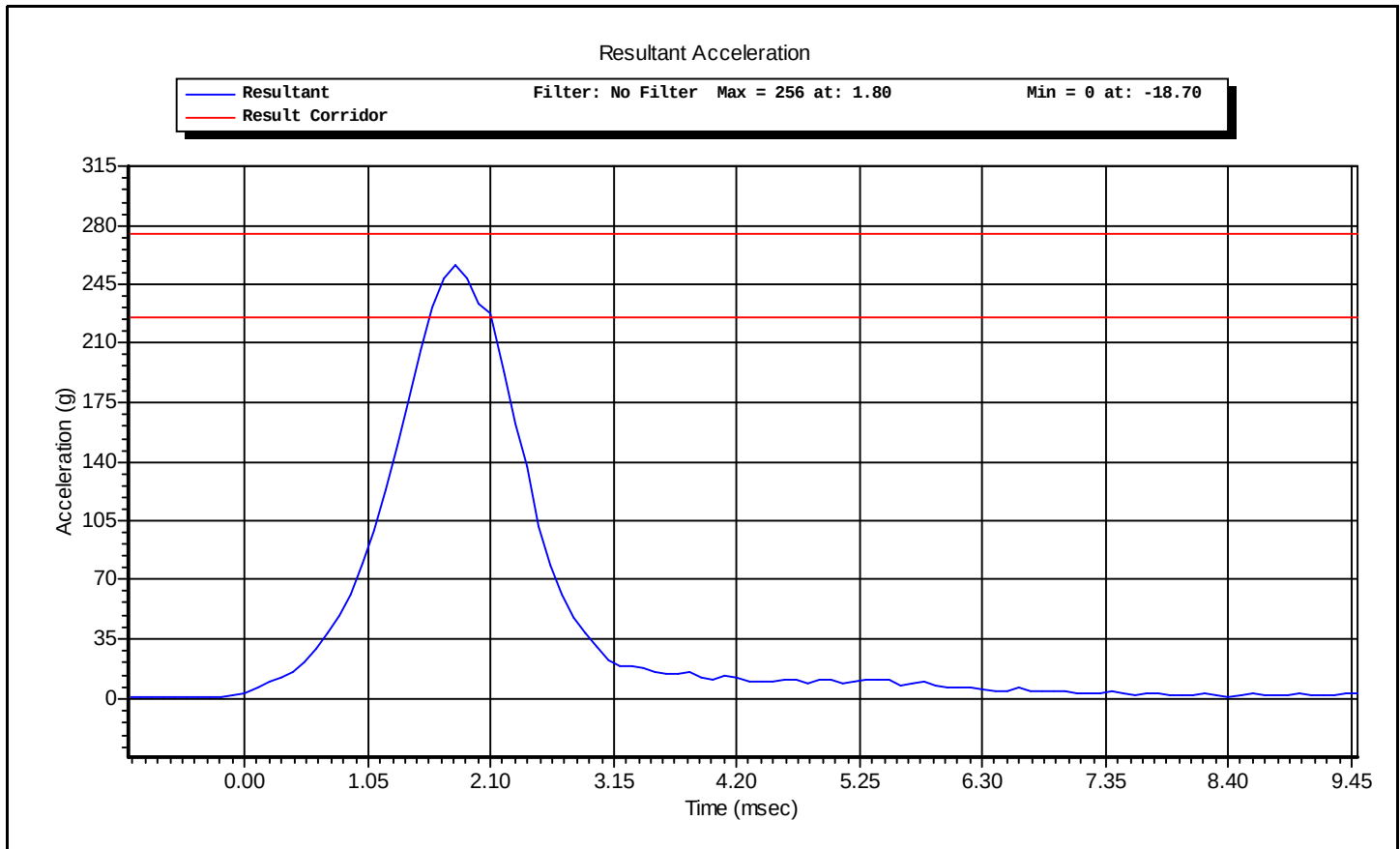


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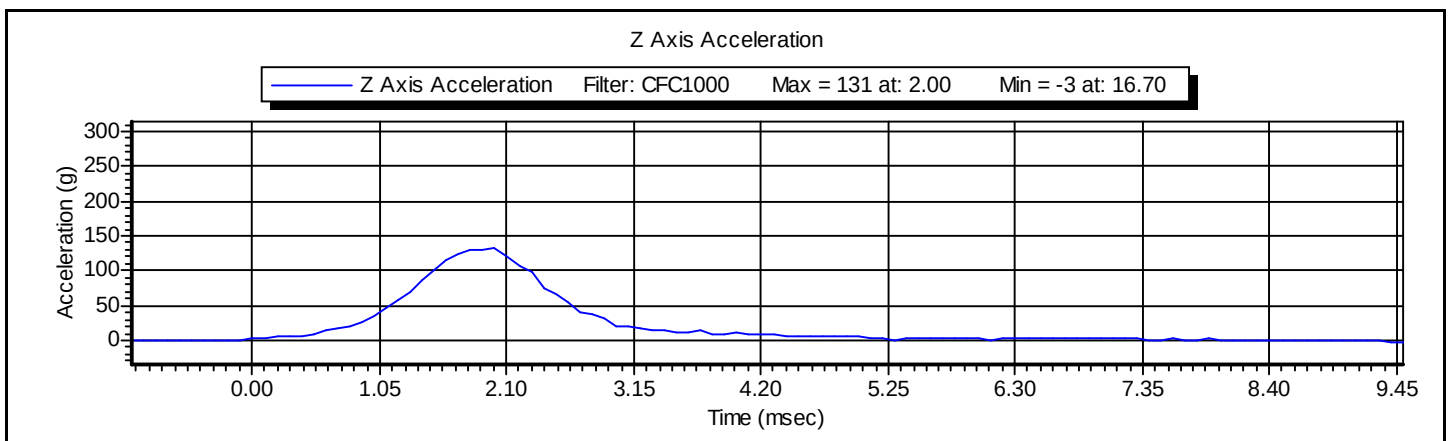
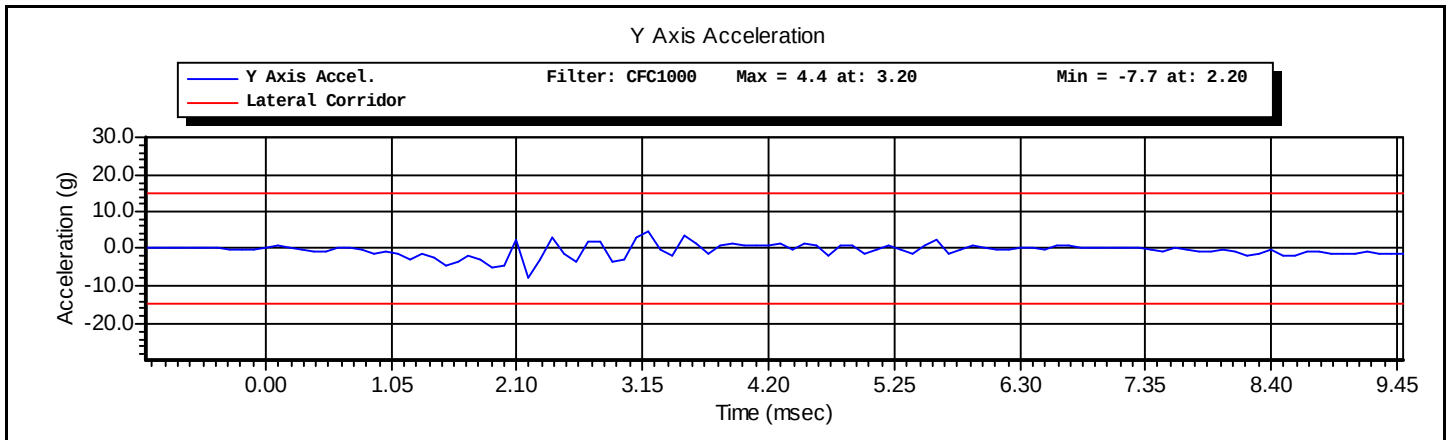
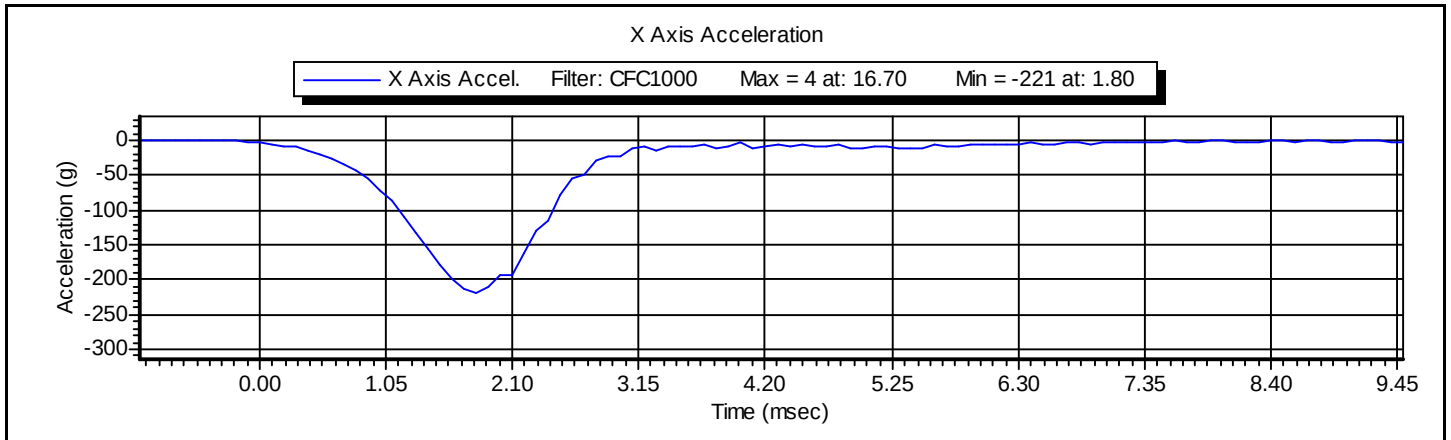
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	3:05:29 PM



Test ID: Head Drop

Test Time: 3:05:29 PM

Test Date: 9/23/2010





www.calspan.com

Calspan - Transportation Research Group

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

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**



www.calspan.com

Calspan - Transportation Research Group

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

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**

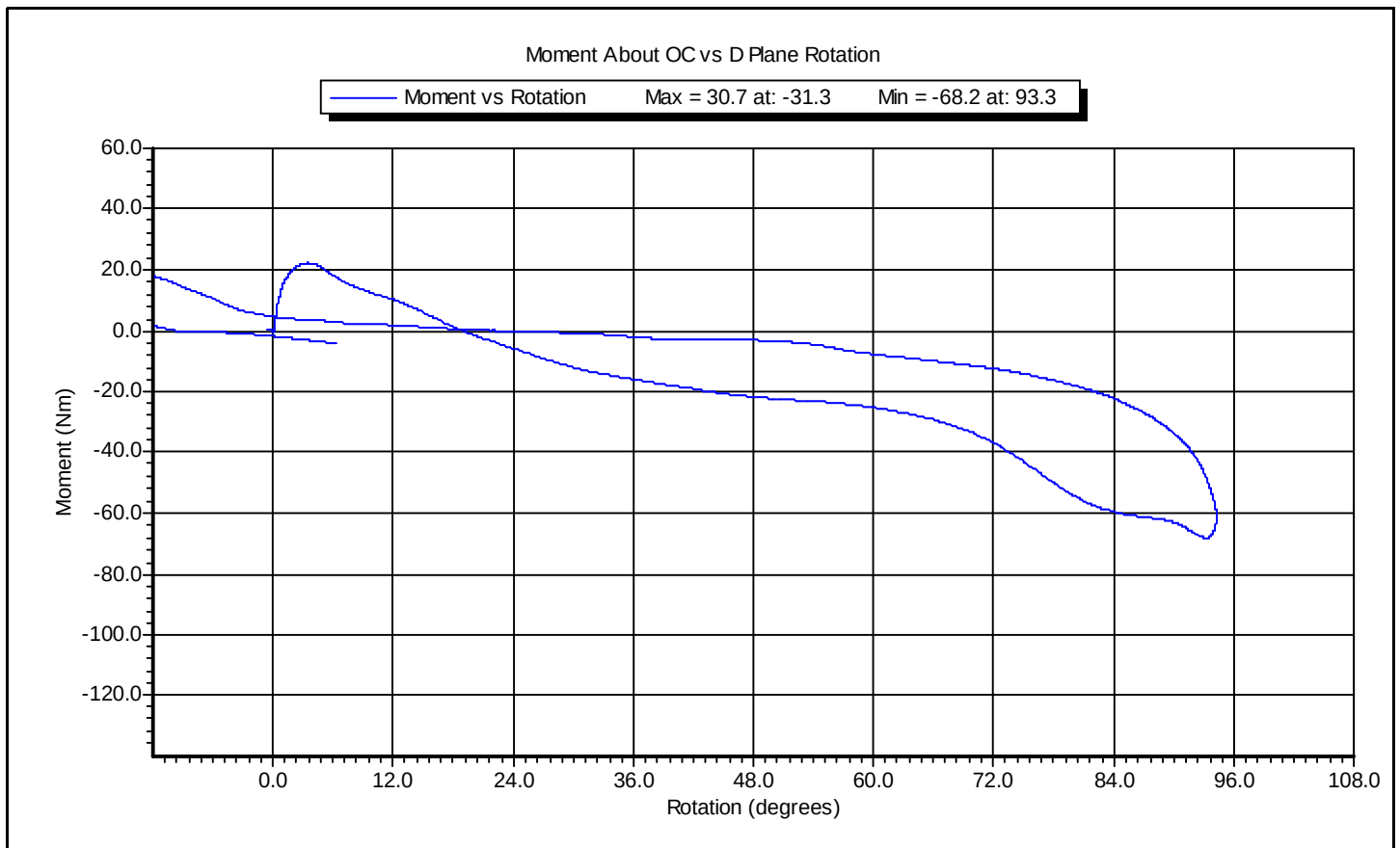


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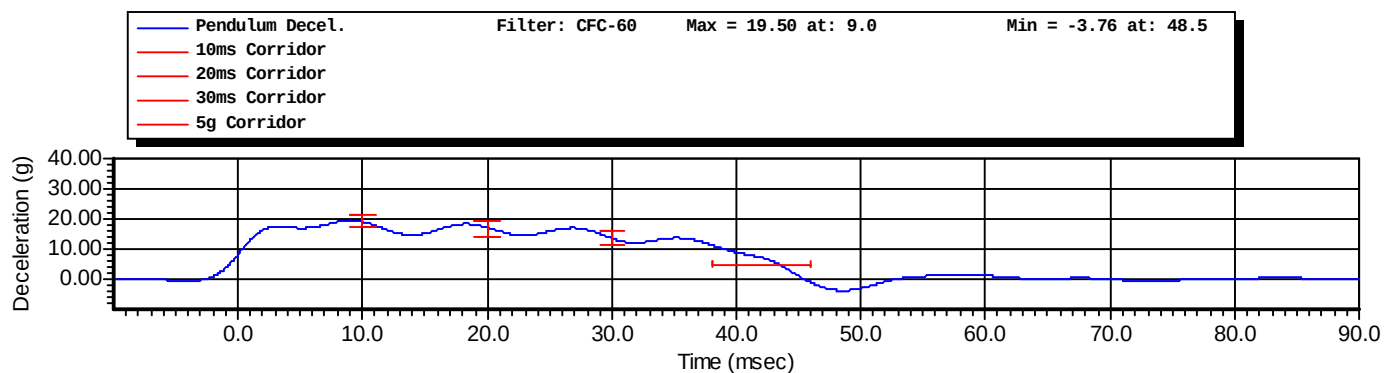
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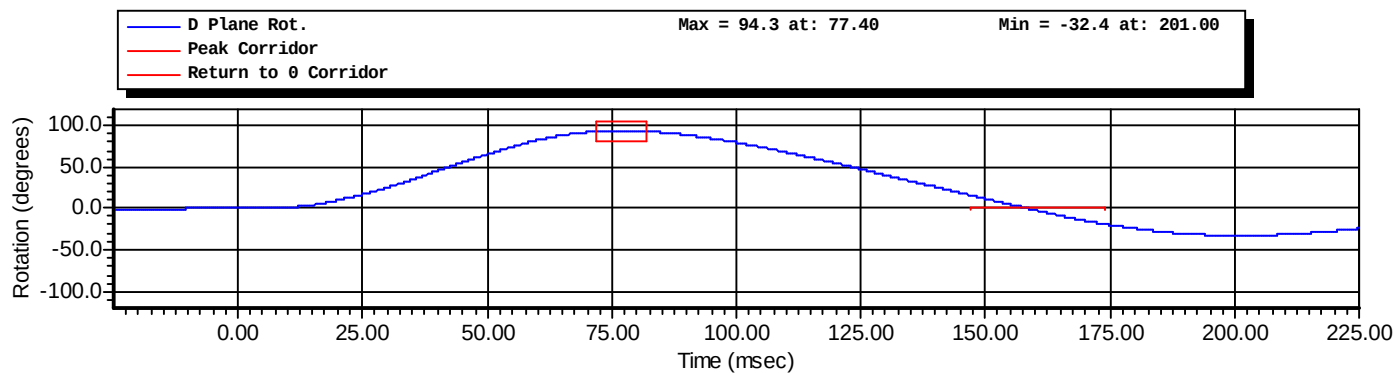
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	9/24/2010
Number of Test:	2	Time of Test:	9:45:55 AM



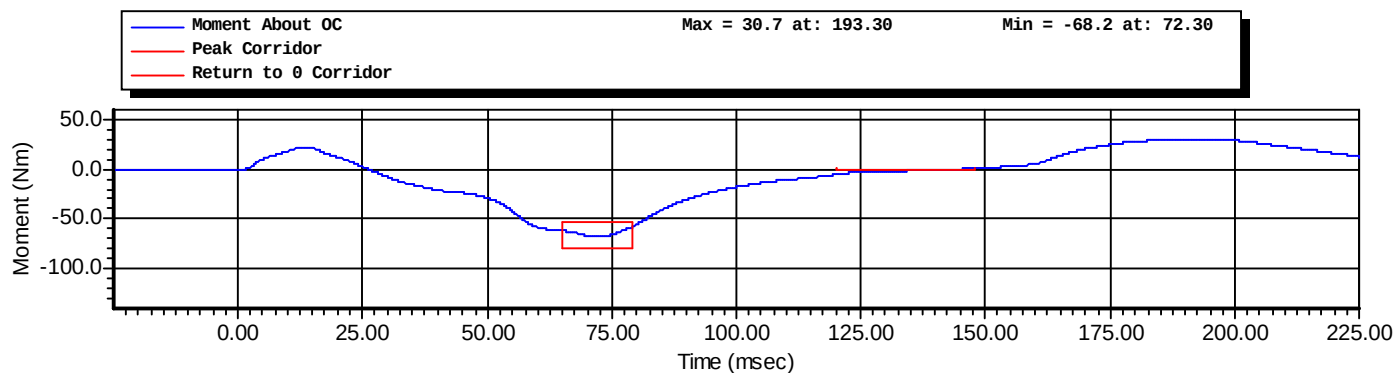
Pendulum Deceleration



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**

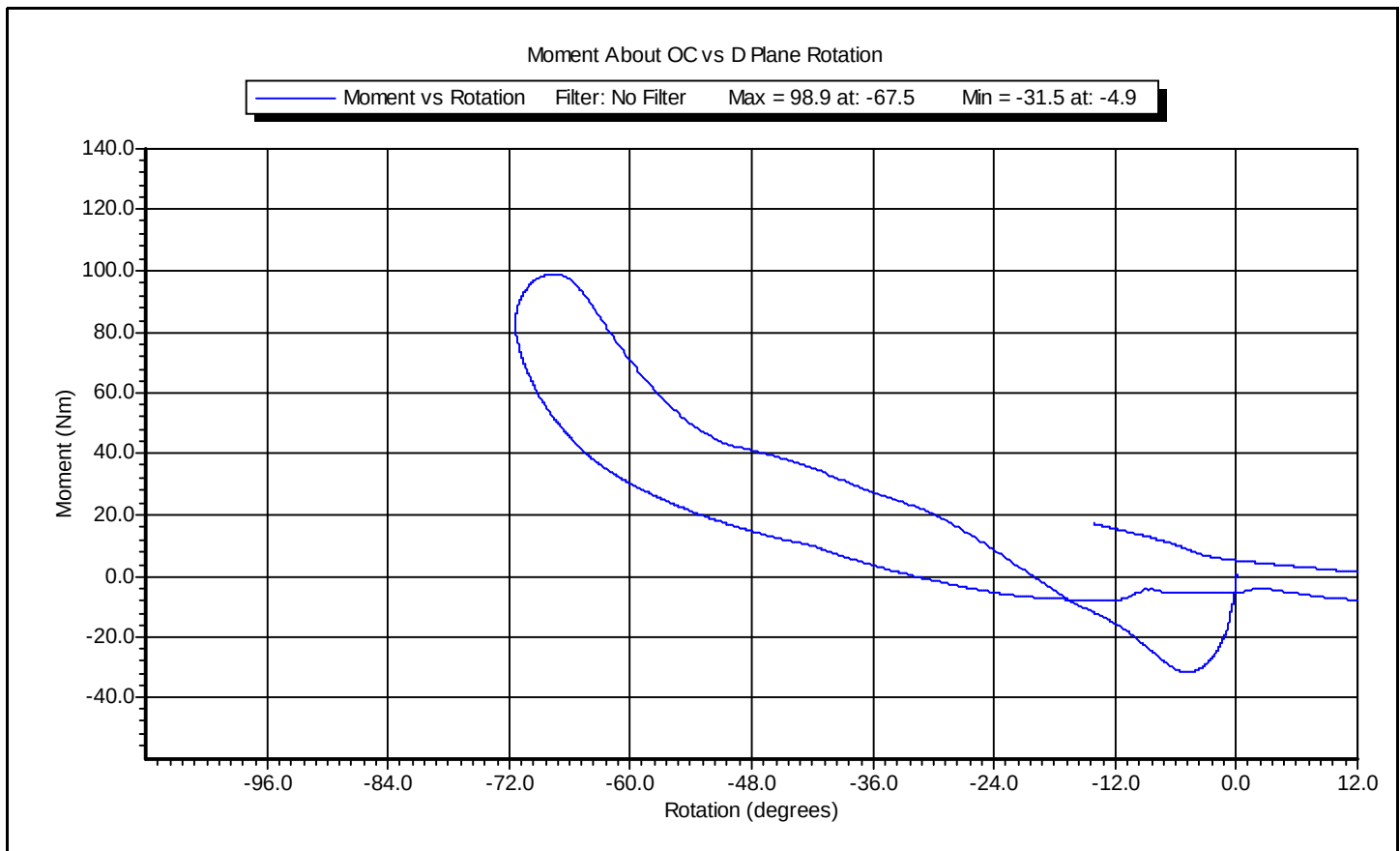


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	9/23/2010
Number of Test:	1	Time of Test:	7:05:58 PM

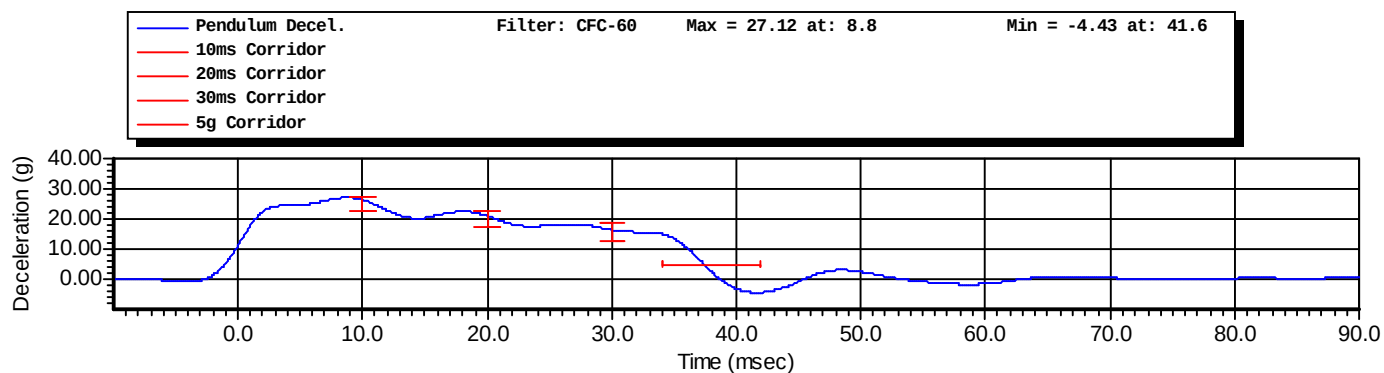


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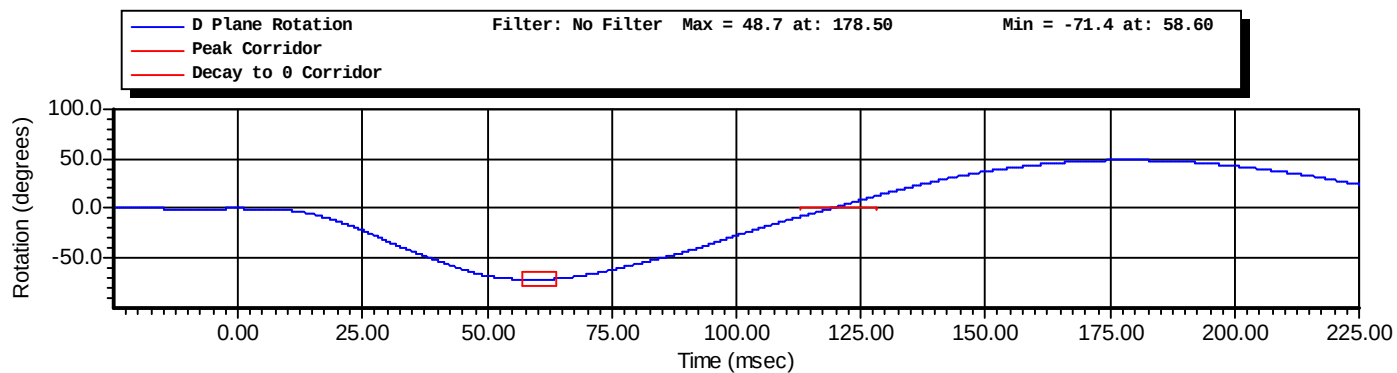
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Date of Test: **9/23/2010**

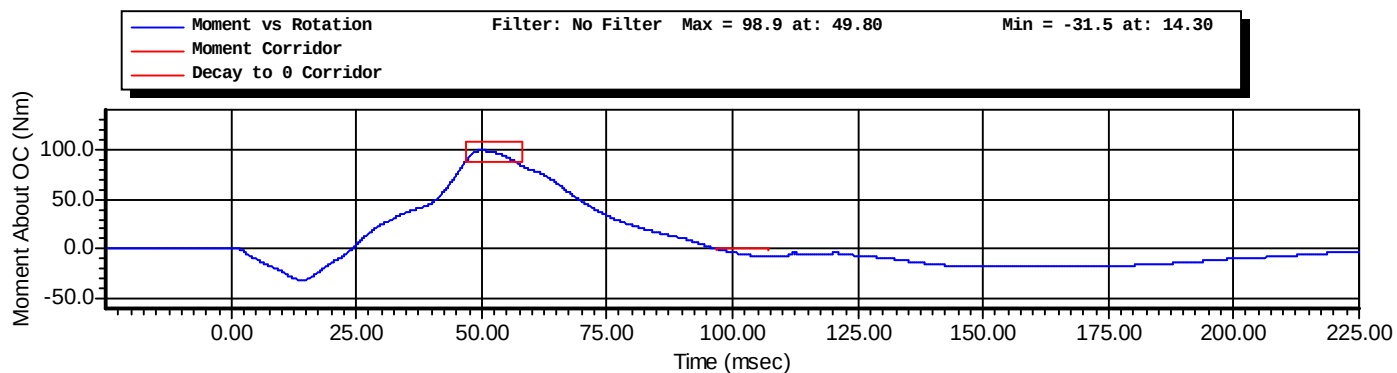
Pendulum Deceleration



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

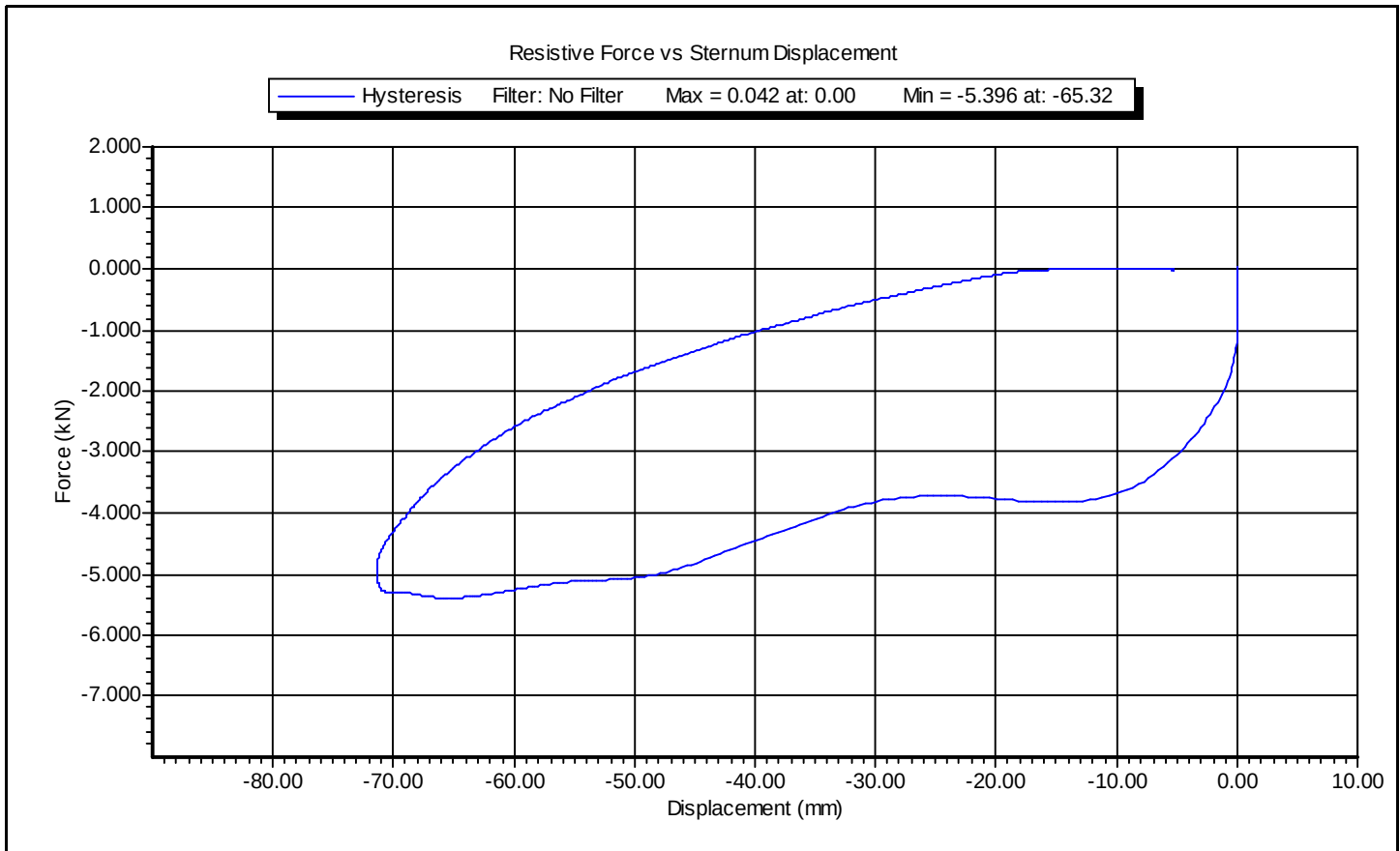
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-061	6/1/2010

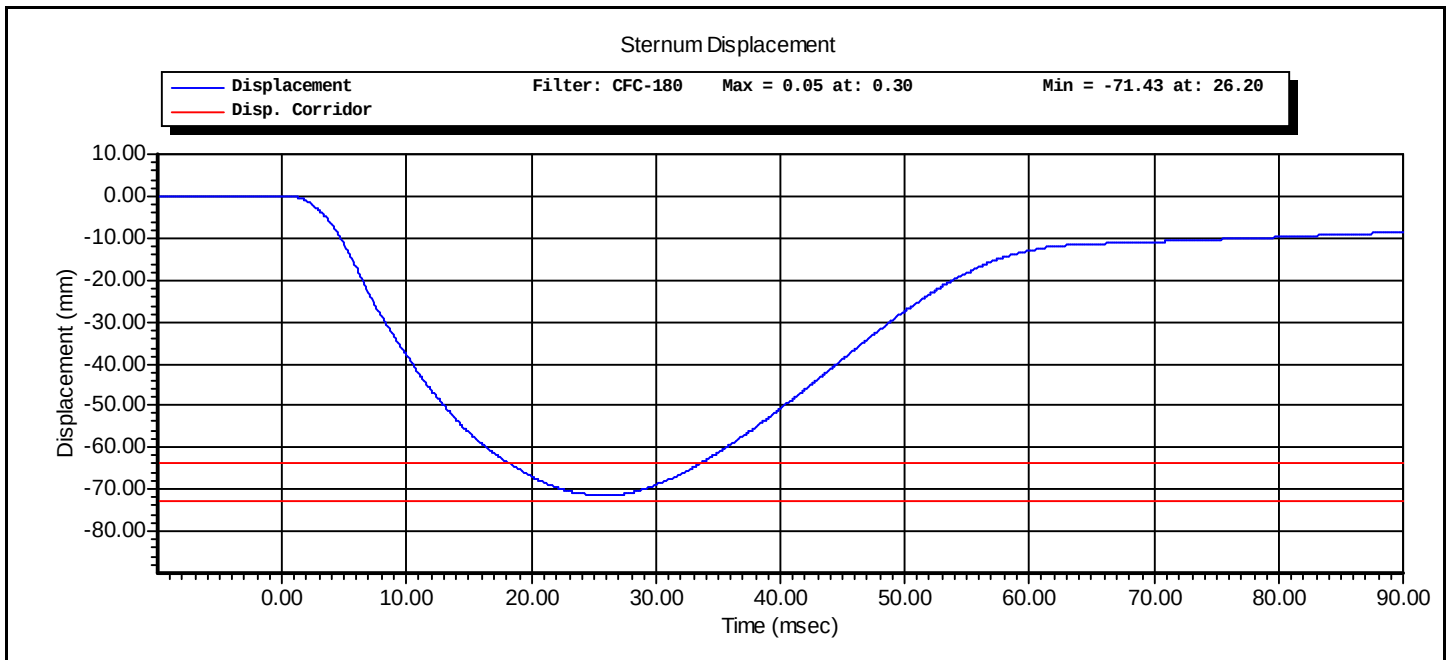
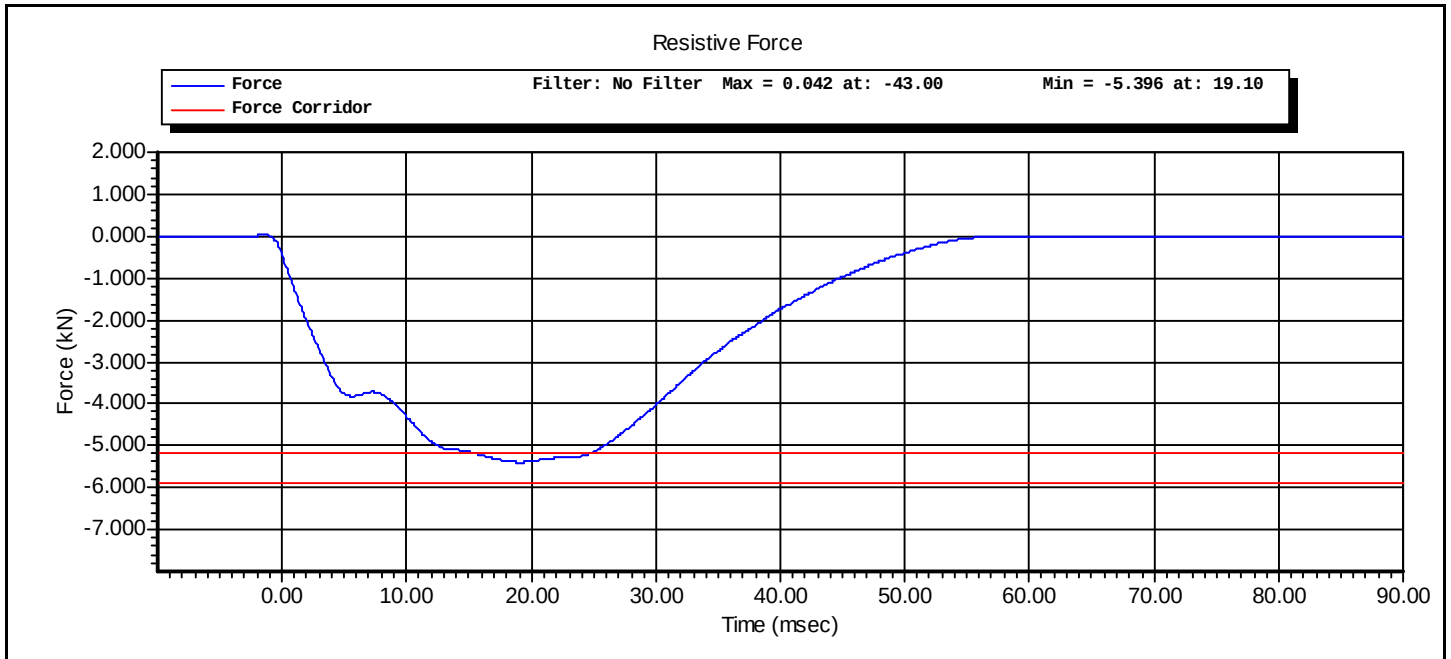
Test ID: **Thorax**

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

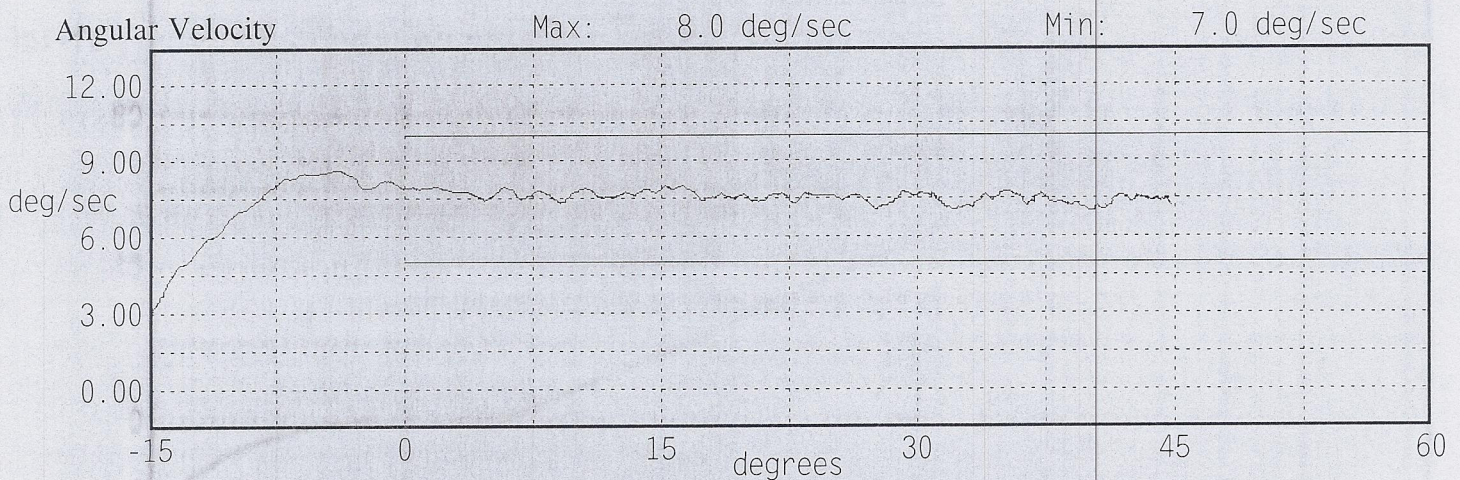
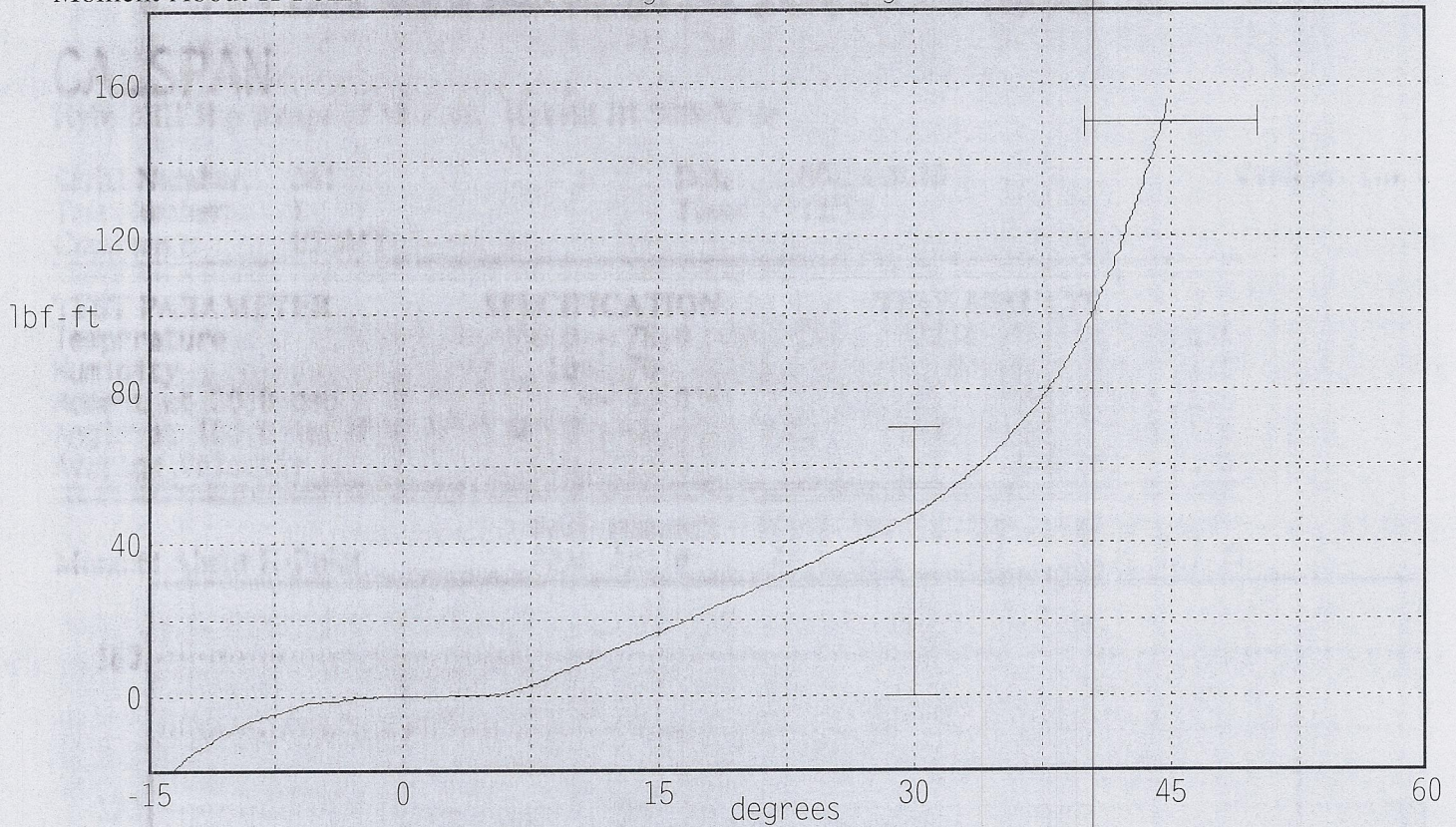
Serial Number: 061
Test Number: 1
Comments: RIGHT

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

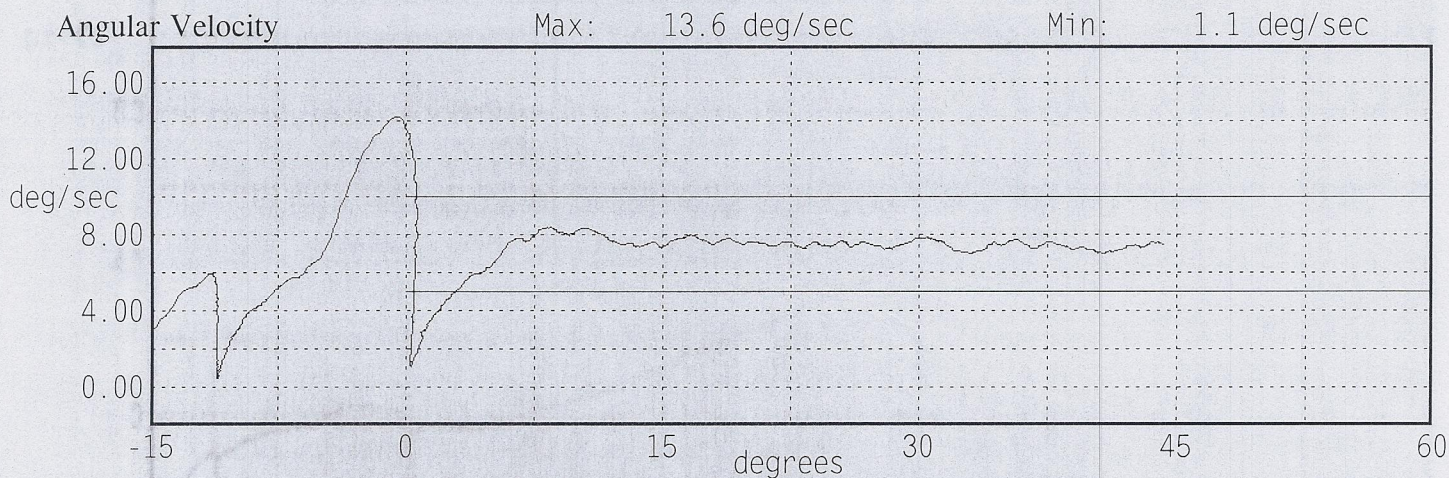
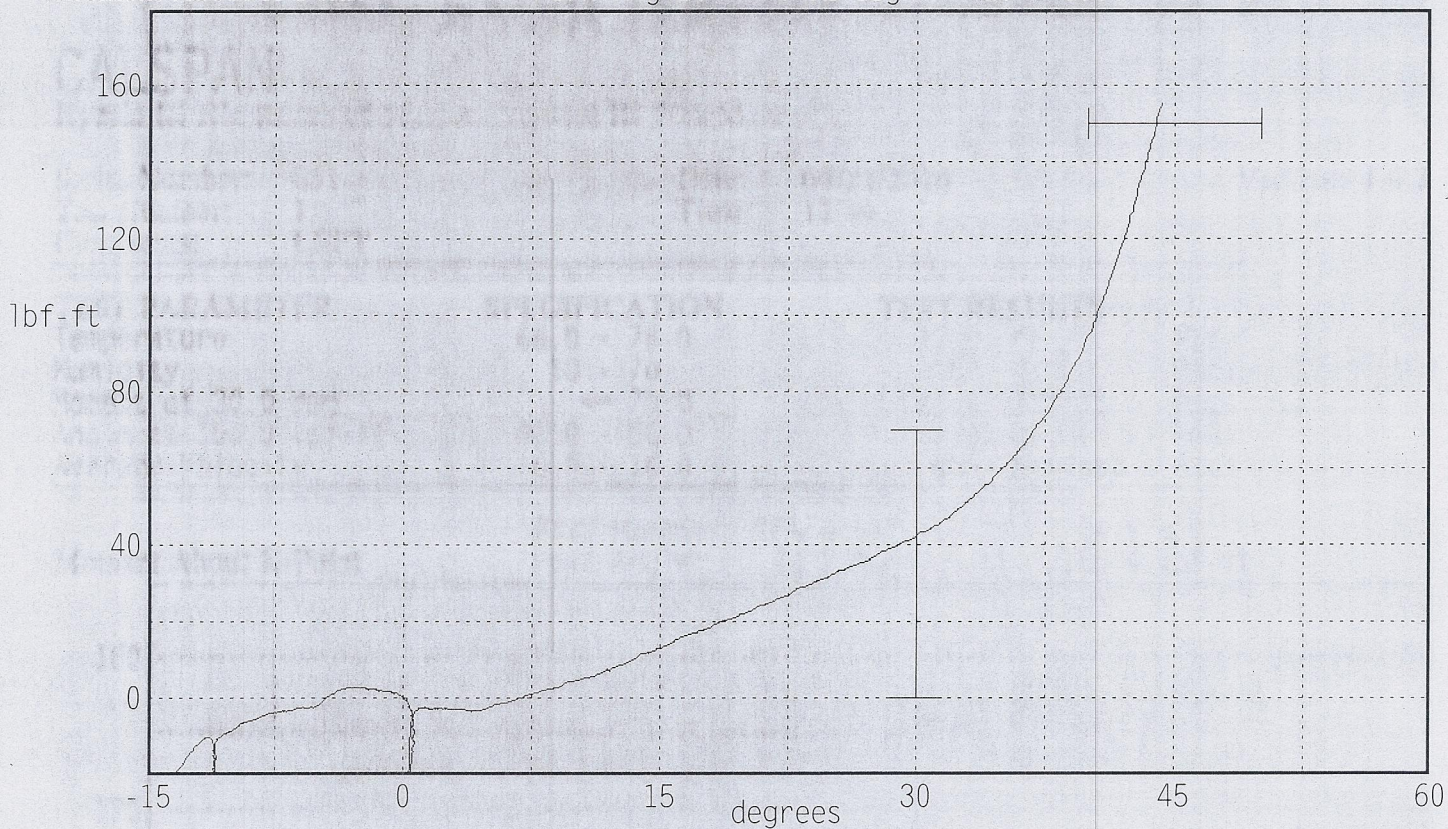
Serial Number: 061
Test Number: 1
Comments: LEFT

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**

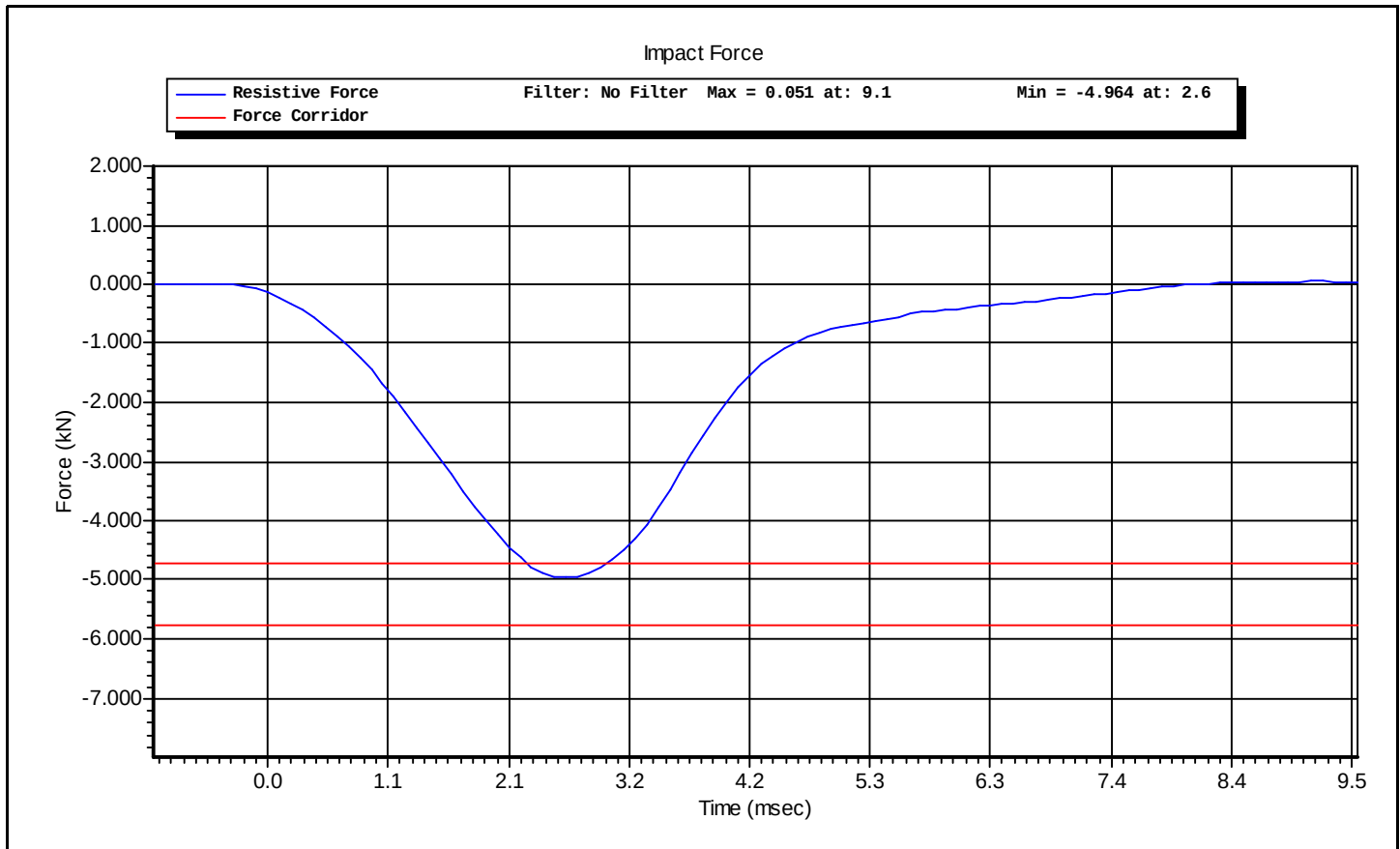


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	2	Test Time:	2:37:59 PM



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**

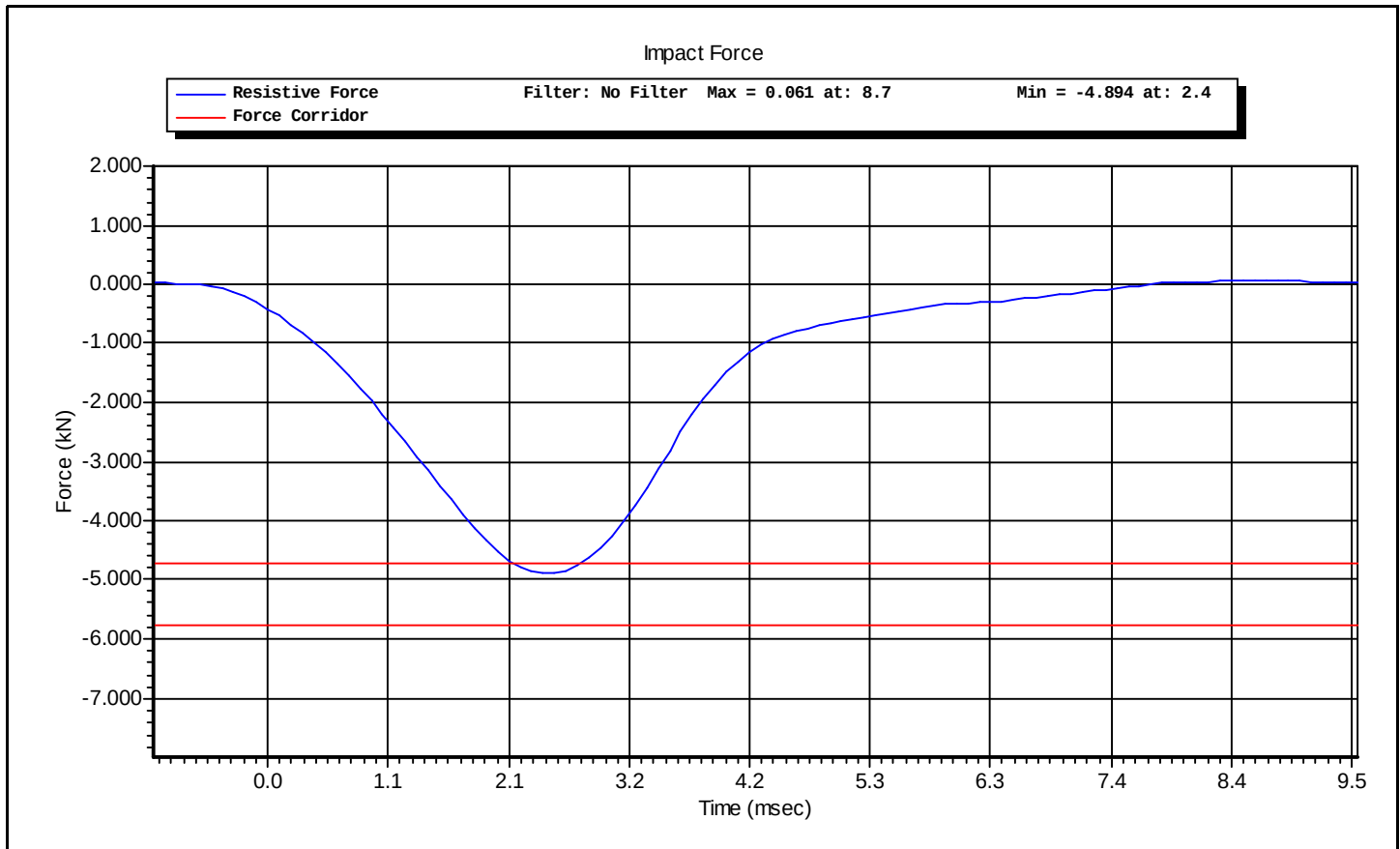


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	2:47:45 PM



Test ID: Right knee

Test Time: 2:47:45 PM

Test Date: 9/24/2010

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

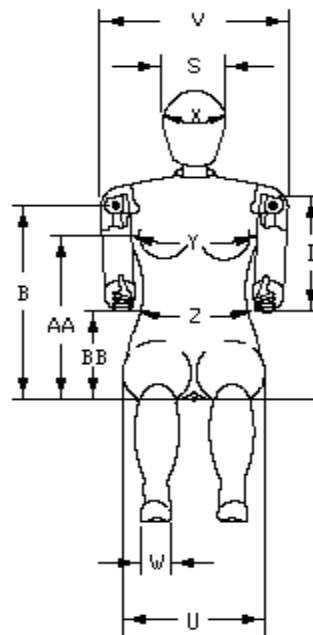
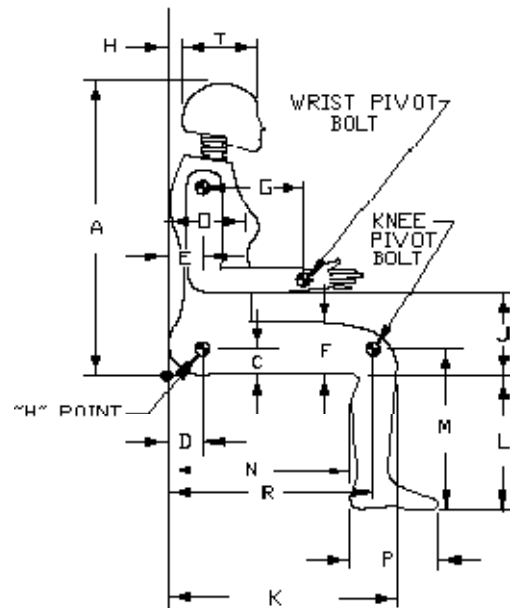
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	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: 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**

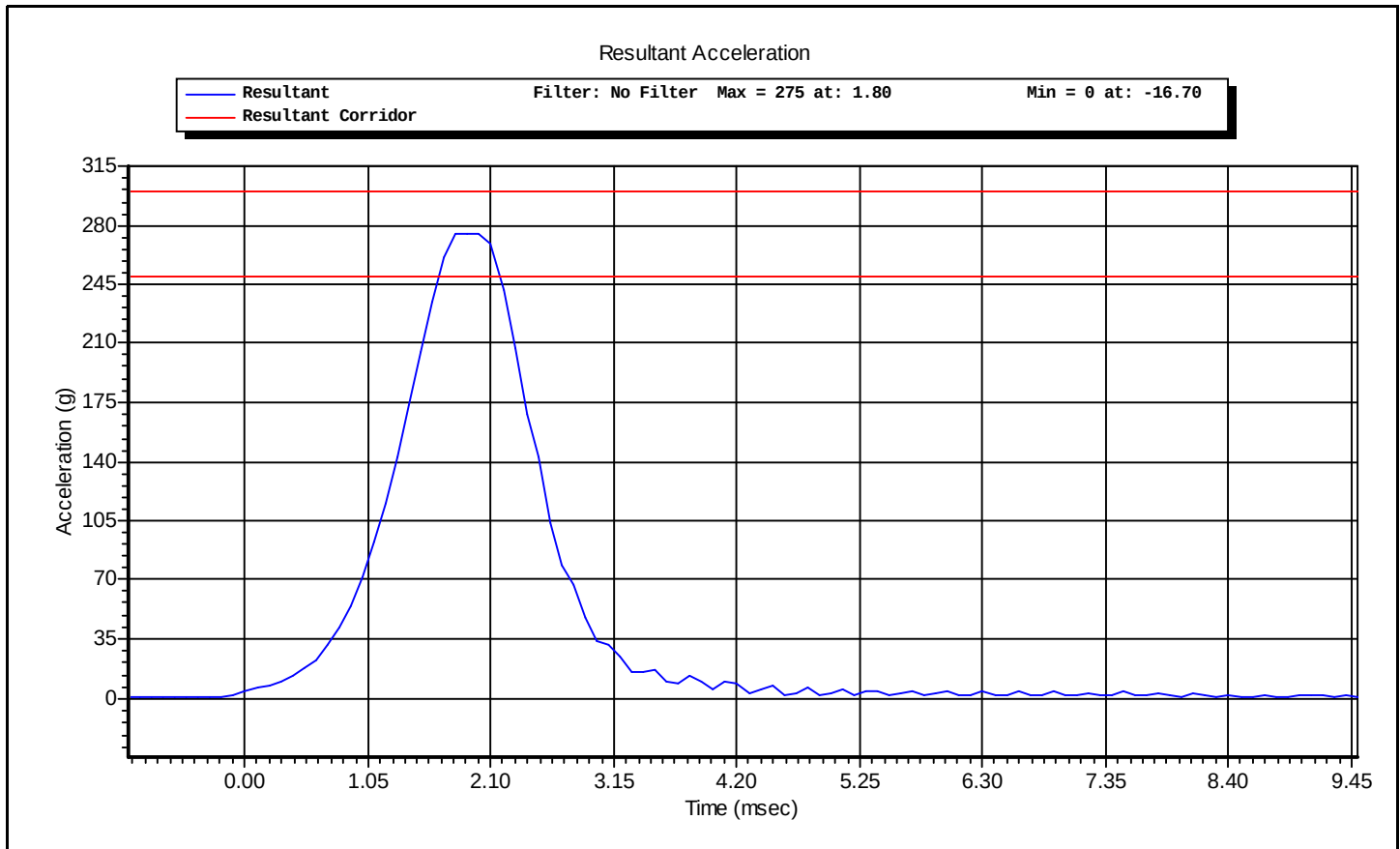


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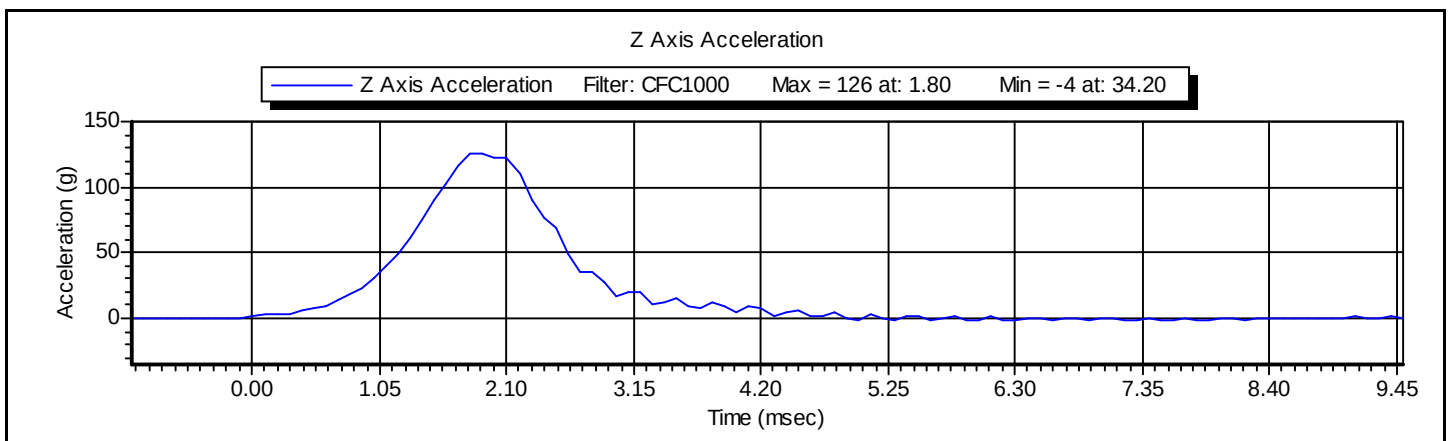
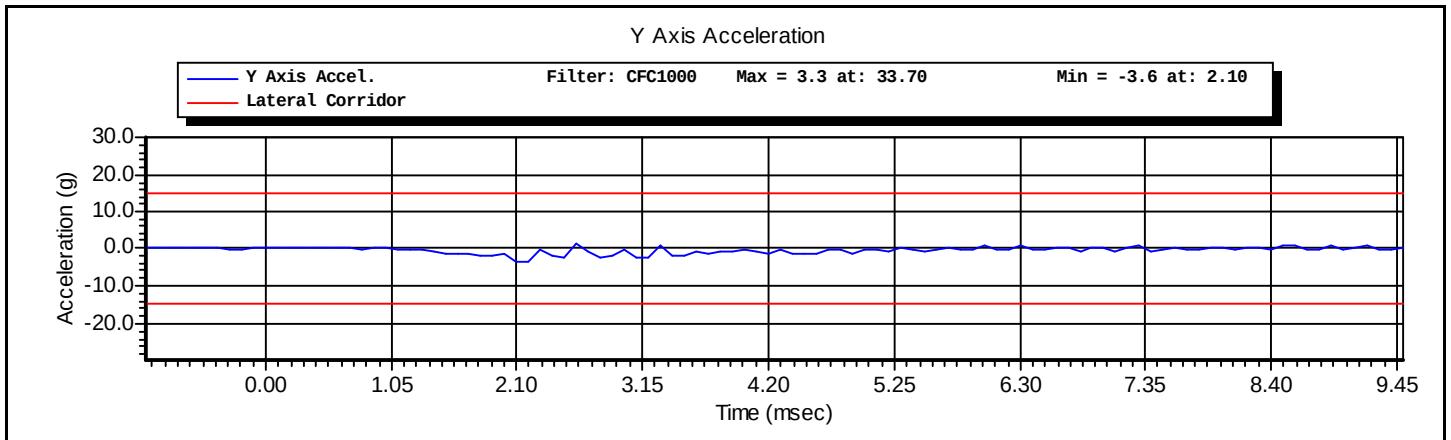
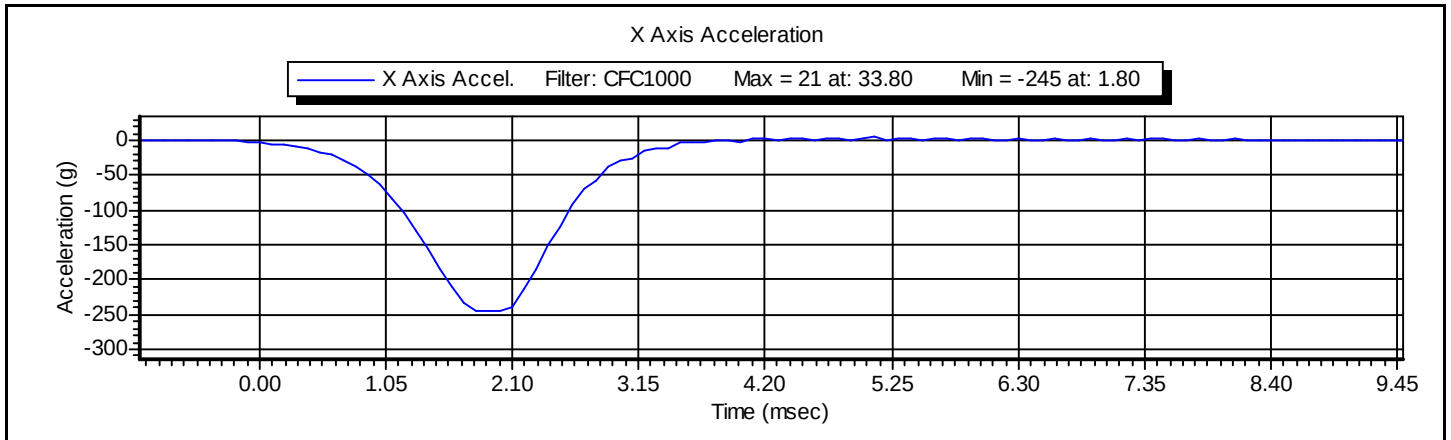
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	4:03:03 PM



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**

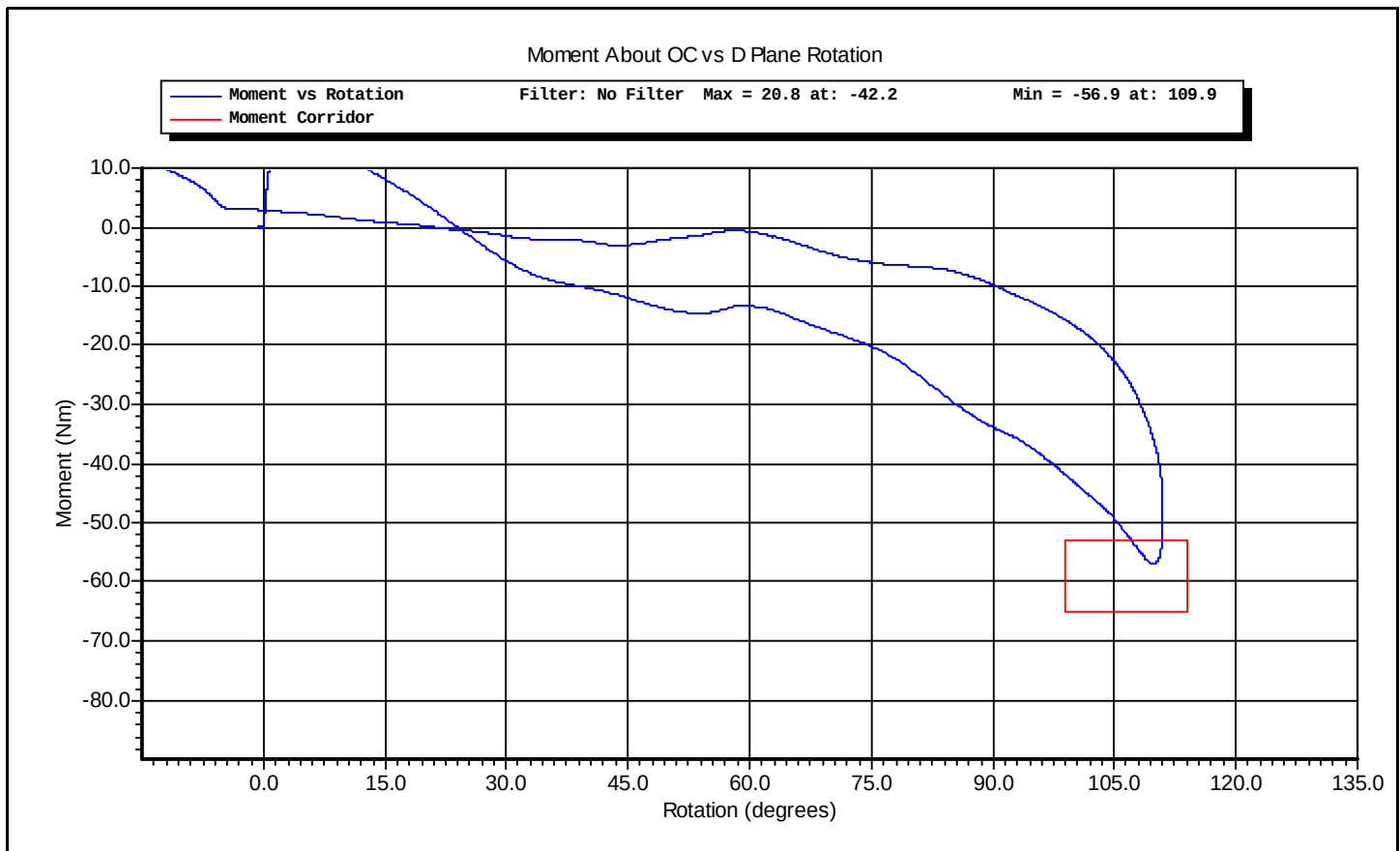


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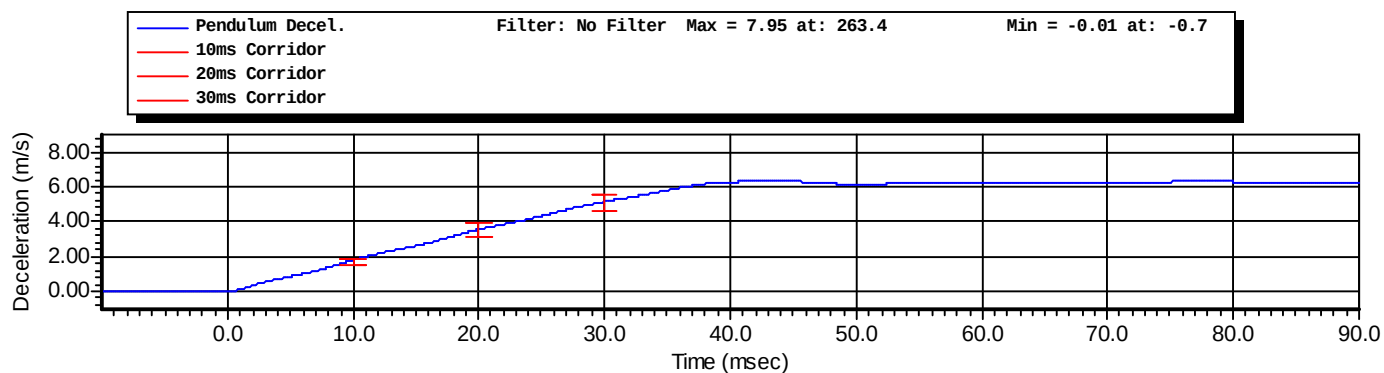
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:56:13 AM



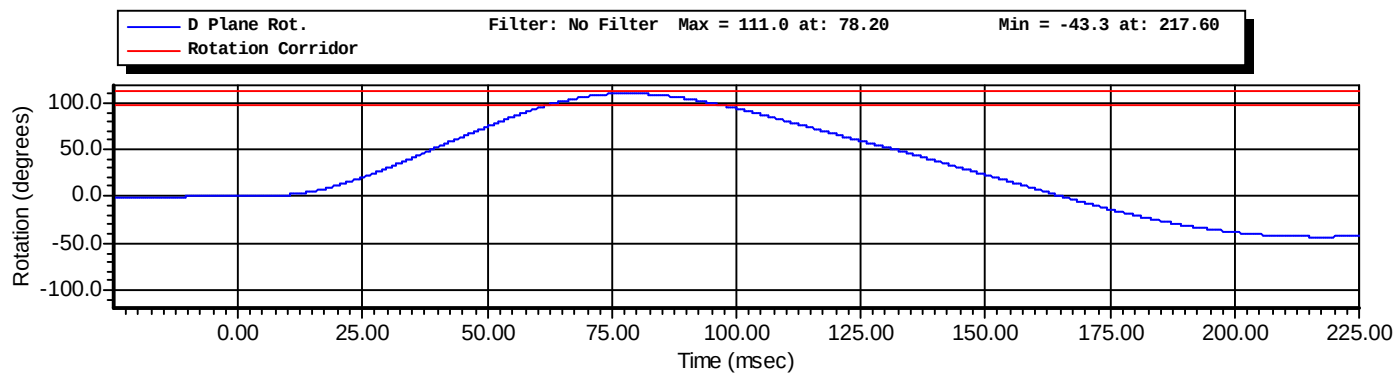
Test ID: Neck Extension Test Time: 11:56:13 AM

Test Date: 9/24/2010

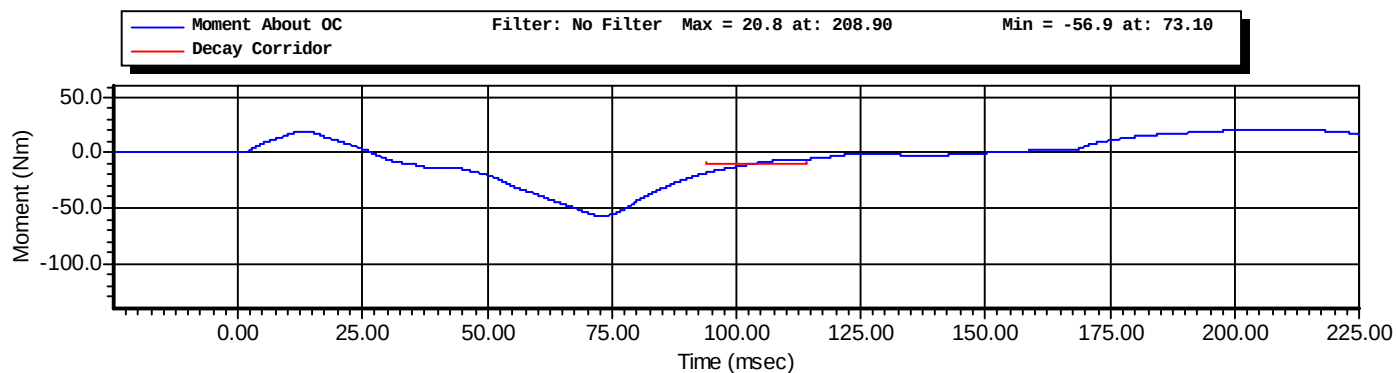
Pendulum Impulse



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**

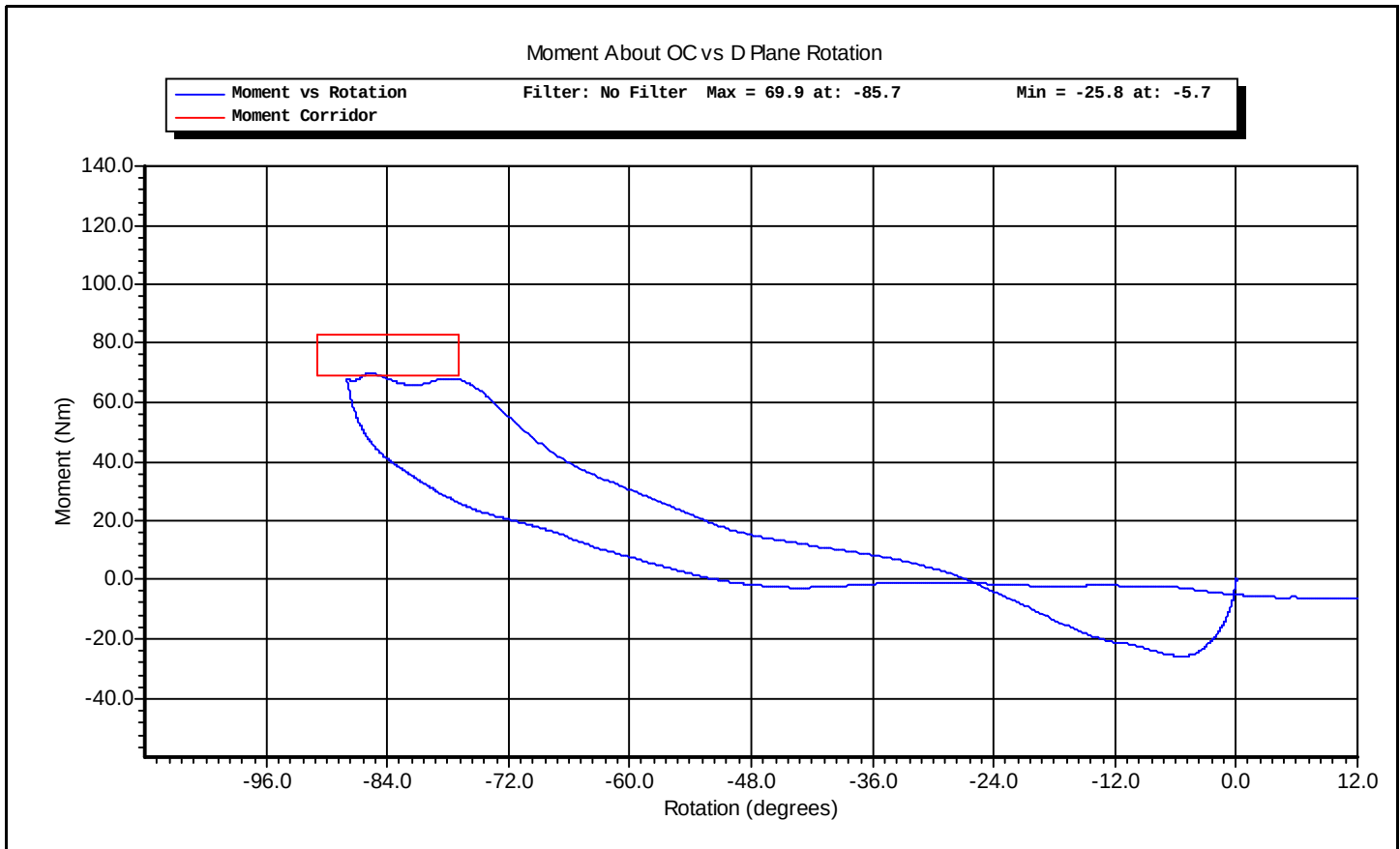


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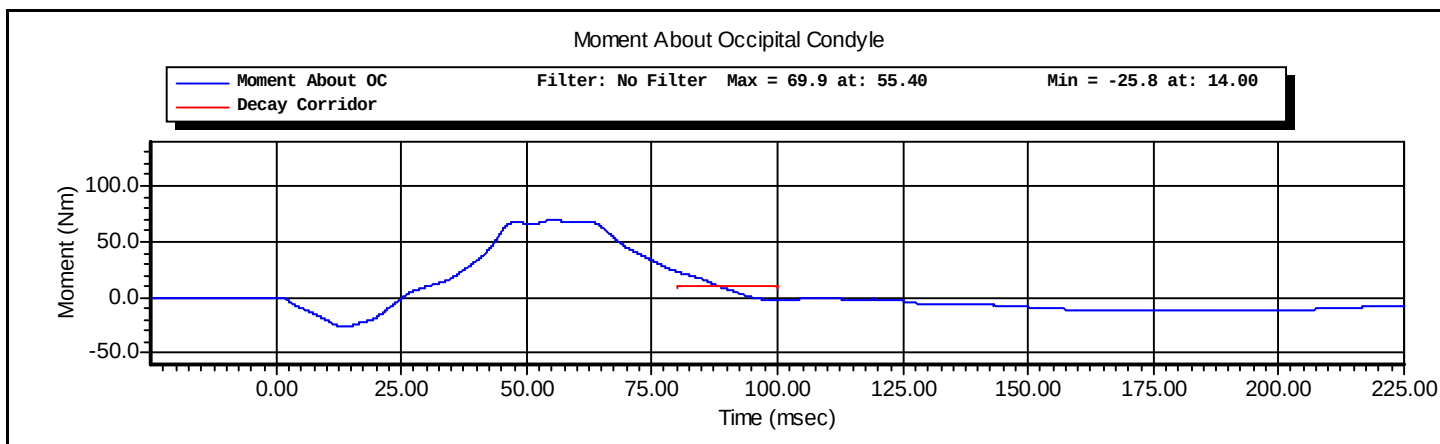
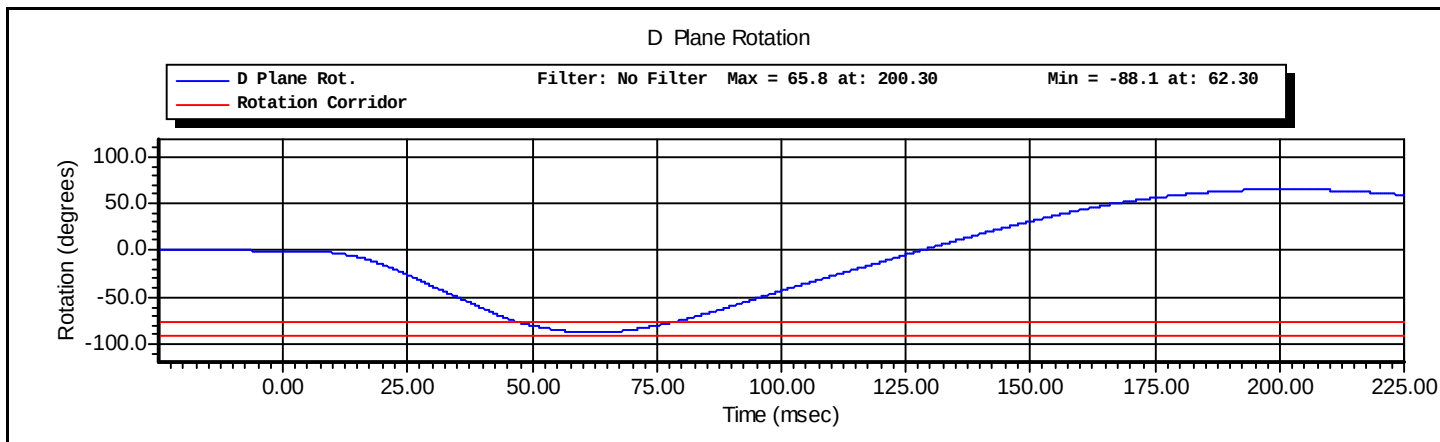
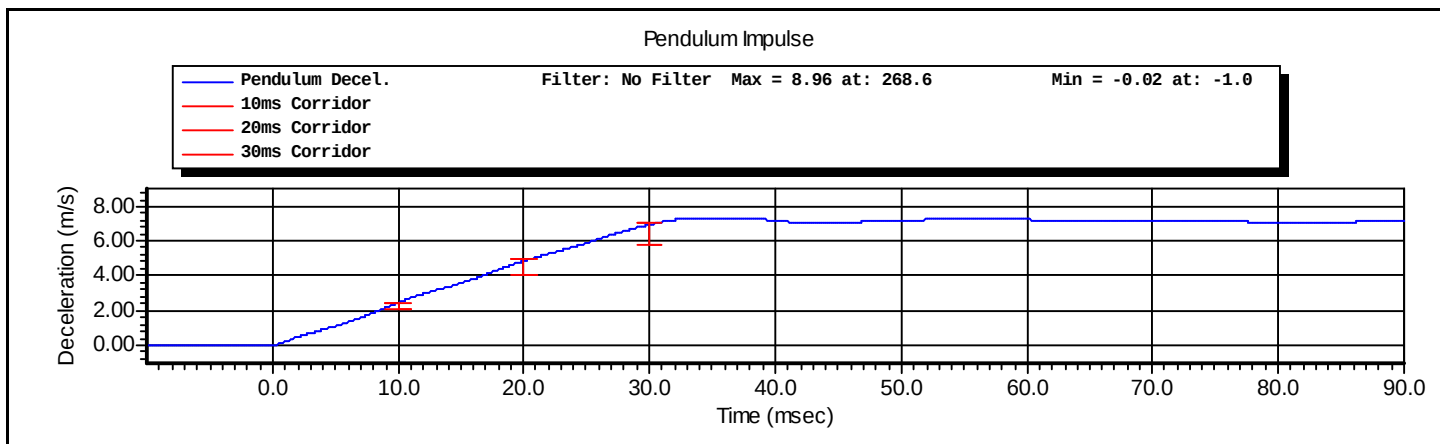
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:29:30 AM



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**



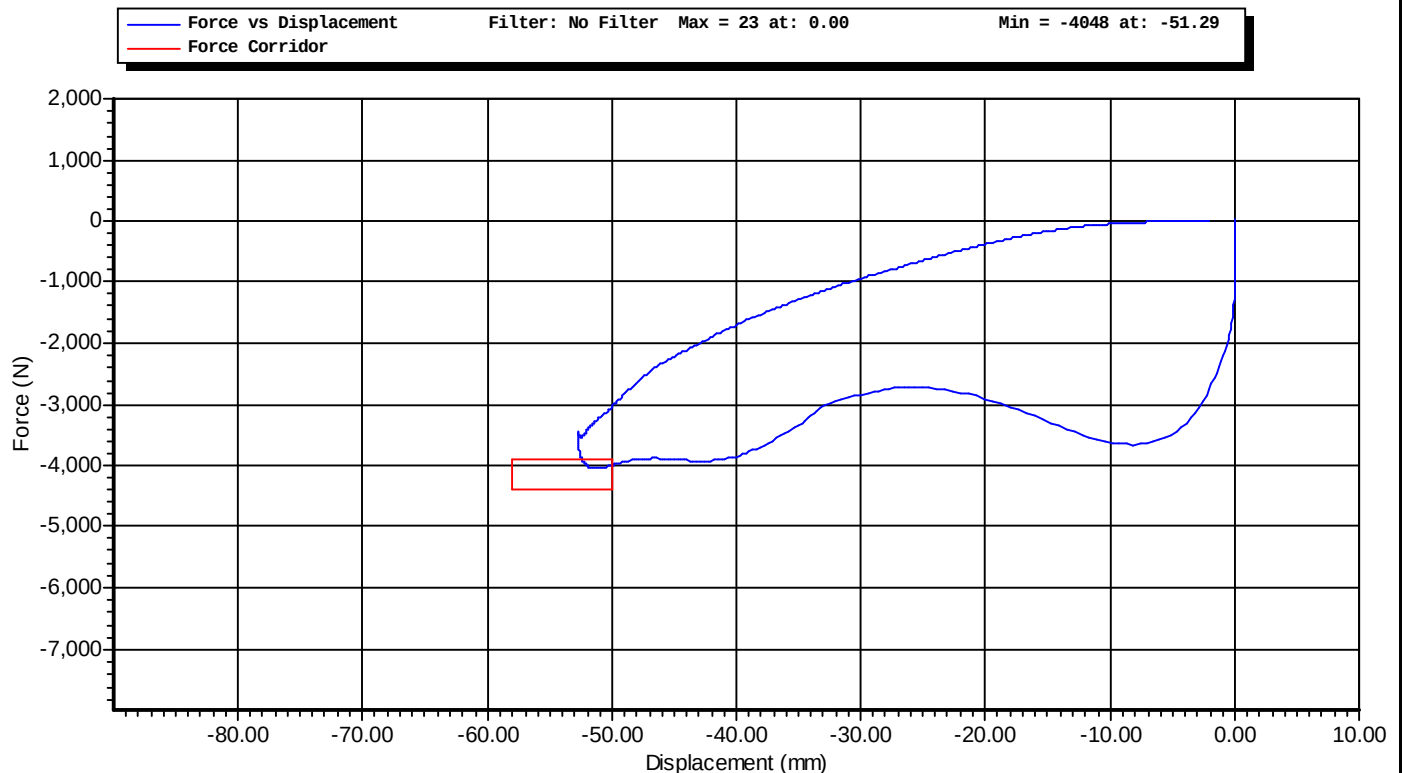
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	11:40:40 AM

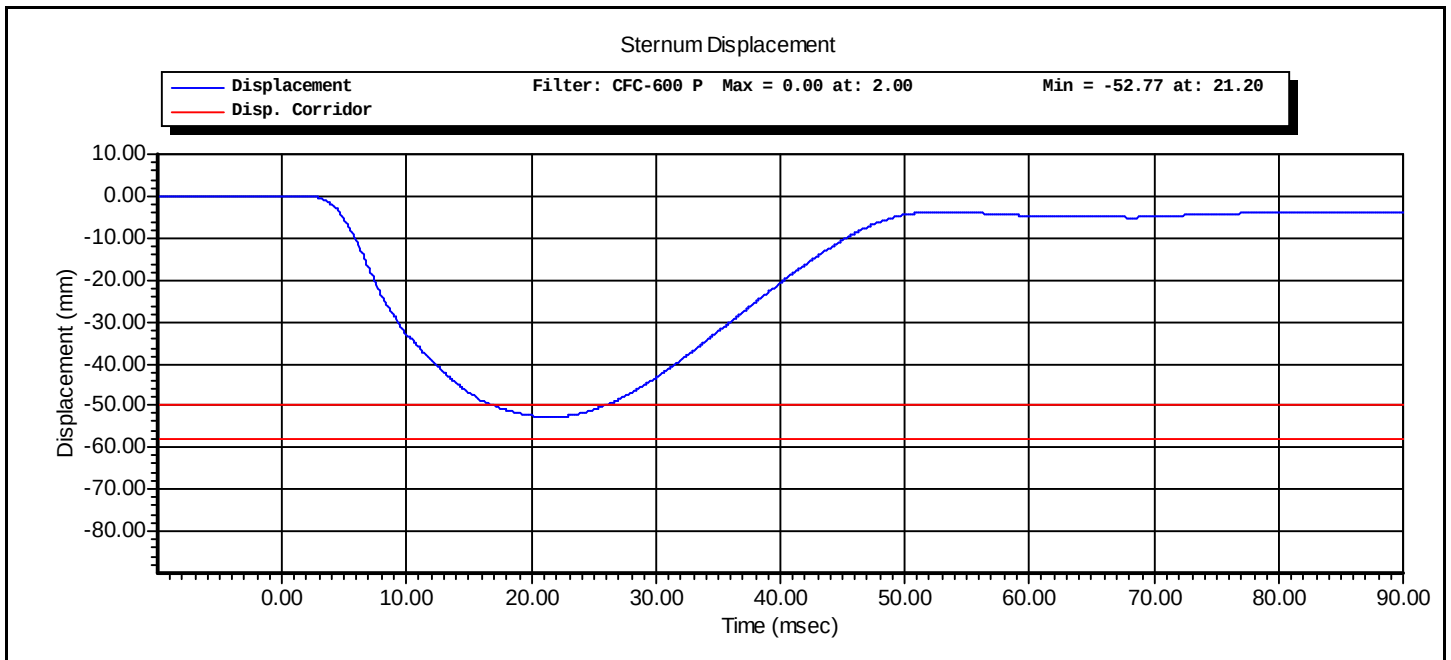
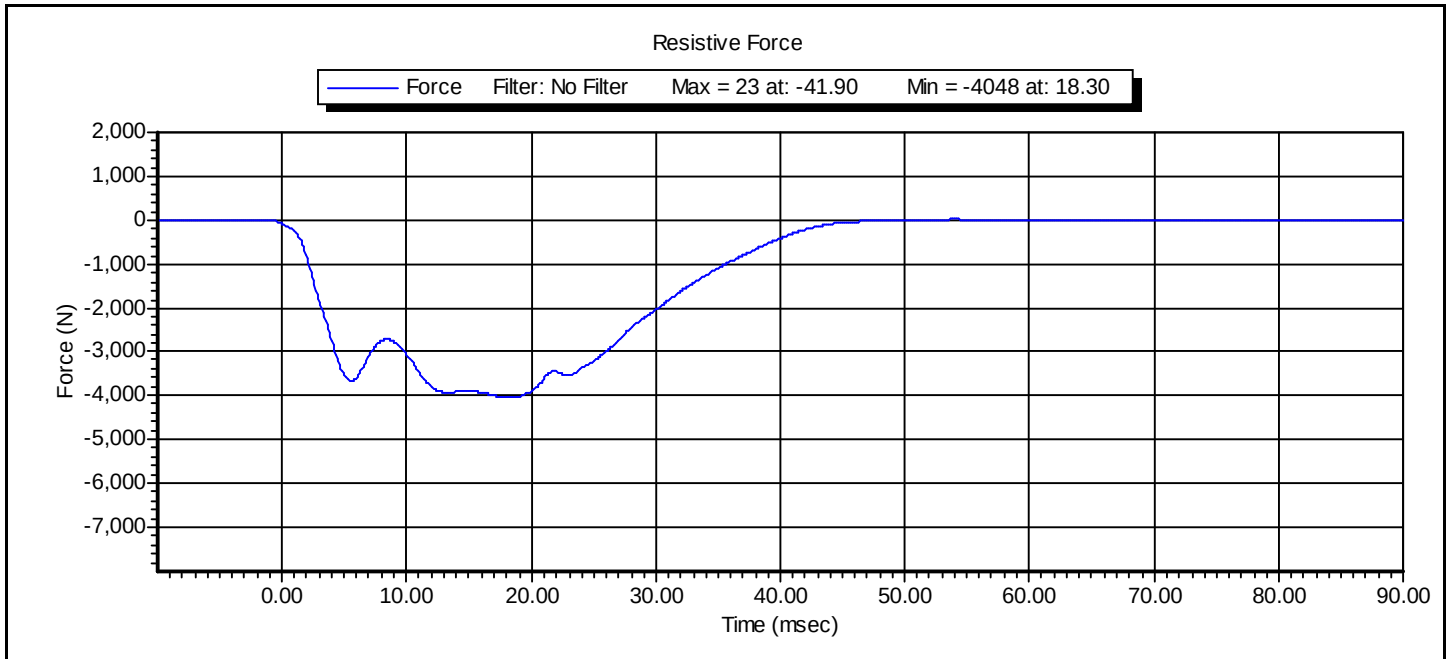
Resistive Force vs Sternum Displacement



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**

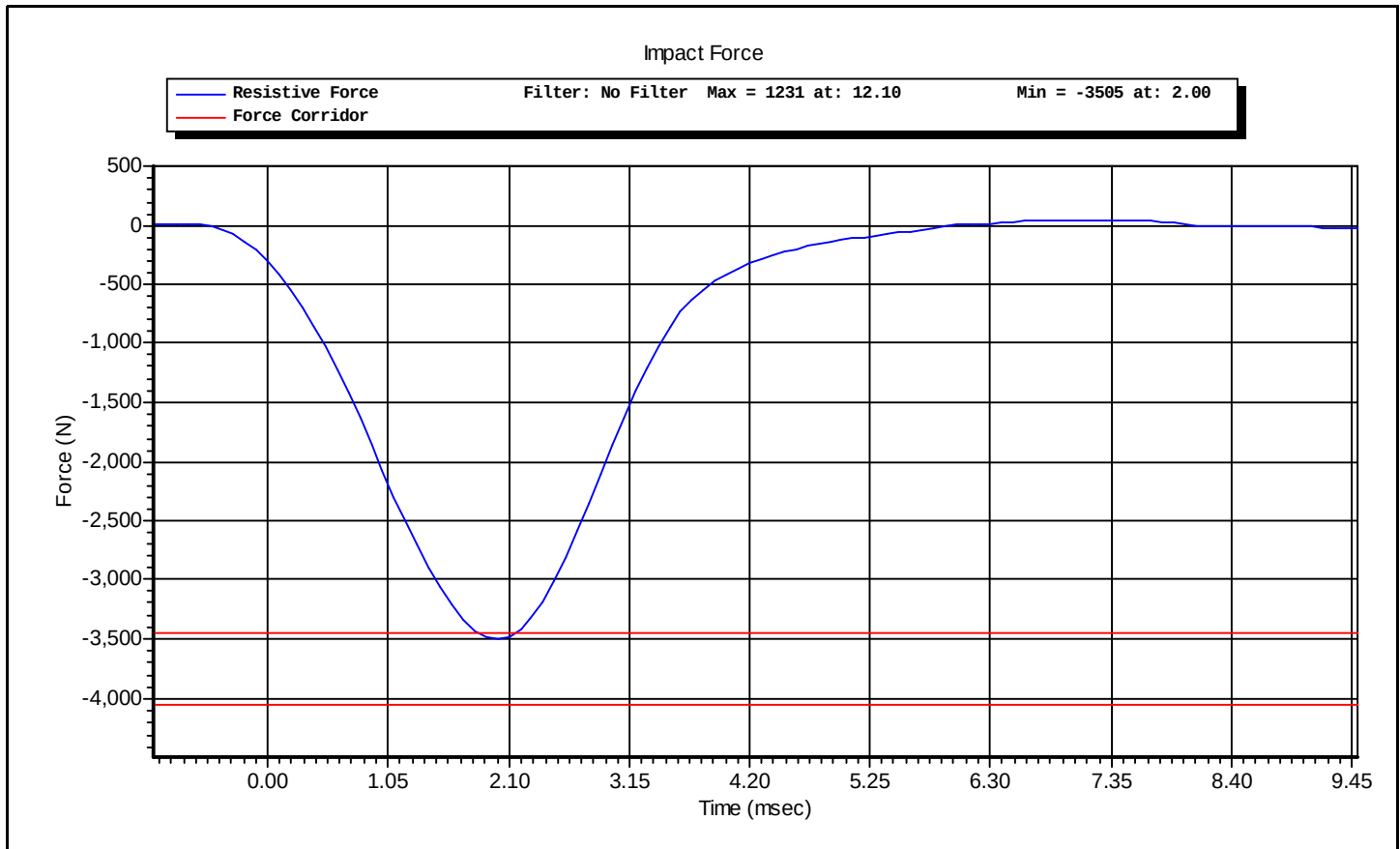


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:07:26 PM



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**

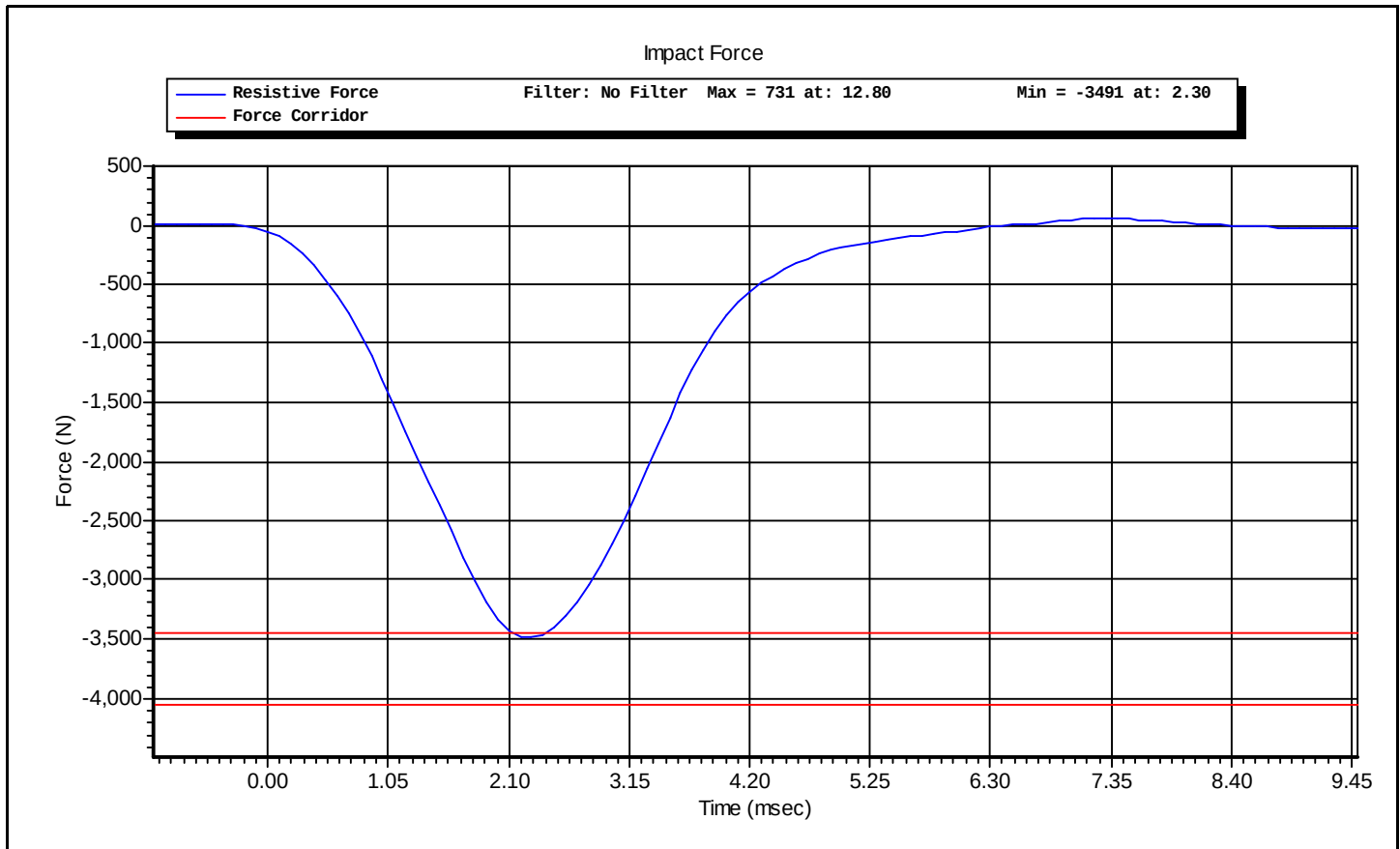


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:23:39 PM



Test ID: **Right Knee**

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

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

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 61

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: 10/1/2010



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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:	9/30/2010
Test Number:	2	Test Time:	5:35:15 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	55 %RH P
Resultant Acceleration	225 -- 275	244 g P
Oscillation	0.0 -- 10.0	5.2 % P
Lateral Acceleration	-15.00 -- 15.00	5.49 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **5:35:15 PM**

Test Date: **9/30/2010**



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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: **5:35:15 PM**

Test Date: **9/30/2010**

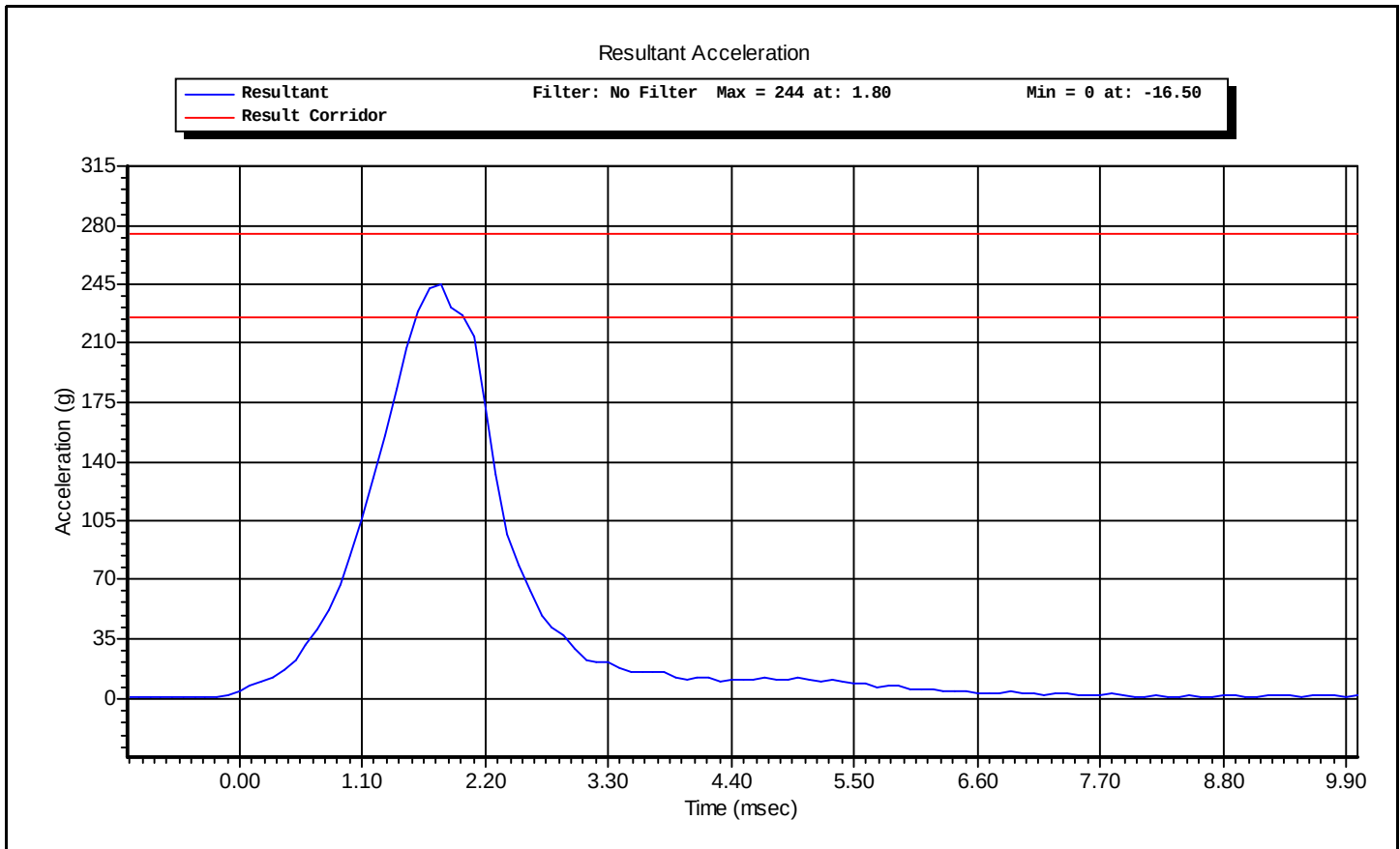


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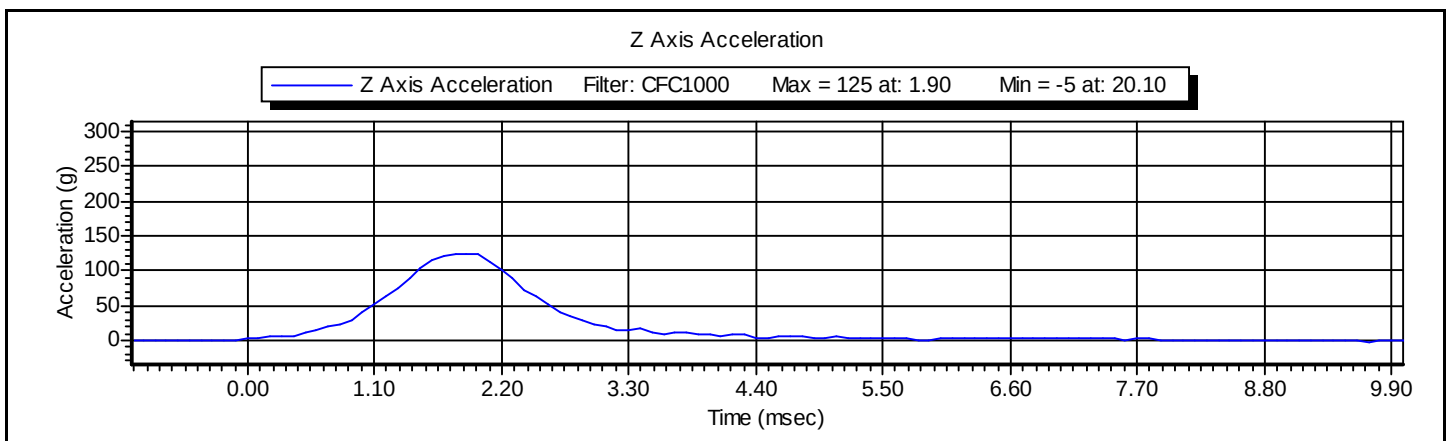
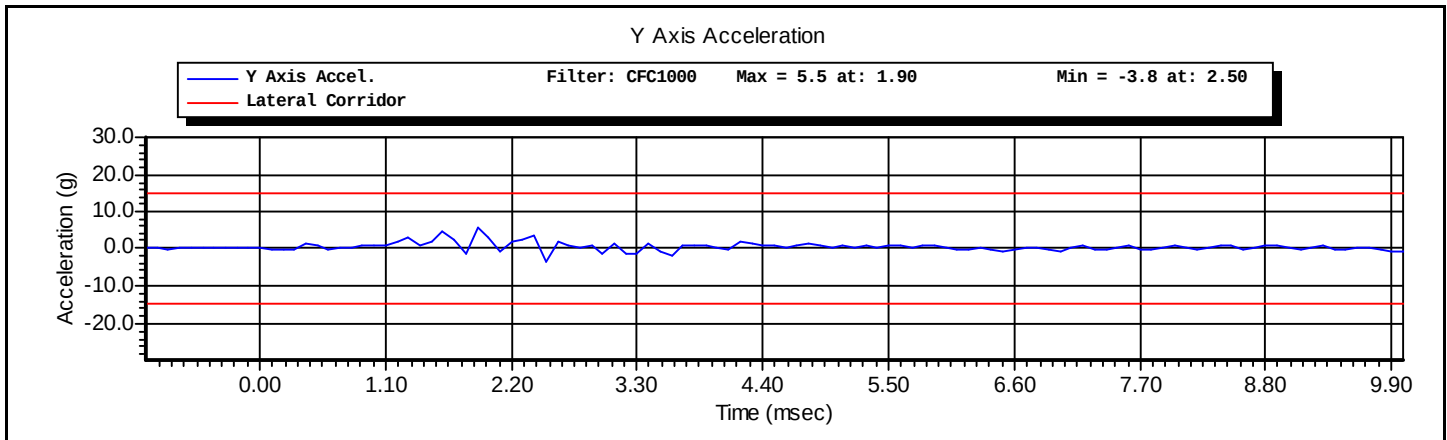
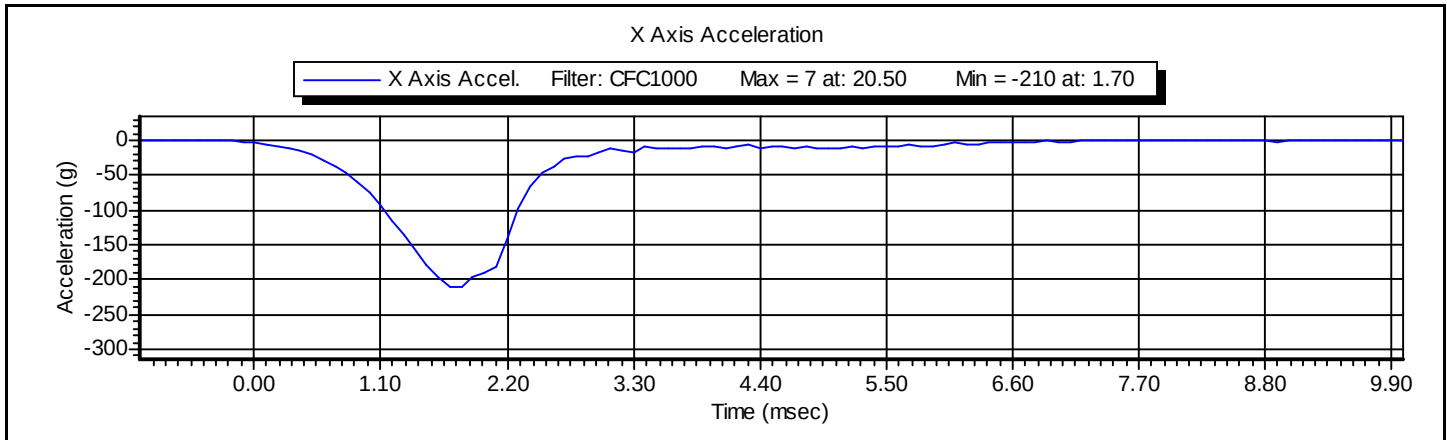
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	2	Test Time:	5:35:15 PM



Test ID: **Head Drop**

Test Time: **5:35:15 PM**

Test Date: **9/30/2010**





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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:	9/30/2010
Test Number:	1	Test Time:	2:16:56 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	55 %RH	P
Velocity		5.94	-- 6.19	6.13 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	18.3 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	14.3 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	14.3 g	P
Decel Time to	5 g	38.0	-- 46.0	40.5 ms	P
D Plane Rotation		81.0	-- 106.0	95.5 degrees	P
Time at Max Rotation		72.0	-- 82.0	75.4 ms	P
Rotation Decay to Zero		147.0	-- 174.0	154.8 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-70.9 Nm	P
Time at Max Moment		65.0	-- 79.0	71.1 ms	P
Moment Decay to Zero		120.0	-- 148.0	140.5 ms	P

All test parameters are within specifications

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

Test ID: **Neck Extension**

Test Time: **2:16:56 PM**

Test Date: **9/30/2010**



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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: **2:16:56 PM**

Test Date: **9/30/2010**

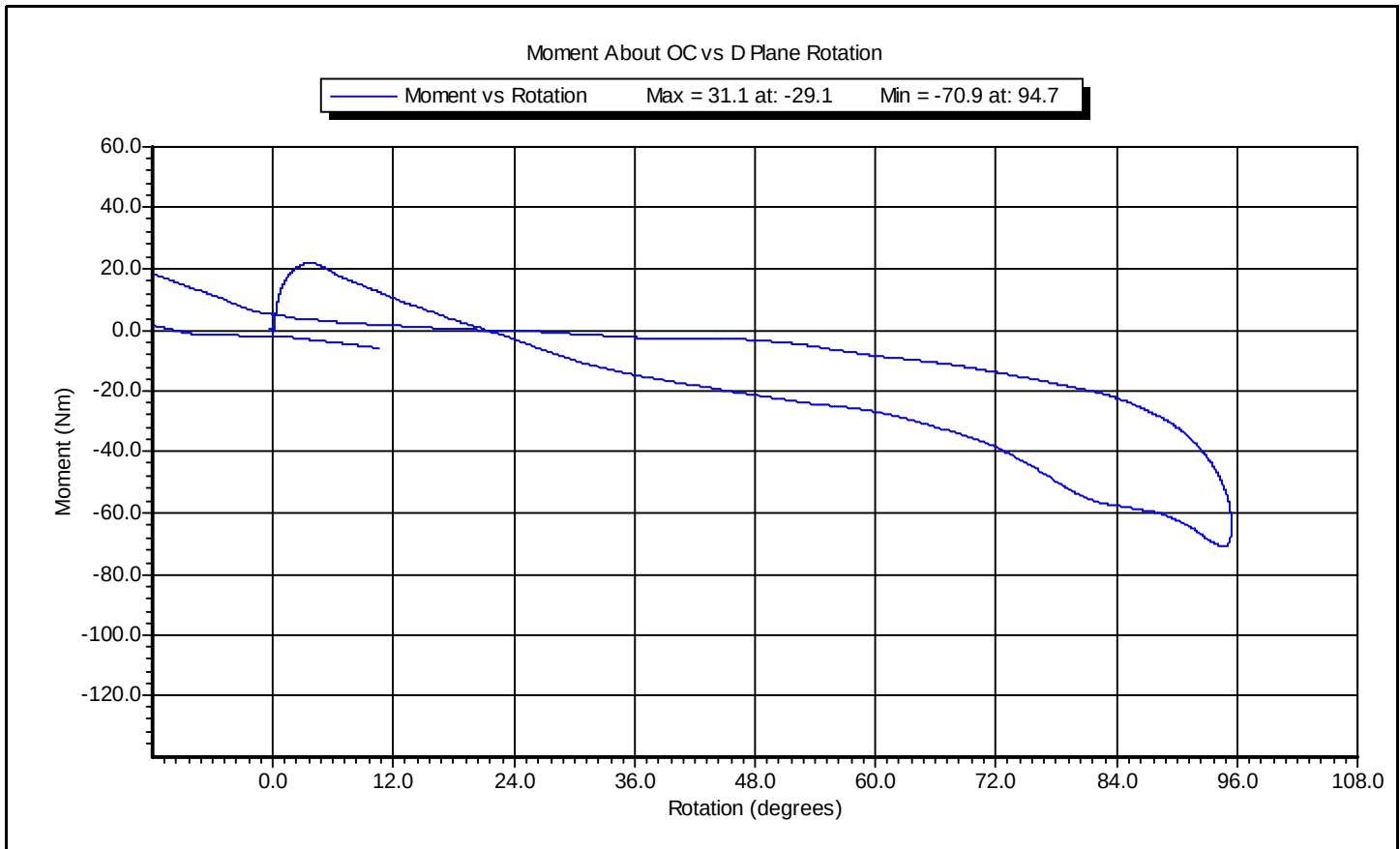


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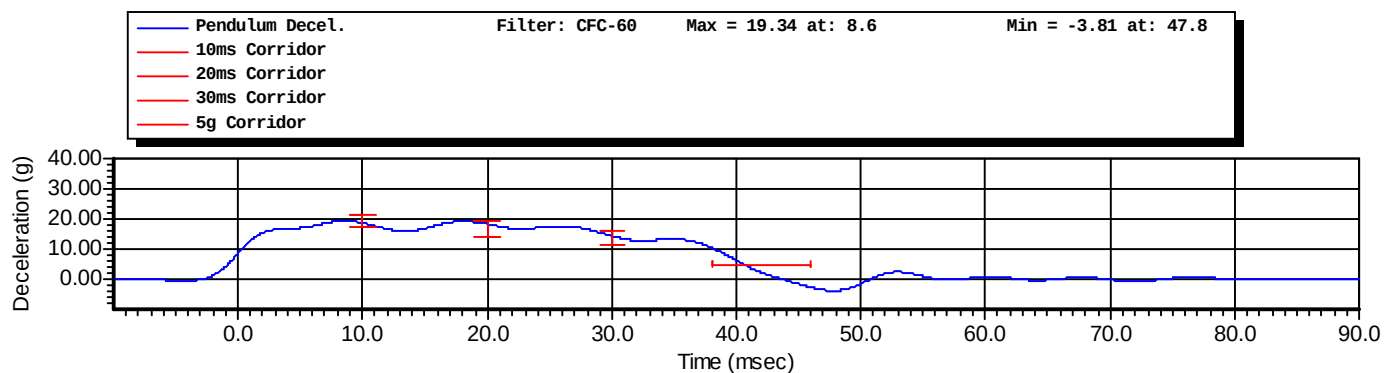
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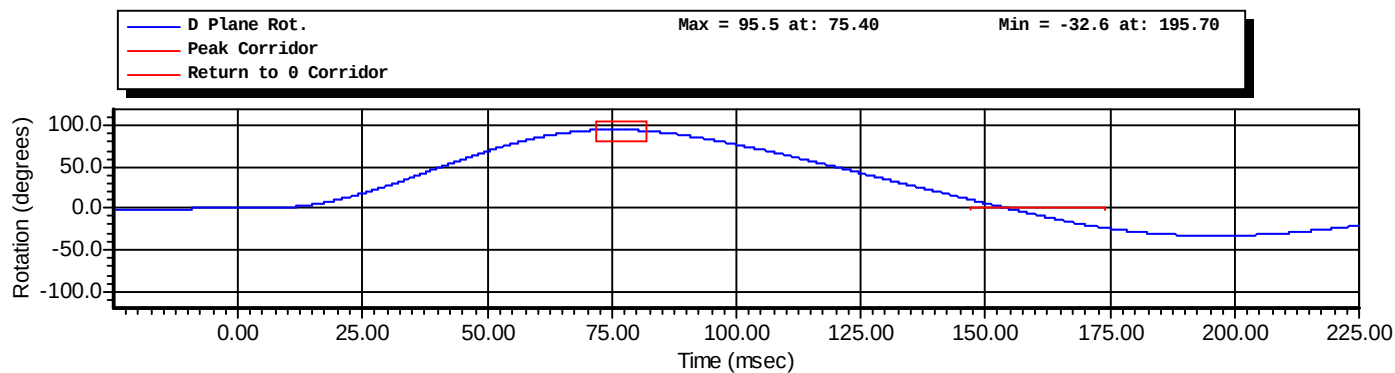
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	9/30/2010
Number of Test:	1	Time of Test:	2:16:56 PM



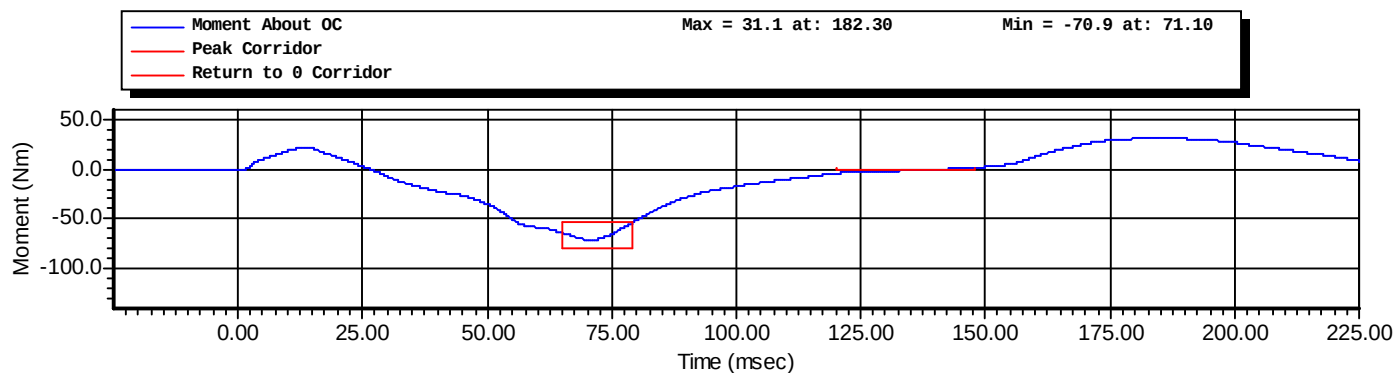
Pendulum Deceleration



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:	9/30/2010
Test Number:	1	Test Time:	1:07:58 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	55 %RH	P
Velocity		6.89	-- 7.13	7.09 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.9 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.6 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	39.4 ms	P
D Plane Rotation		-78.0	-- -64.0	-70.4 degrees	P
Time at max rotation		57.0	-- 64.0	58.2 ms	P
Rotation Decay to Zero		113.0	-- 128.0	117.0 ms	P
Moment about OC		88.1	-- 108.4	104.5 Nm	P
Time at Max Moment		47.0	-- 58.0	52.9 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.2 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:07:58 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

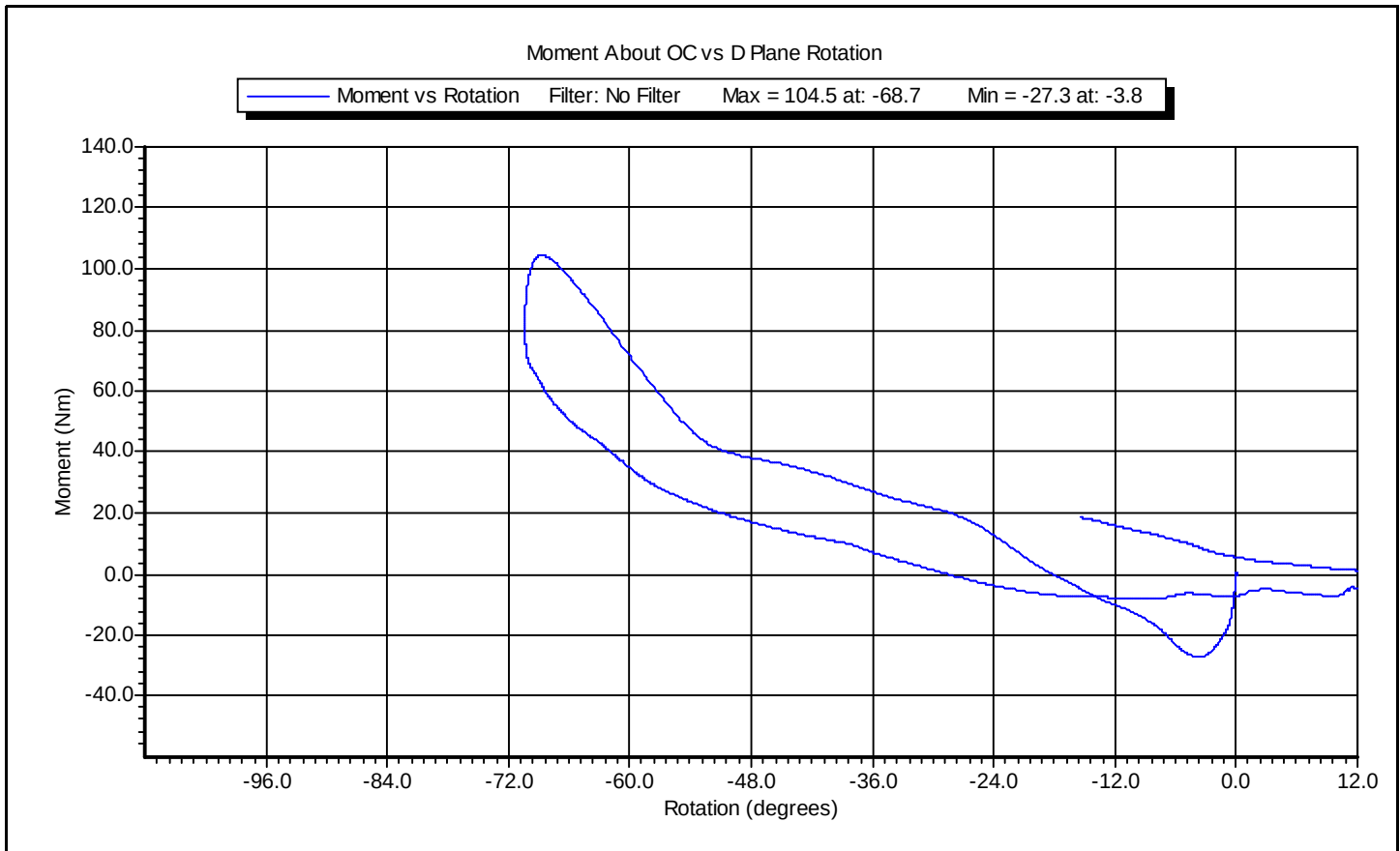
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

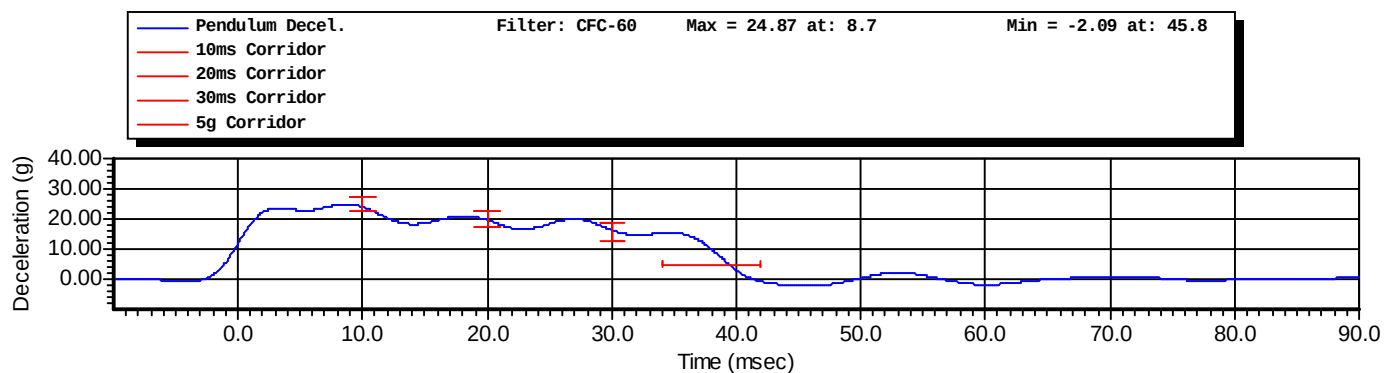
Test Time: **1:07:58 PM**

Test Date: **9/30/2010**

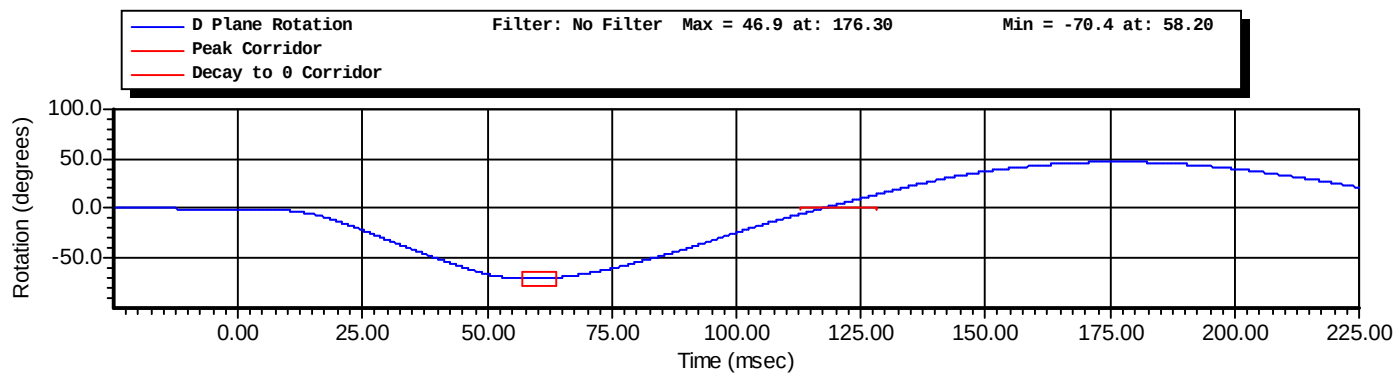
Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	9/30/2010
Number of Test:	1	Time of Test:	1:07:58 PM



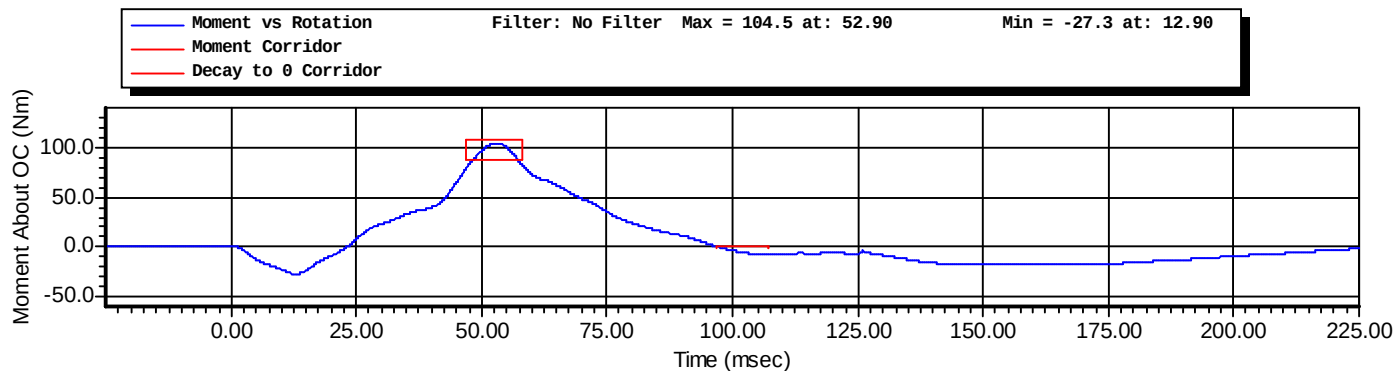
Pendulum Deceleration



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:	9/30/2010
Test Number:	1	Test Time:	9:38:05 AM

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	54.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.726 kN P
Sternum Displacement	-72.6 -- -63.5	-67.3 mm P
Hysteresis	69 -- 85	74 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **9:38:05 AM**

Test Date: **9/30/2010**



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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: **9:38:05 AM**

Test Date: **9/30/2010**

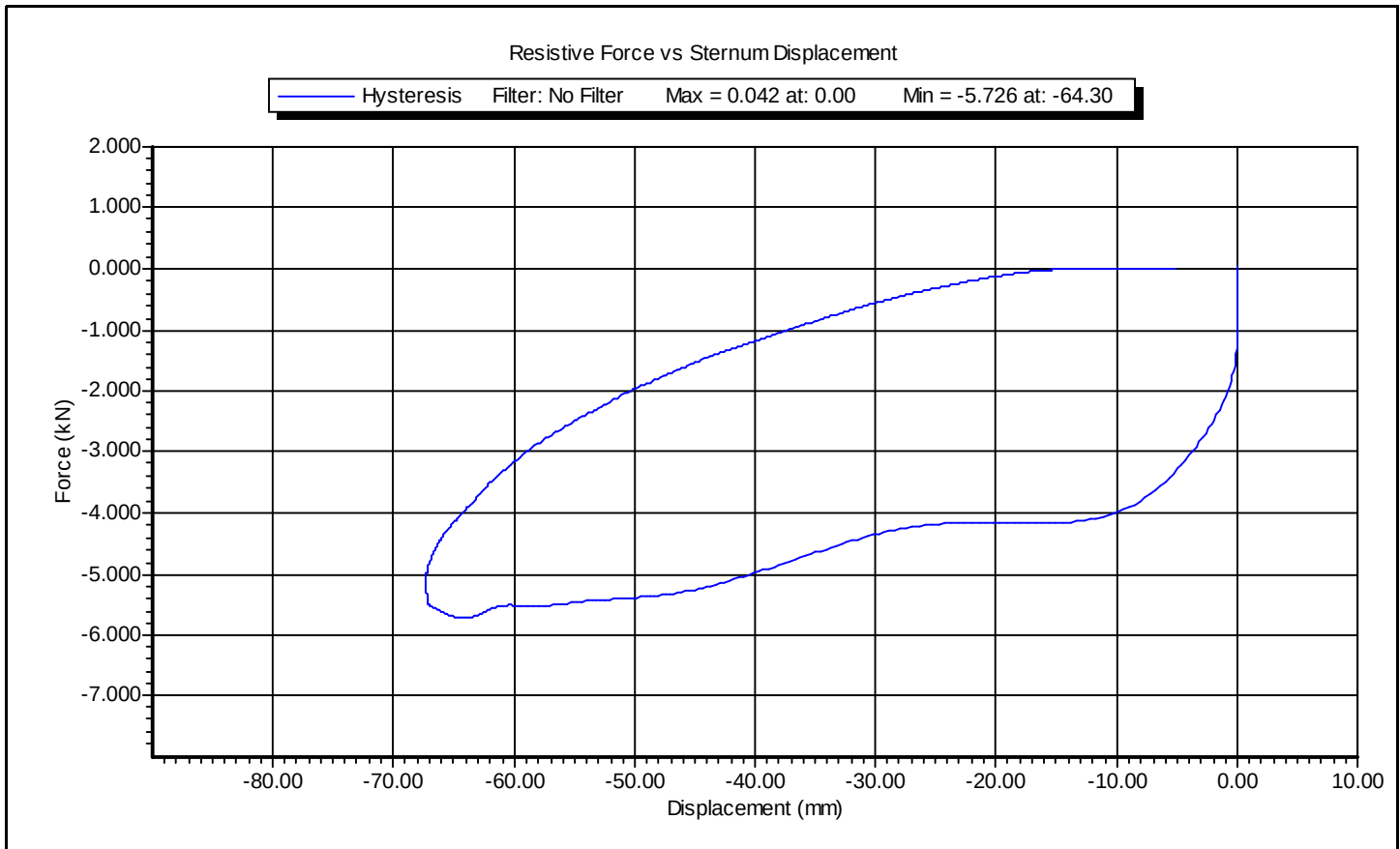


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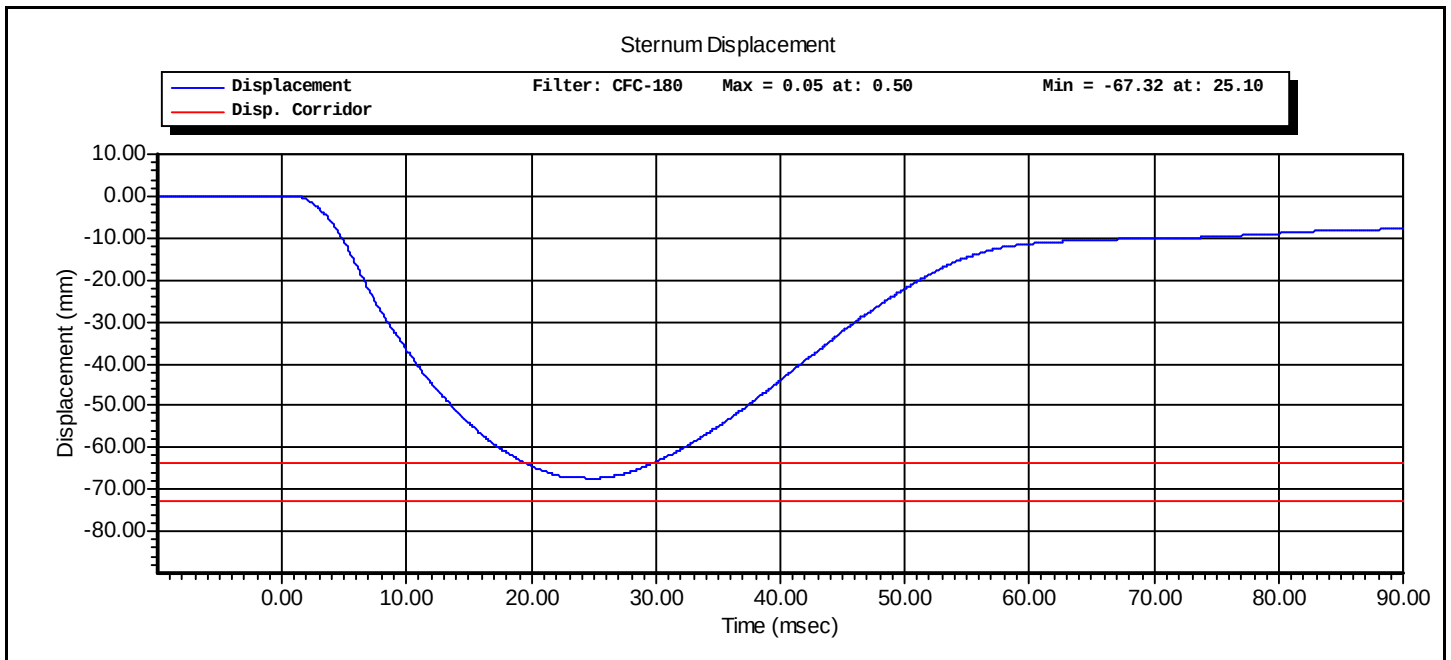
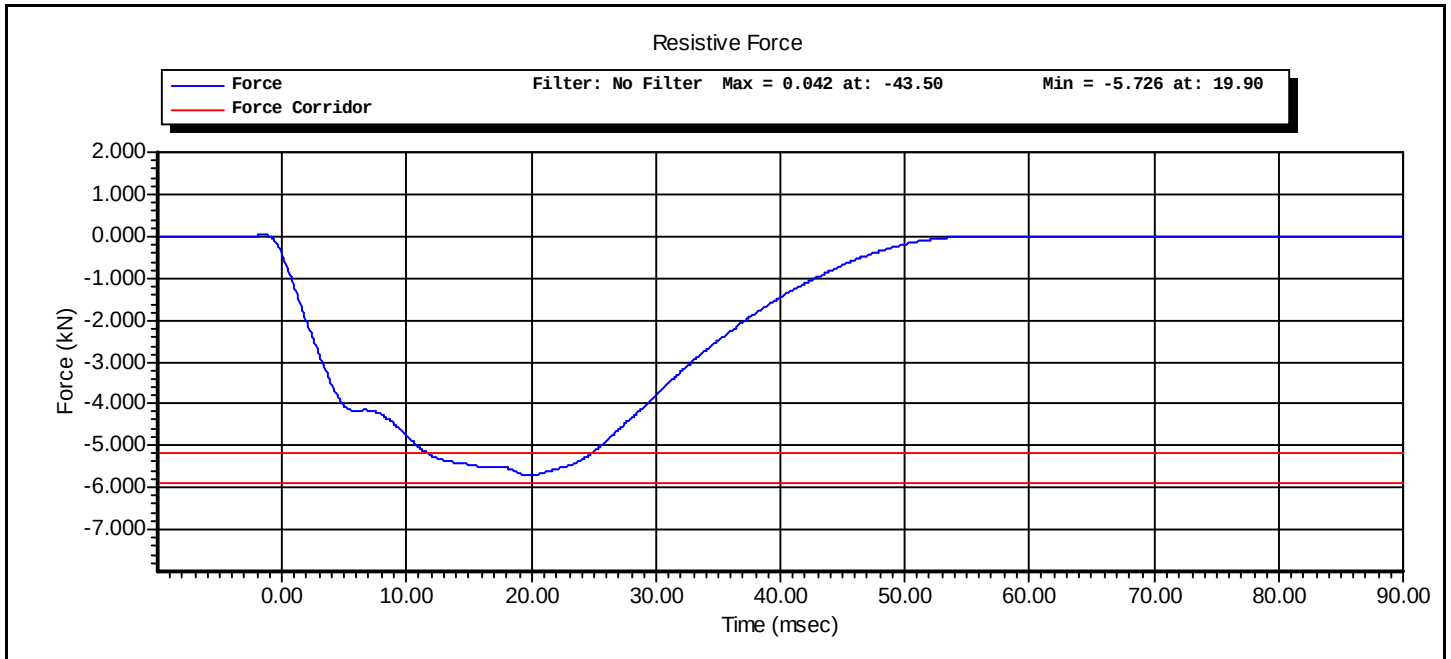
Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/30/2010
Test Number:	1	Test Time:	9:38:05 AM



Test ID: **Thorax**

Test Time: **9:38:05 AM**

Test Date: **9/30/2010**



CALSPAN

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

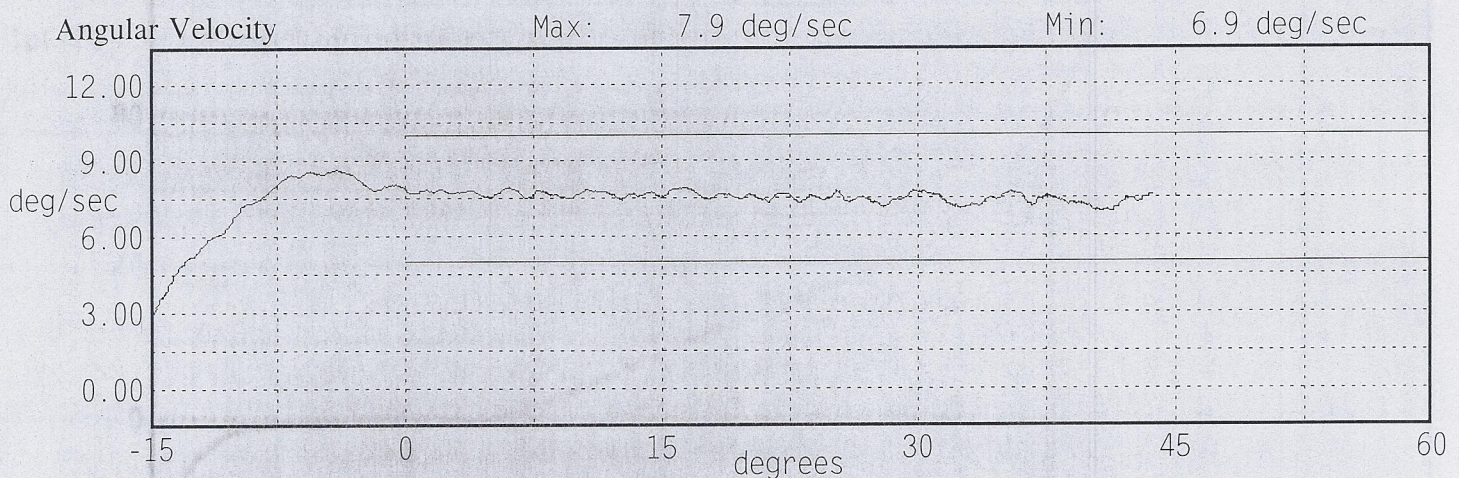
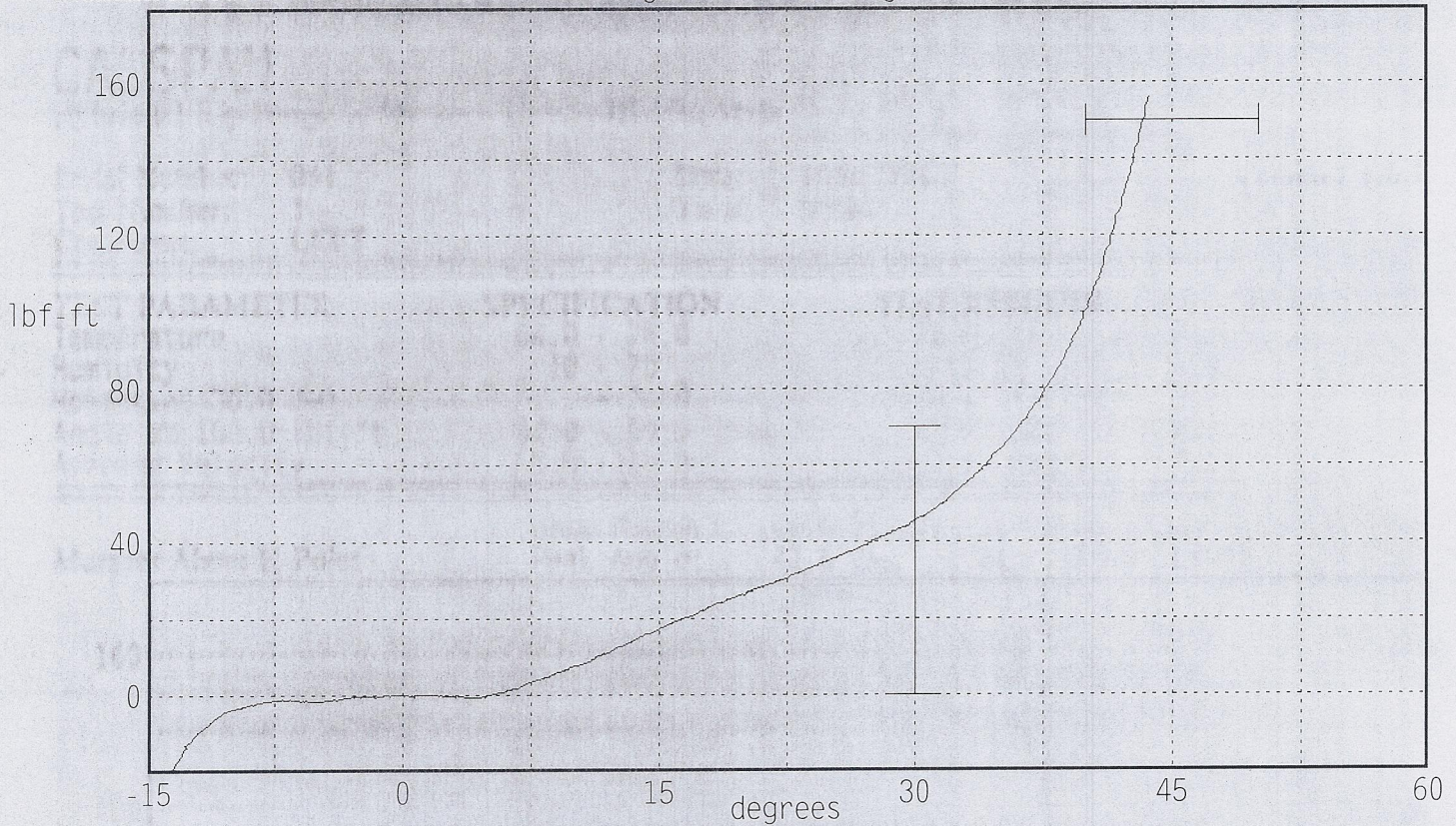
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 10/01/2010
Time: 09:40

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	54 % Pass
Moment at 30.0 deg	<= 70.0	45.6 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

Moment About H-Point
Peak Moment: 155.9 lbf-ft at 43.6 deg
Peak Angle: 43.6 deg at 155.9 lbf-ft



CALSPAN

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

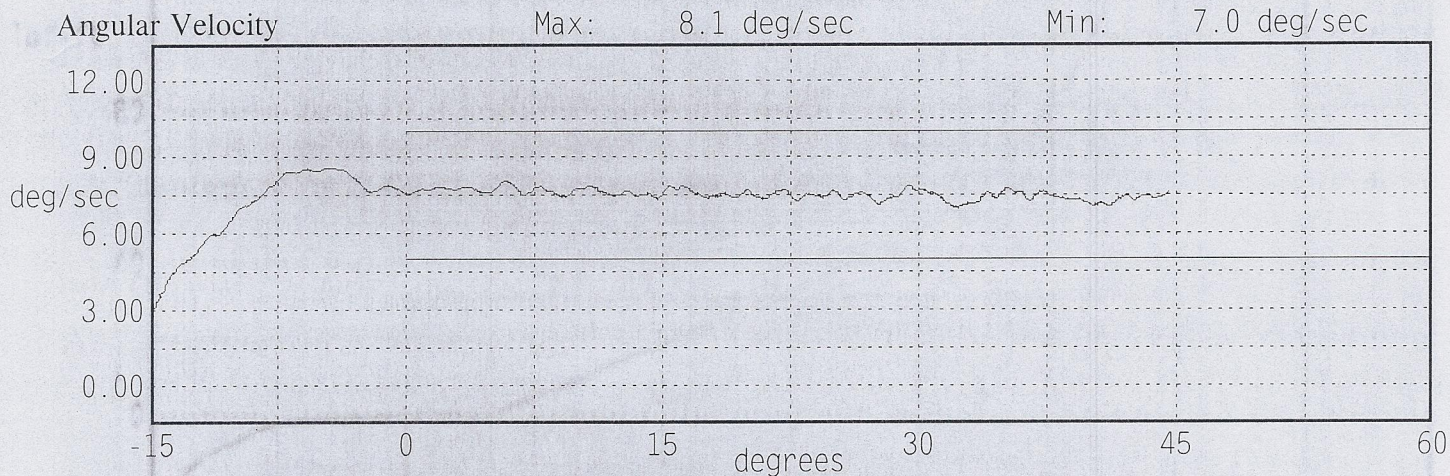
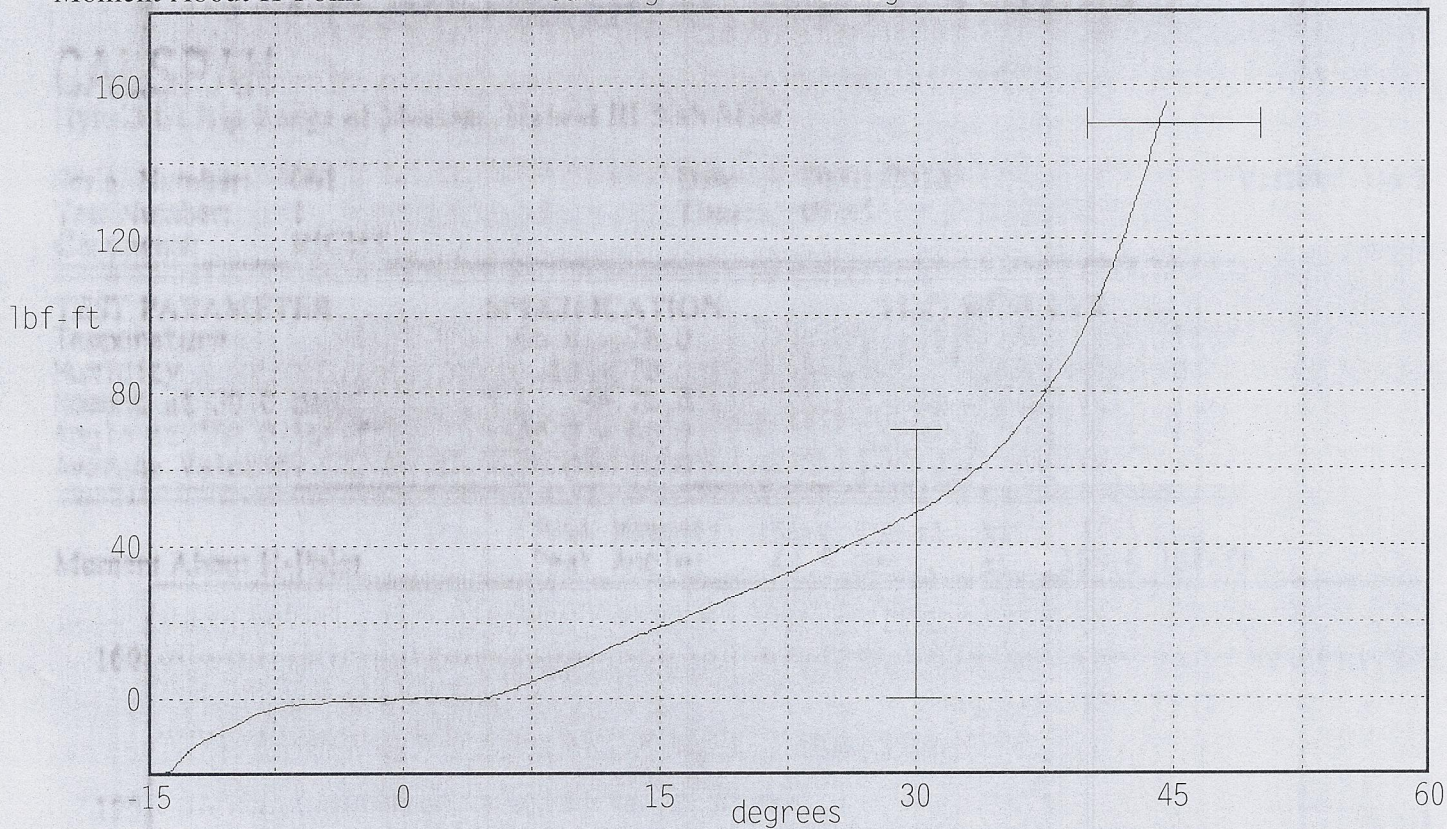
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 10/01/2010
Time: 09:45

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	54 % Pass
Moment at 30.0 deg	<= 70.0	48.6 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

Moment About H-Point
Peak Moment: 155.6 lbf-ft at 44.5 deg
Peak Angle: 44.5 deg at 155.6 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:	9/30/2010
Test Number:	1	Test Time:	5:55:21 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	55.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-4.93 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **5:55:21 PM**

Test Date: **9/30/2010**



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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: **5:55:21 PM**

Test Date: **9/30/2010**

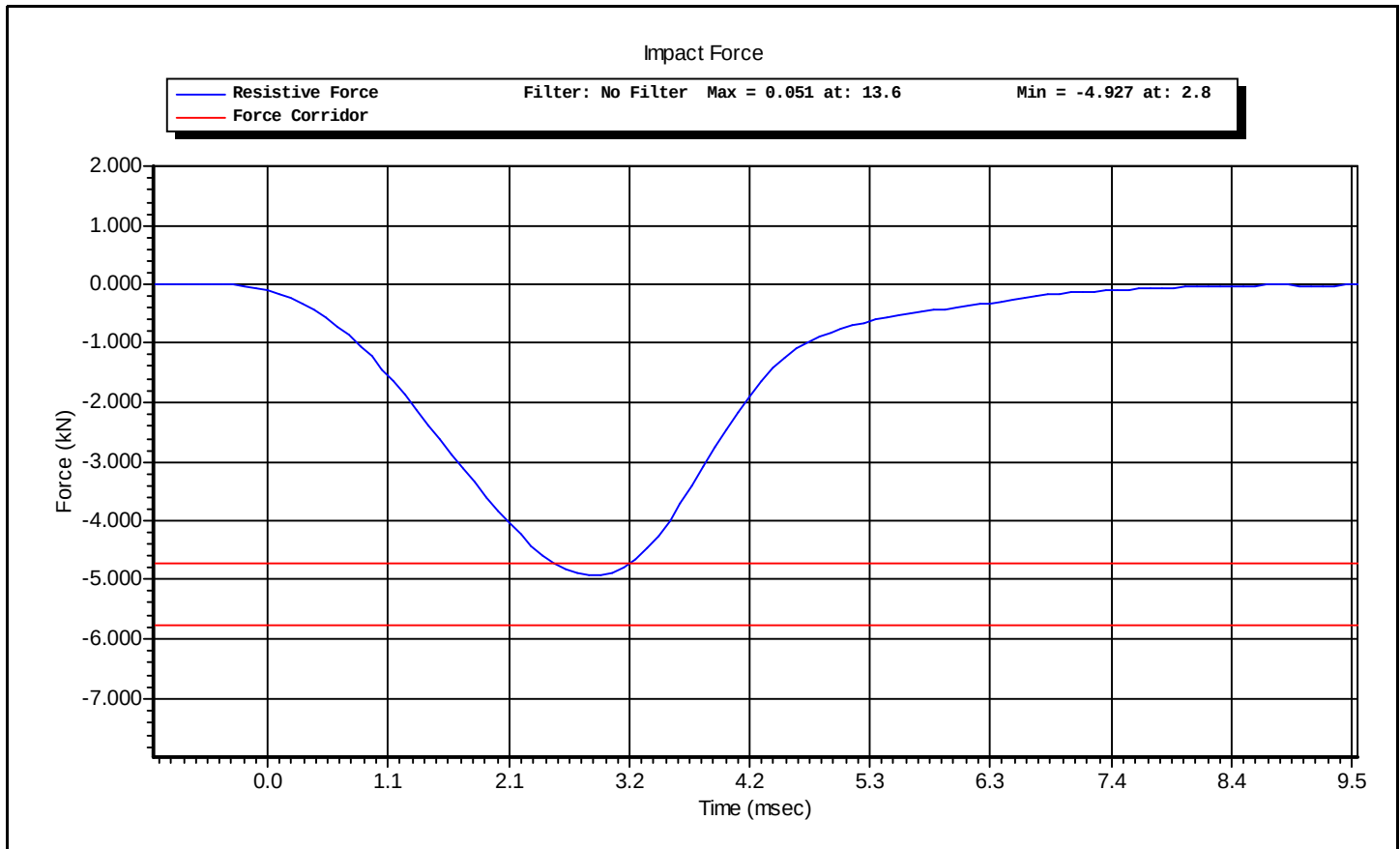


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/30/2010
Test Number:	1	Test Time:	5:55:21 PM



Test ID: Left Knee

Test Time: 5:55:21 PM

Test Date: 9/30/2010



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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:	10/1/2010
Test Number:	1	Test Time:	8:28:06 AM

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	21.1 deg C P
Humidity	10.0 -- 70.0	54.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.17 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **8:28:06 AM**

Test Date: **10/1/2010**



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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: **8:28:06 AM**

Test Date: **10/1/2010**

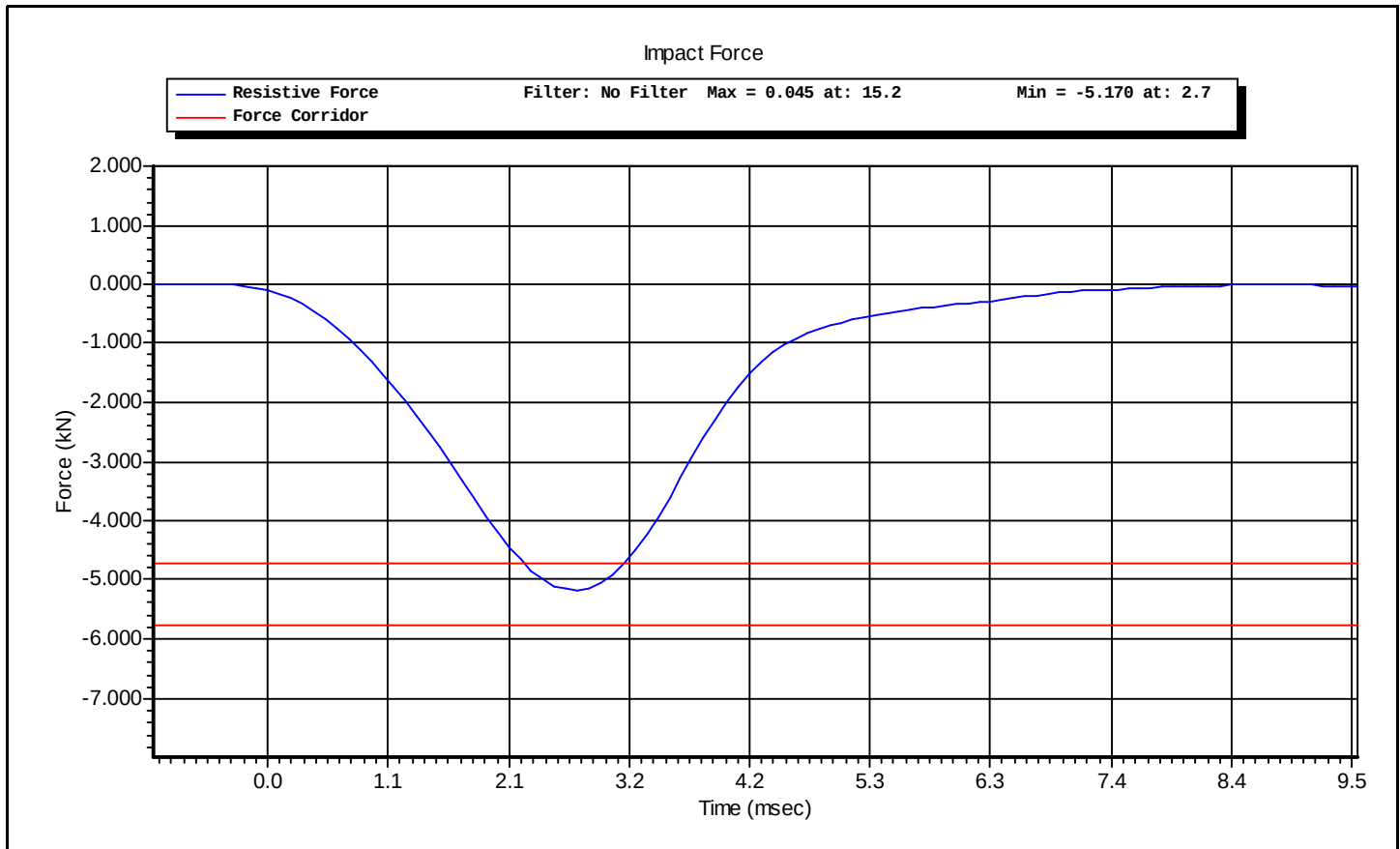


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	8:28:06 AM



Test ID: **Right Knee**

Test Time: **8:28:06 AM**

Test Date: **10/1/2010**

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

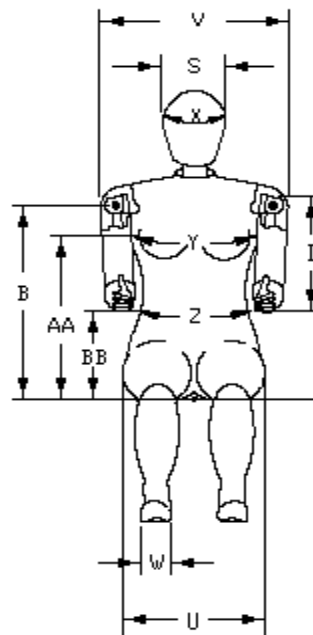
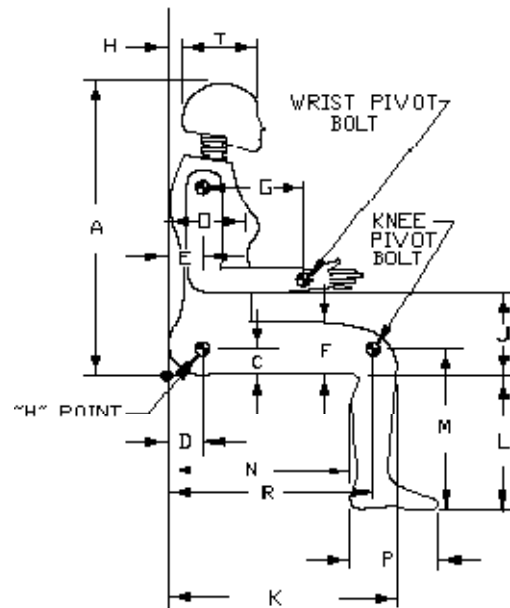
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	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: 10/1/2010

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:	9/30/2010
Test Number:	1	Test Time:	2:38:04 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Resultant Acceleration	250 -- 300	285 g P
Oscillation	0.0 -- 10.0	1.5 % P
Lateral Acceleration	-15.00 -- 15.00	-4.06 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **2:38:04 PM**

Test Date: **9/30/2010**



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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: **2:38:04 PM**

Test Date: **9/30/2010**

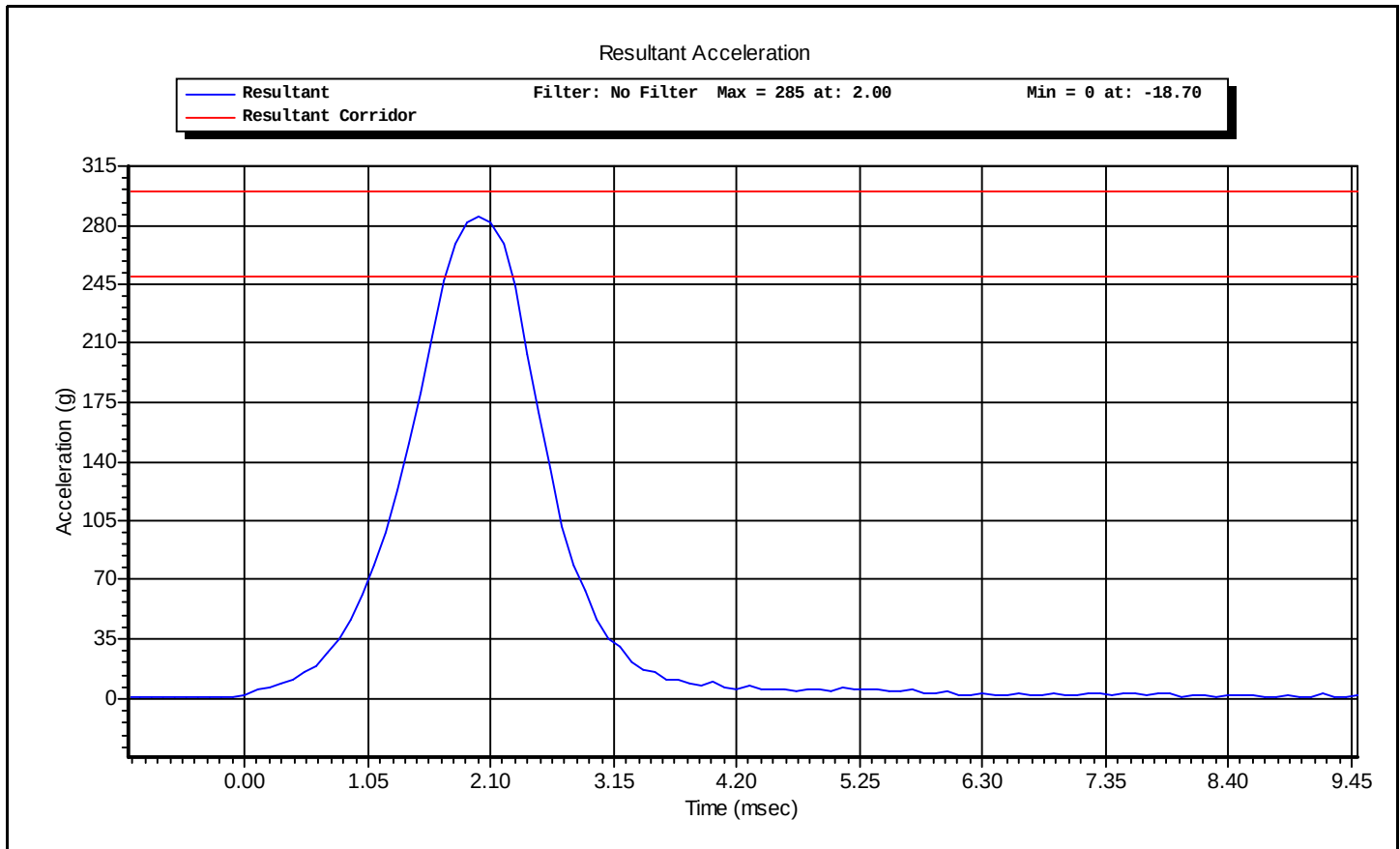


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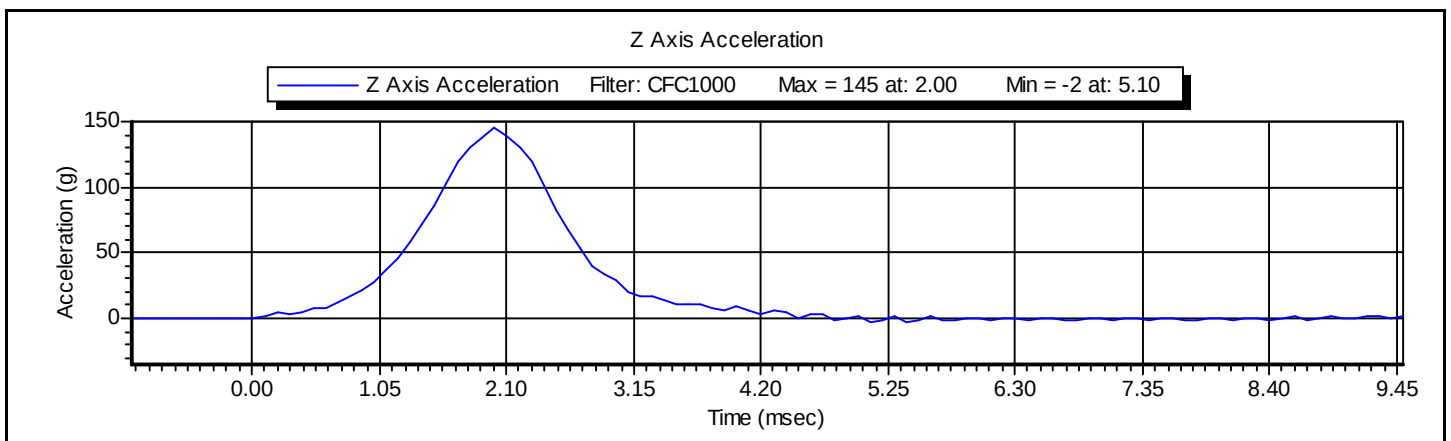
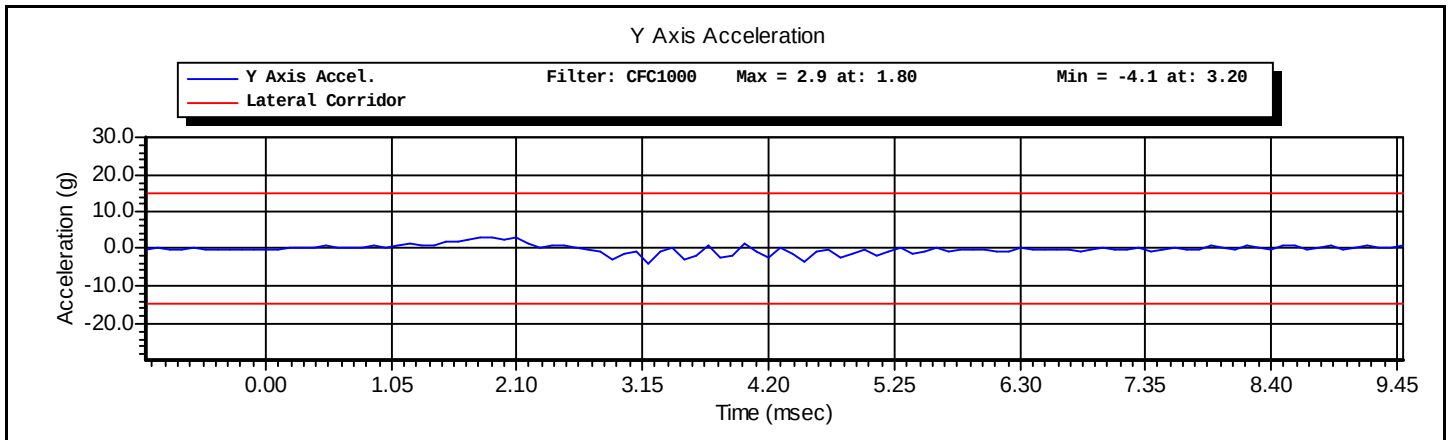
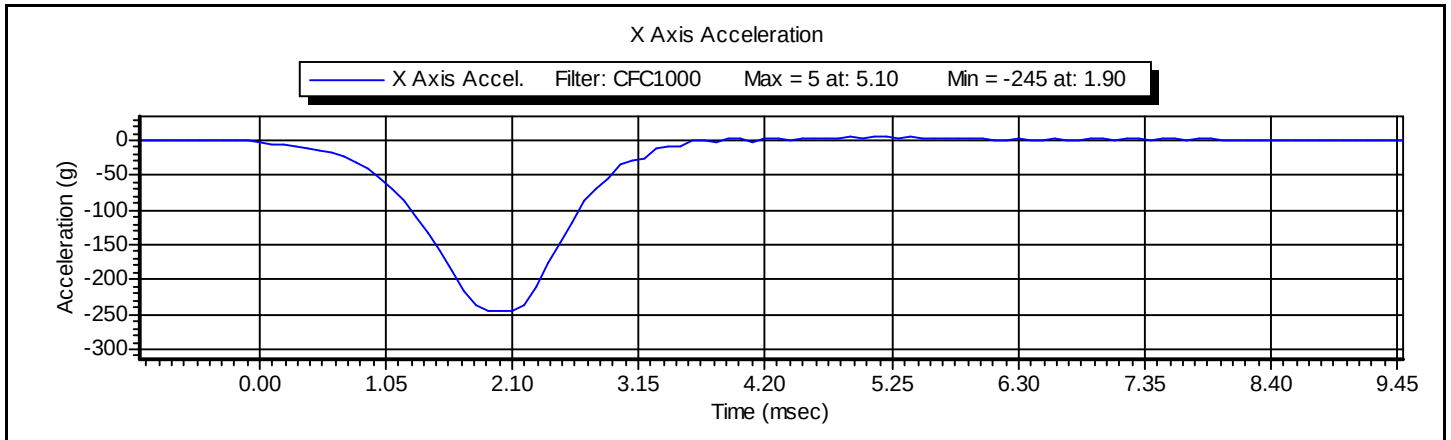
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	1	Test Time:	2:38:04 PM



Test ID: **Head Drop**

Test Time: **2:38:04 PM**

Test Date: **9/30/2010**





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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:	9/30/2010
Test Number:	2	Test Time:	4:59:14 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	55 %RH P
Velocity	5.95 -- 6.19	6.19 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	3.62 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.24 m/s P
D Plane Rotation	99.0 -- 114.0	110.6 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-59.0 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.2 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **4:59:14 PM**

Test Date: **9/30/2010**



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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: **4:59:14 PM**

Test Date: **9/30/2010**

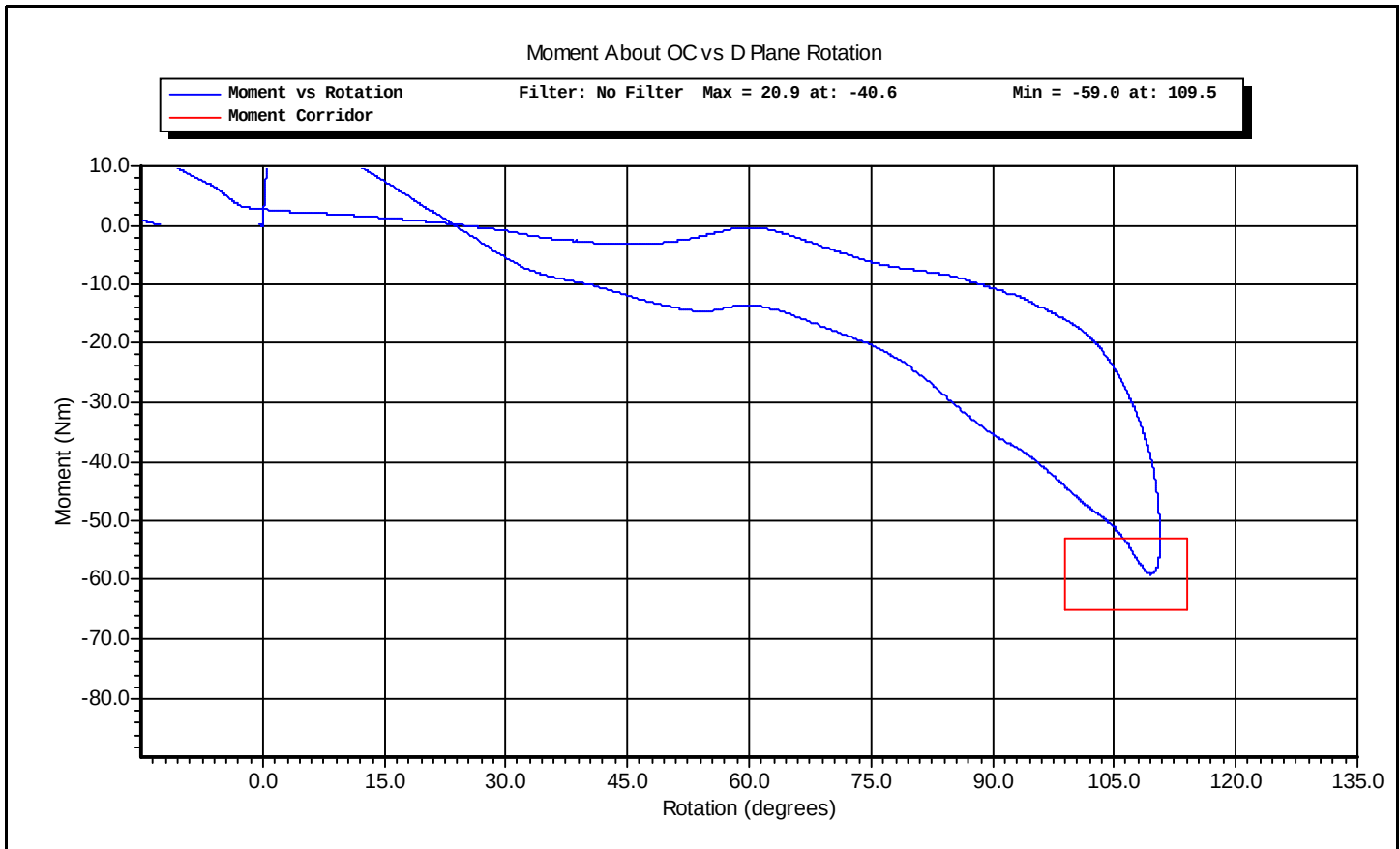


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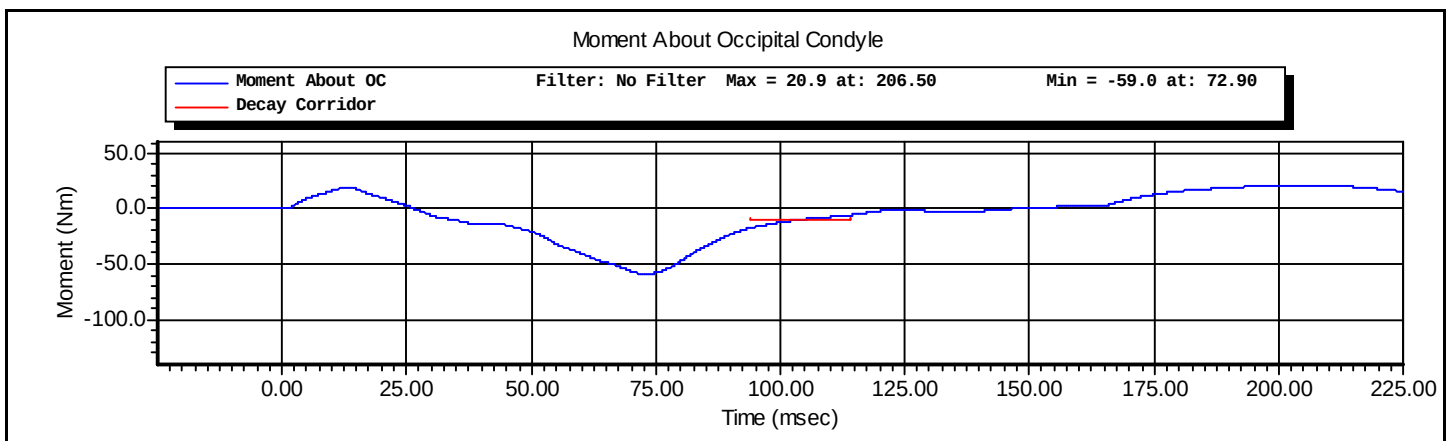
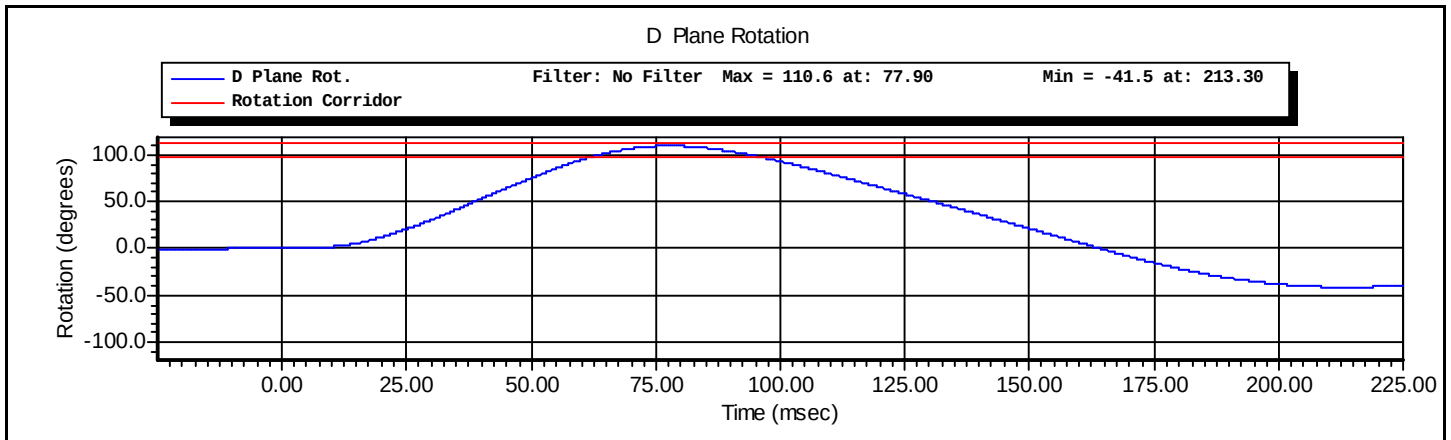
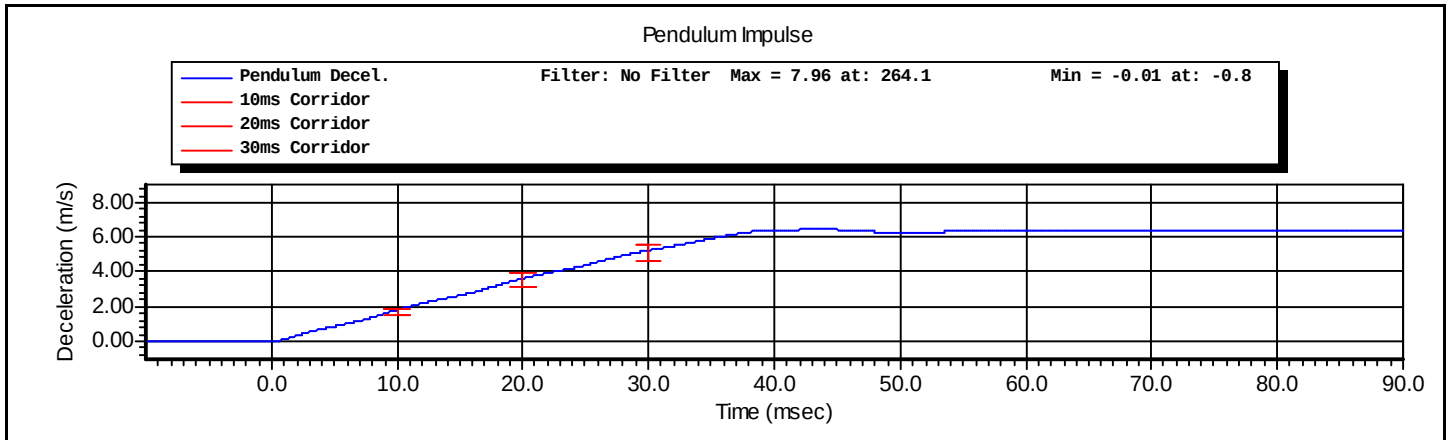
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Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/30/2010
Test Number:	2	Test Time:	4:59:14 PM



Test ID: Neck Extension Test Time: 4:59:14 PM

Test Date: 9/30/2010





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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:	9/30/2010
Test Number:	1	Test Time:	3:43:31 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	56 %RH P
Velocity	6.89 -- 7.13	7.05 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.15 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.30 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.25 m/s P
D Plane Rotation	-91.0 -- -77.0	-82.0 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.6 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	89.8 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **3:43:31 PM**

Test Date: **9/30/2010**



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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: **3:43:31 PM**

Test Date: **9/30/2010**

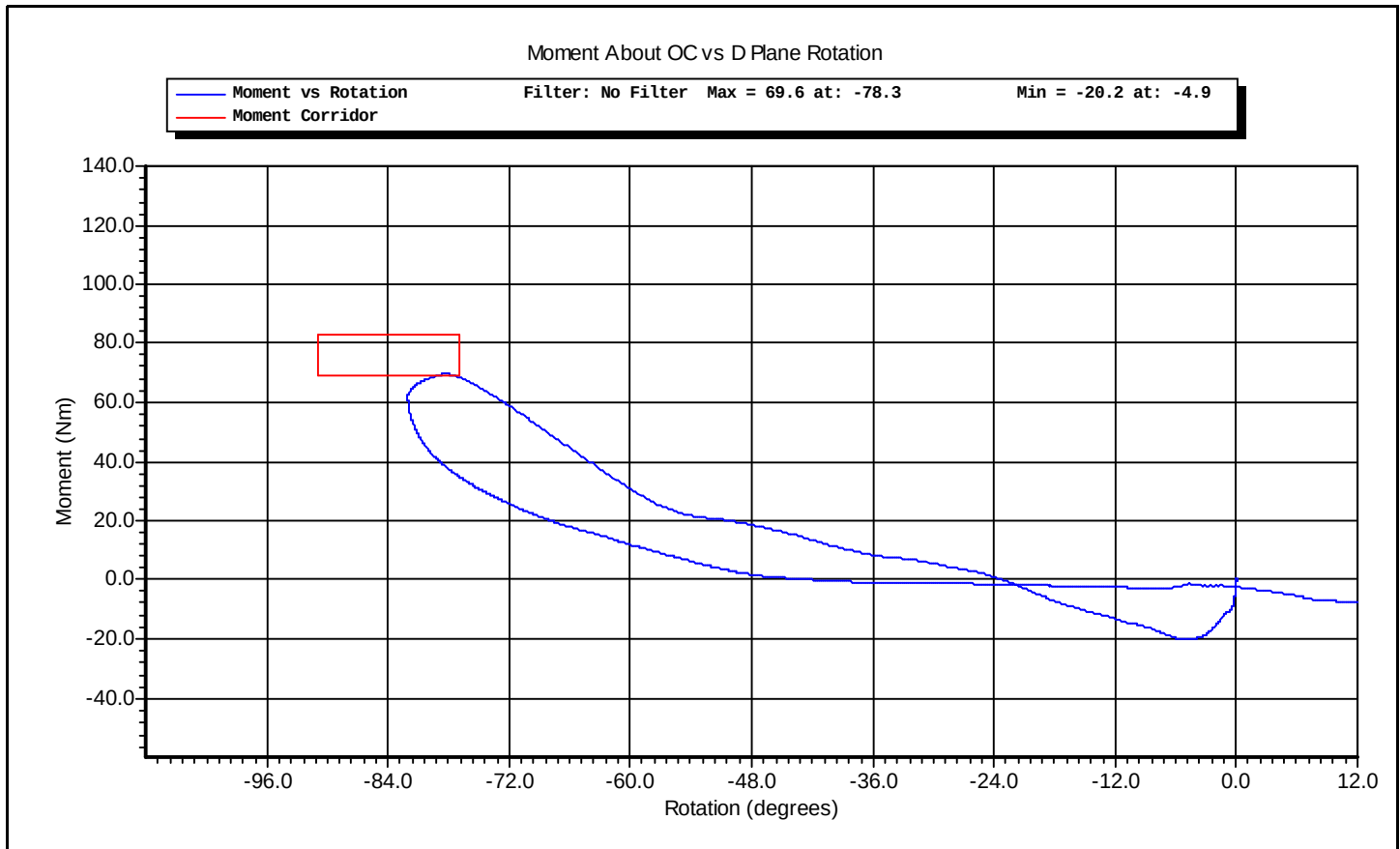


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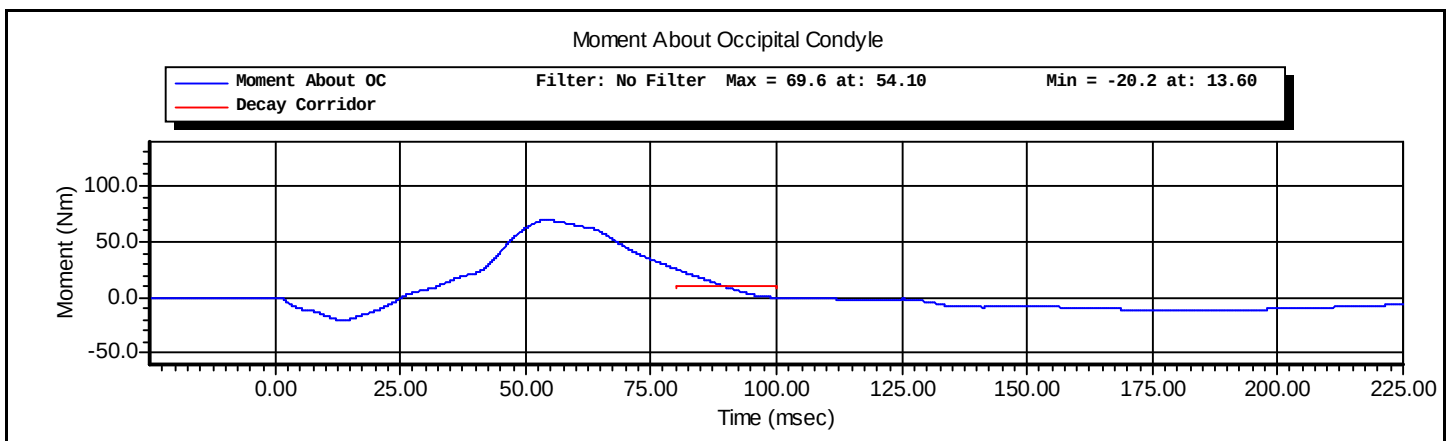
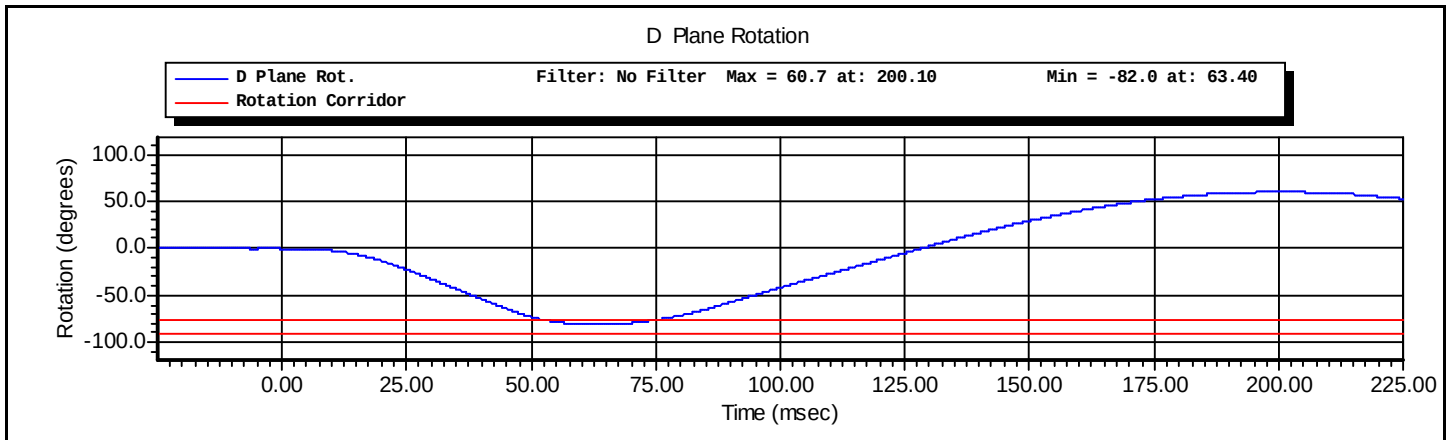
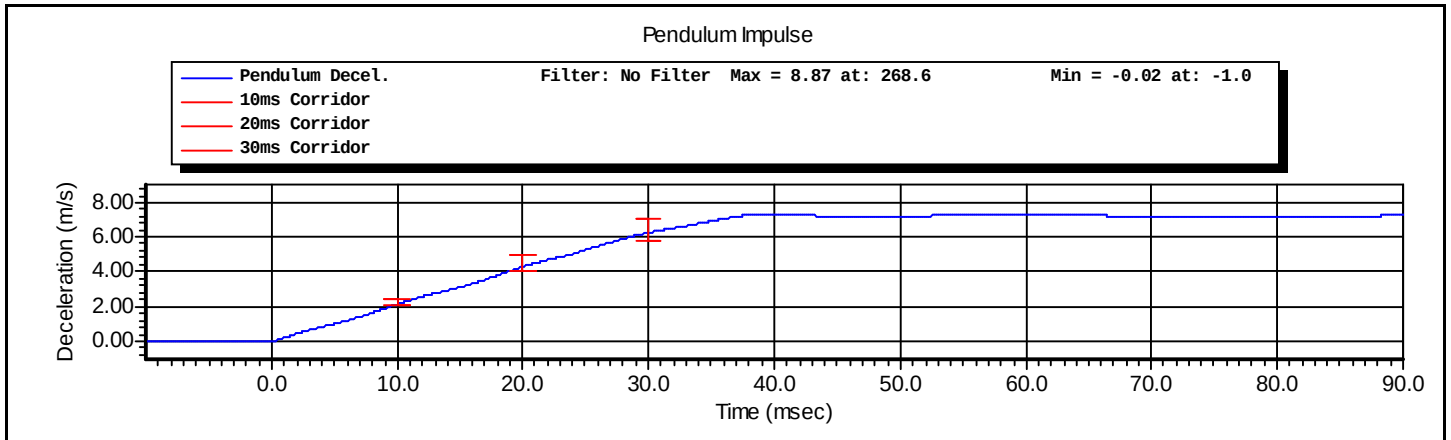
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/30/2010
Test Number:	1	Test Time:	3:43:31 PM



Test ID: Neck Flexion

Test Time: 3:43:31 PM

Test Date: 9/30/2010





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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 Impact	Test Date:	9/30/2010
Test Number:	2	Test Time:	11:10:13 AM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG0304

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	6.59 -- 6.83	6.69 m/s P
Sternum Displacement	-58.0 -- -50.0	-51.7 mm P
Force During Displacement Interval	-4400 -- -3900	-4142 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4167 N P
Hysteresis	69 -- 85	71 % P

All test parameters are within specifications

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

Test ID: **Thorax Impact**

Test Time: **11:10:13 AM**

Test Date: **9/30/2010**



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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 Impact**

Test Time: **11:10:13 AM**

Test Date: **9/30/2010**



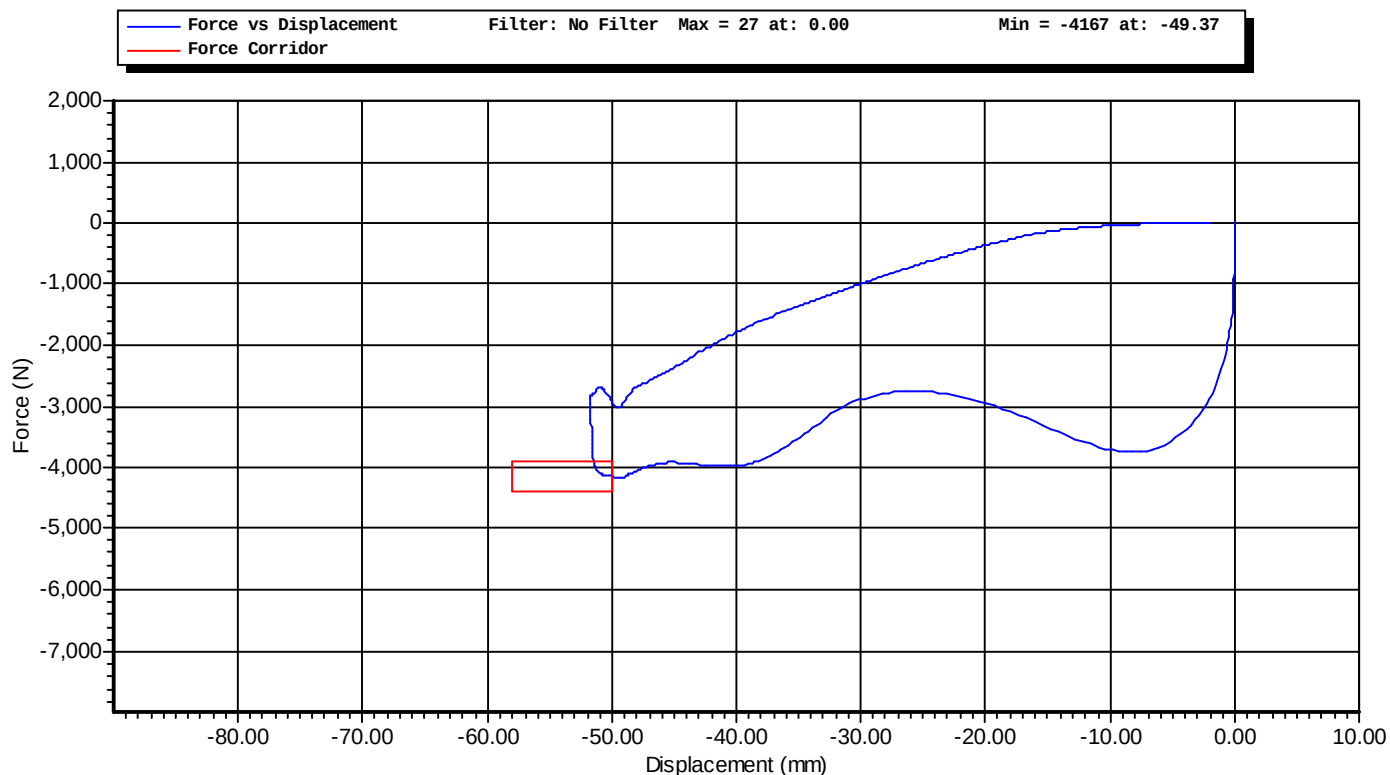
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	9/30/2010
Test Number:	2	Test Time:	11:10:13 AM

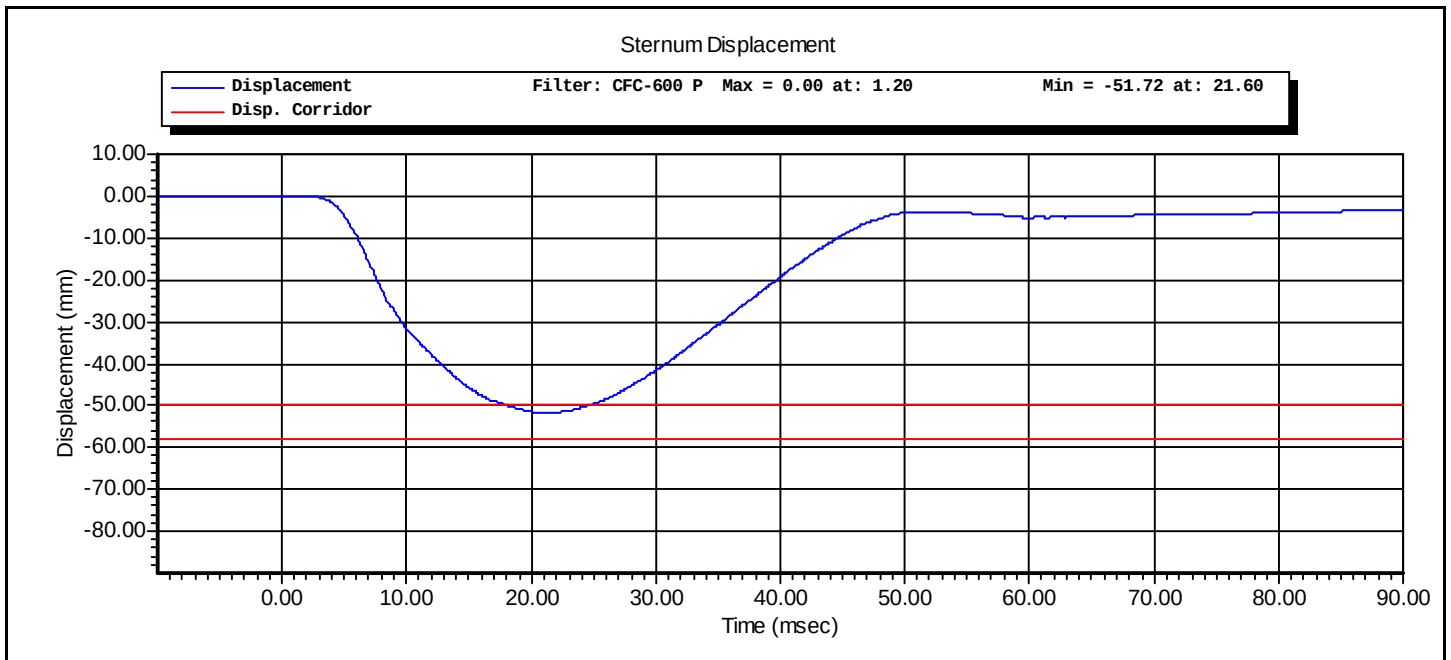
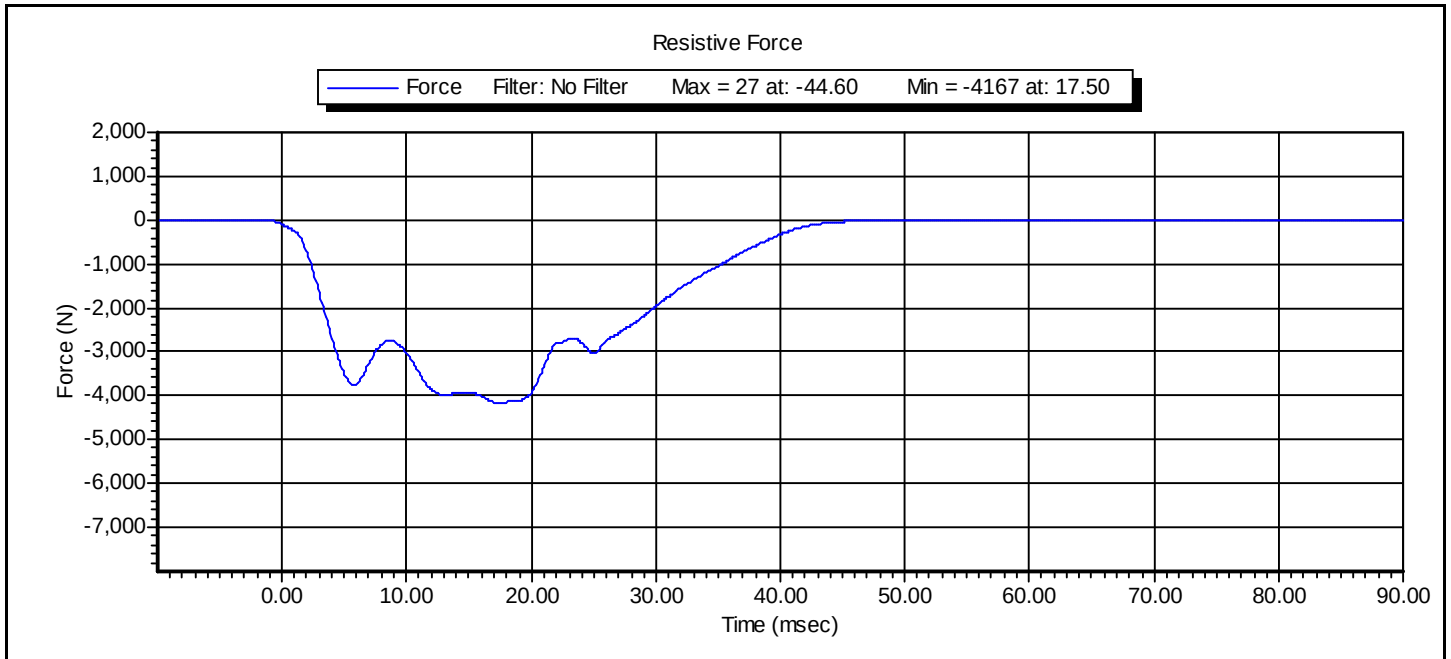
Resistive Force vs Sternum Displacement



Test ID: **Thorax Impact**

Test Time: **11:10:13 AM**

Test Date: **9/30/2010**



Torso Flexion Test

Technician: AR

Calibration Date: 10/1/2010

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%	41%	P
Max Force @ 45 deg	320 – 390N	353N	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	22°	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:	10/1/2010
Test Number:	1	Test Time:	1:10:48 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	46.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3639 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **1:10:48 PM**

Test Date: **10/1/2010**



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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: **1:10:48 PM**

Test Date: **10/1/2010**

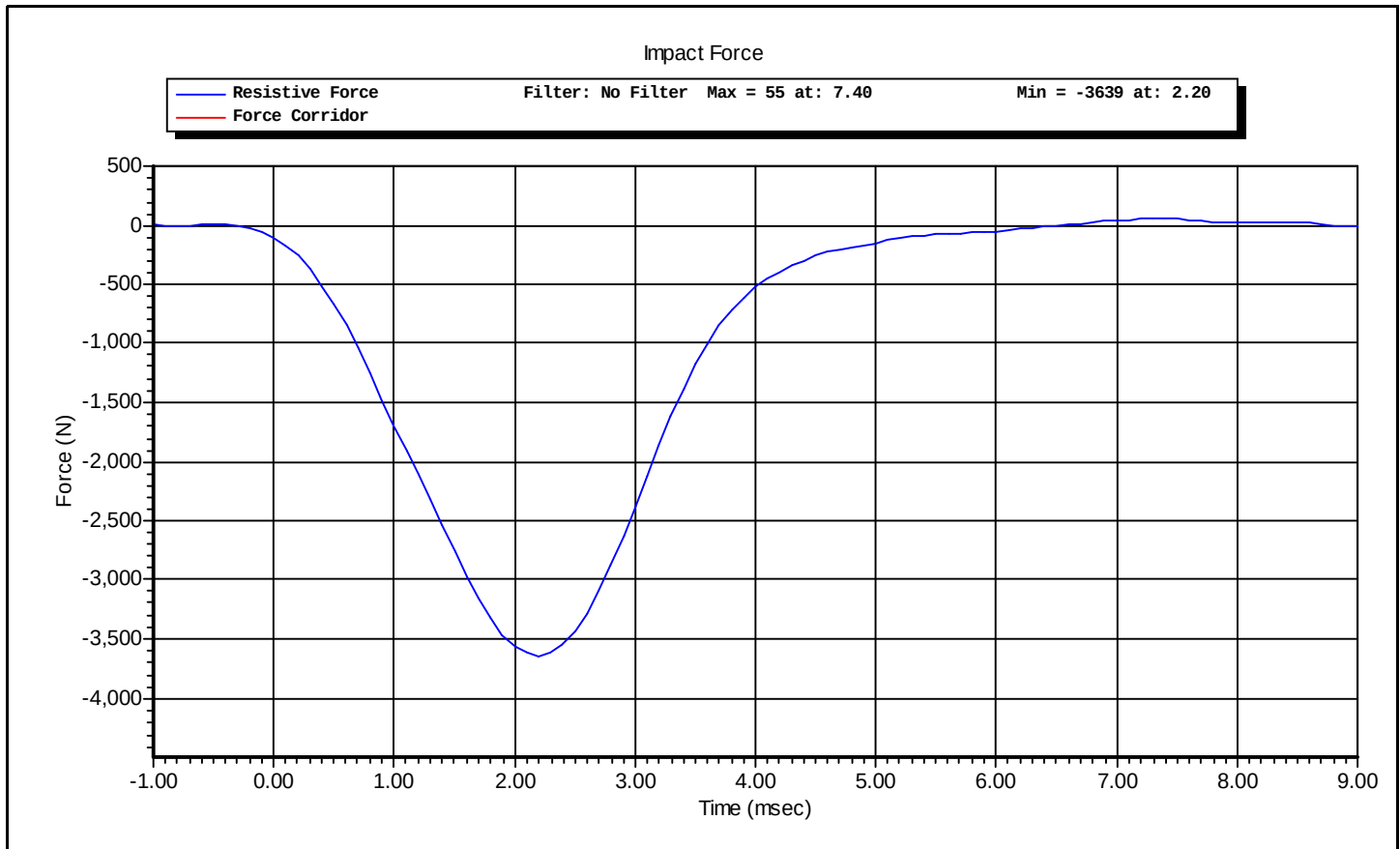


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:10:48 PM



Test ID: **Left Knee**

Test Time: **1:10:48 PM**

Test Date: **10/1/2010**



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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:	10/1/2010
Test Number:	1	Test Time:	1:54:25 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	45.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3638 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **1:54:25 PM**

Test Date: **10/1/2010**



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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: **1:54:25 PM**

Test Date: **10/1/2010**

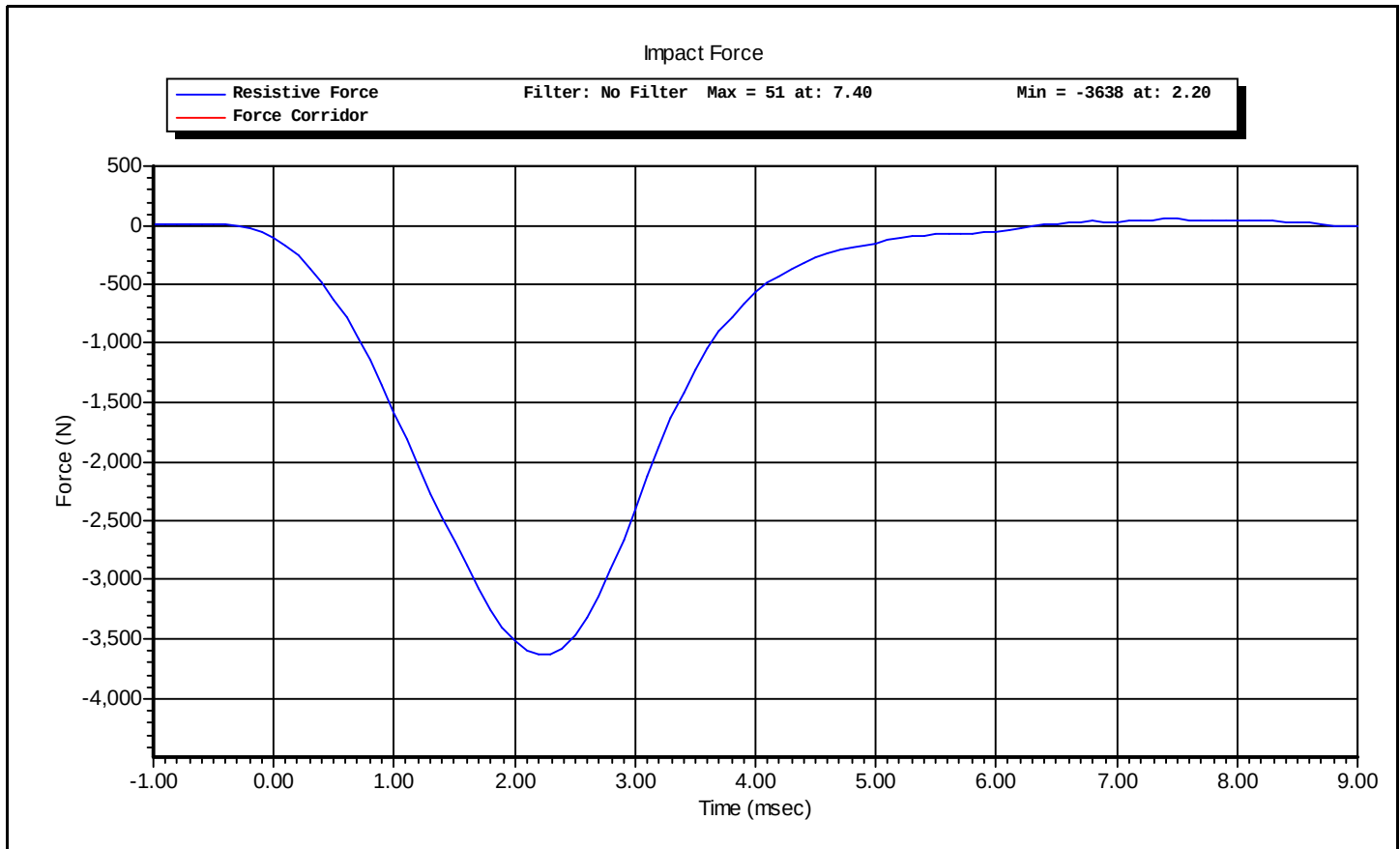


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:54:25 PM



Test ID: **Right Knee**

Test Time: **1:54:25 PM**

Test Date: **10/1/2010**