REPORT NUMBER: NCAP-CAL-12-016

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

CHRYSLER GROUP LLC
2012 Jeep Liberty Sport 4X4
4 Door SUV

NHTSA No: MC0334

CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225

2/15/2012

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

Date: _____

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

Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. *Report No.* NCAP-CAL-12-016	**2. *Government Accession No.***	**3. *Recipient's Catalog No.***
4. *Title and Subtitle* Final Report of New Car Assessment Program Testing of a 2012 Jeep Liberty Sport 4X4 4 Door SUV NHTSA No. MC0334		**5. *Report Date*** 2/15/2012 **6. *Performing Organization Code*** CAL
7. *Author(s)* David J. Travale, Technical Director Vanessa Walsh, Project Engineer		**8. *Performing Organization Report No.*** TR2555
9. *Performing Organization Name and Address* Calspan Corporation 4455 Genesee Street Buffalo, New York 14225		**10. *Work Unit No.*** **11. *Contract or Grant No.*** DTNH22-06-D-00024
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave SE, Room W43-410 Washington, DC 20590		**13. *Type of Report and Period Covered*** Final Report, 2/15/2012 **14. *Sponsoring Agency Code*** NVS-111

15. *Supplementary Notes*

16. *Abstract*

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2012 Jeep Liberty Sport 4X4 4 Door SUV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Calspan Corporation's crash test facility in Buffalo, New York on 12/7/2011.

The impact velocity of the vehicle was 56.62 km/h, and the ambient temperature at the barrier face at the time of impact was 2°C. The target vehicle post-test maximum crush was 371 mm of Vehicle. The test vehicle's performance is as follows:

Measurement Description	Units	Driver ATD		Pass. ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})	N/A	700	322.24	700	321.23
Maximum Chest Compression	mm	63	-32.79	52	-31.34
Nij	N/A	1	0.33	1	0.53
Neck Tension	N	4,170	1,608.53	2,620	1,266.69
Neck Compression	N	4,000	-150.18	2,520	-324.34
Left Femur Force	N	10,008	-5,245.95	6,805	-1,736.51
Right Femur Force	N	10,008	-4235.23	6,805	-3512.57

17. *Key Words* 35 mph Frontal Barrier Impact test New Car Assessment Program (NCAP)	**18. *Distribution Statement*** Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division 1200 New Jersey Ave, SE Washington, DC 20590

19. *Security Classif. (of this report)* UNCLASSIFIED	**20. *Security Classif. (of this page)*** UNCLASSIFIED	**21. *No. of Pages*** 176	**22. *Price***

Form DOT F1700.7 (8-69)

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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 2012 Jeep Liberty Sport 4X4 4 door SUV at a velocity of 56.62 kph. The test was performed at Calspan on 12/7/2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

One Part 572E, 50th percentile male anthropomorphic test 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 tri-axial 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. 64) 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 of this report.

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 371 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

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

The passenger’s visible contact points were as follows: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the lower glovebox door.

The occupant data is summarized below.

ATD Position	HIC_{15}	Nij	Neck Tension (N)	Neck Compression (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50th)	322.24	0.33	1,608.53	-150.18	33.70	-32.79	-5,245.95	-4,235.23
Passenger (5th)	321.23	0.53	1,266.69	-324.34	37.14	-31.34	-1,736.51	-3,512.57

SECTION 2
DATA SHEETS

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DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

NHTSA No.	MC0334
Model Year	2012
Make	Jeep
Model	Liberty Sport 4X4
Body Style	4 Door SUV
VIN	1C4PJMAK3CW102834
Body Color	Light gray/silver
Odometer Reading (km/mi)	162.5/101
Engine Displacement. (L)	3.7
Type/No. Cylinders	V6
Engine Placement	Lateral
Transmission Type	Automatic
Transmission Speeds	4-Speed
Overdrive	Yes
Final Drive	All Wheel Drive
Roof Rack	No
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
All-Wheel Drive (AWD)	Yes
Traction Control System (TCS)	Yes

Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	--
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	No
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Driver Seat Belt Pretensioner	Yes
Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Pass. Load Limiter	Yes
Other Safety Restraint	-

Does owner's manual provide instructions to turn off automatic door locks?	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler Group LLC
Date of Manufacture	8/11

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

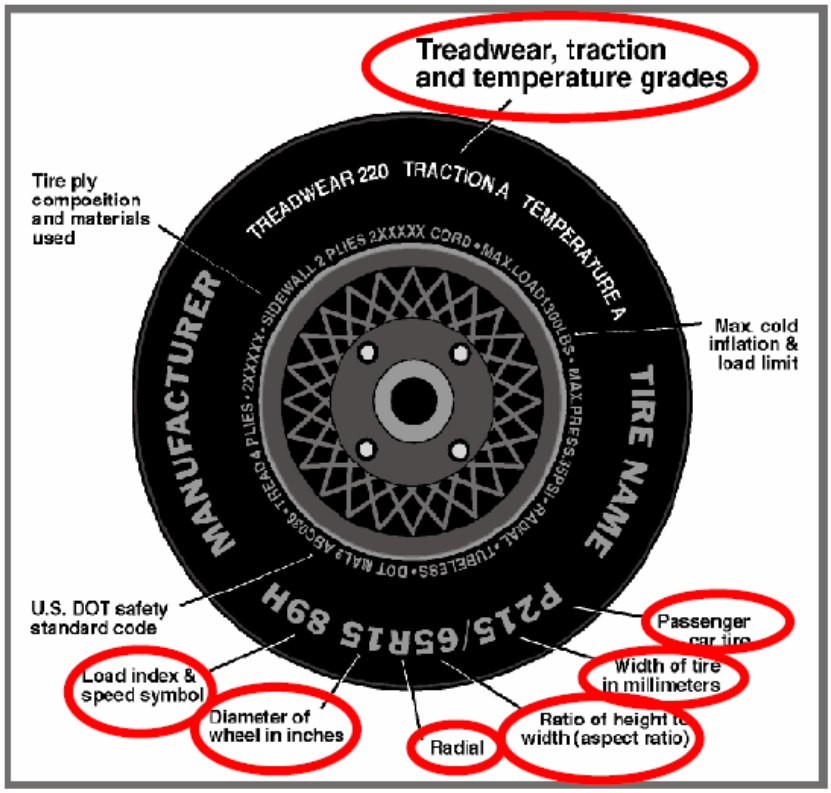
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	NA	
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				430.0
Cargo Wt. (RCLW) (kg)				89.8

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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

Collect items circled in red, tire manufacturer, and tire name.



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	228	228
Recommended Tire Size	P225/75R16	P225/75R16
Tire Size on Vehicle	P225/75R16	P225/75R16
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler ST	Wrangler ST
Treadwear	640	640
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	2 Polyester, 2 Steel	2 Polyester, 2 Steel
Load Index/Speed Symbol	101S	101S
Tire Material	Rubber	Rubber
DOT Safety Code Right	M671EYDR3011	M671EYDR3011
DOT Safety Code Left	M671EYDR3011	M671EYDR3011

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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	501.5	473.5		530	566	
Right	kg	482	434		493	524	
Ratio	%	52	48		48	52	
Totals	kg	983.5	907.5	1,891	1,023	1,090	2,113

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,891.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	89.8
Calculated Vehicle Target Weight (TVTW)	kg	2,121.4

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	826	830	854	860	1295
As Tested	mm	822	826	825	827	1392
Post Test	mm	785	794	850	826	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,698
Total Vehicle Length at Left Side	mm	4,462
Total Vehicle Length at Centerline	mm	4,495
Total Vehicle Length at Right Side	mm	4,462
Weight of Ballast in Cargo Area	kg	72.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	68.5

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

No components were removed to meet test weight

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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4495
2	Total Width	1785
3	Bumper Top Height	662
4	Bumper Bottom Height	488
5	Longitudinal Member Top Height	618
6	Distance Between Longitudinal Members	853
7	Longitudinal Member Width	64
8	Engine Top Height	932
9	Engine Bottom Height	297
10	Engine and Gearbox Width	625
11	Front Bumper-Engine Distance	637
12	Front Shock Absorber Fixing Height	752
13	Bonnet Leading Edge Height	996
14	Front Shock Absorber Fixing Width	876
15	Front Bumper – Front Axle Distance	746
16	Front Axle – A Pillar Distance	684
17	A-Pillar – B-Pillar Distance	1021
18	B-Pillar – Rear Axle Distance	992
19	B-Pillar – C-Pillar Distance	886
20	Roof Sill Bottom Height	1662
21	Roof Sill Top Height	1710
22	Floor Sill Bottom Height	438
23	Floor Sill Top Height	508

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

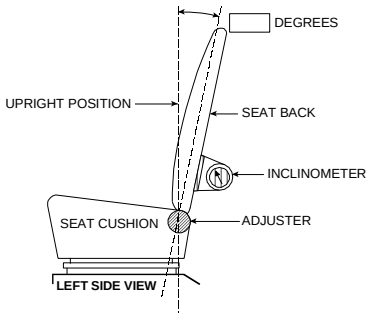
Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

Driver seat: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1

Passenger Seat: The passenger seat back as positioned to allow for a zero head angle of the passenger SID-IIs dummy. Please note that the passenger's seat back angle was measured off of the headrest post.



FRONT SEAT ASSEMBLY

	Deg.
Driver Seat Back Angle	24.5
Passenger Seat Back Angle	11.4

SEAT FORE/AFT POSITIONS

Describe the method used of determining seat fore/aft positions.

The driver's seat was positioned at the mid-point of fore/aft travel.

The passenger's seat was positioned at the most forward position of fore/aft travel.

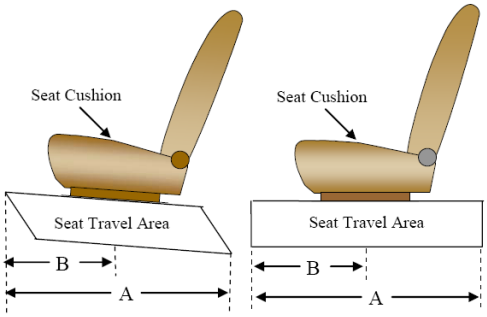
	Total Fore/Aft Travel	Placed in Position #
Driver Seat	230	12
Passenger Seat	230	4

SEAT BELT UPPER ANCHORAGES

Describe the method of positioning seat belt upper anchorages.

For this test 0 is the uppermost position and 4 is the lowermost position.

	Total # of Positions	Placed in Position #
Driver Seat	5	2
Passenger Seat	5	4



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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

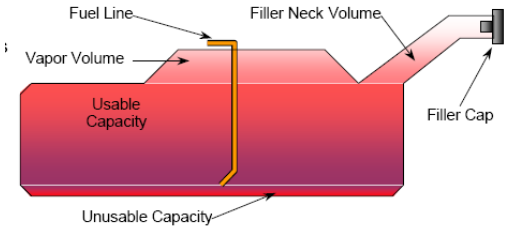
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	73.8
Usable Capacity of "Optional Tank"	
92%-94% of Usable Capacity	67.9 - 69.4
Actual Amount of Solvent Used	68.5
1/3 of Usable Capacity	24.6

FUEL PUMP

Describe the fuel system - what type of fuel pump, details about how it operates, etc.

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

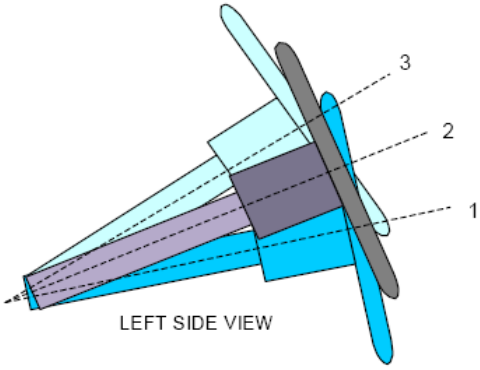


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. Describe how this measurement was taken.

The steering wheel was adjusted to the midpoint of tilt angle range and the midpoint of the telescoping travel (if applicable). There was no telescoping option for this vehicle.



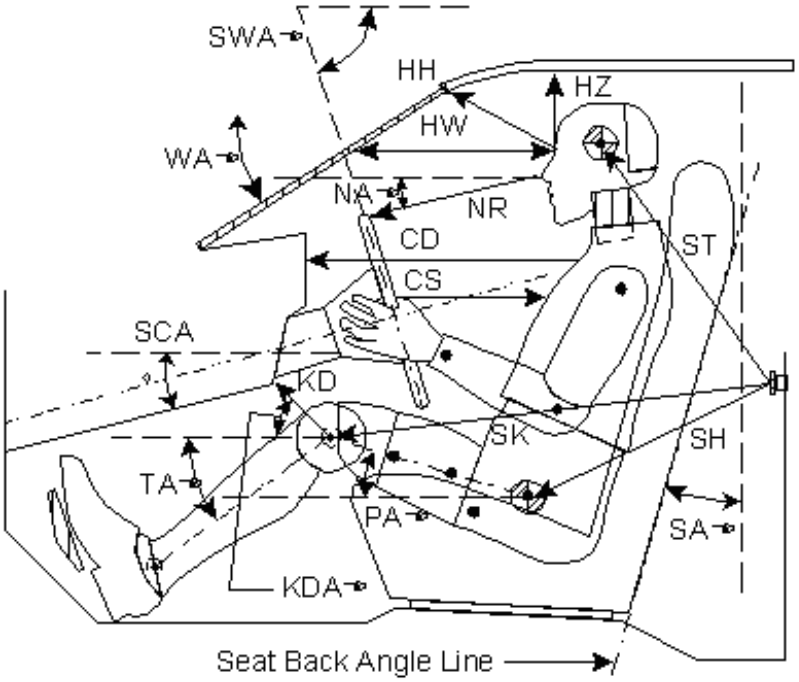
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	63.6	
Geometric center position No. 2	66.7	
Uppermost position No. 3	69.8	
Telescoping Steering Wheel Travel		
Test Position	66.7	

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

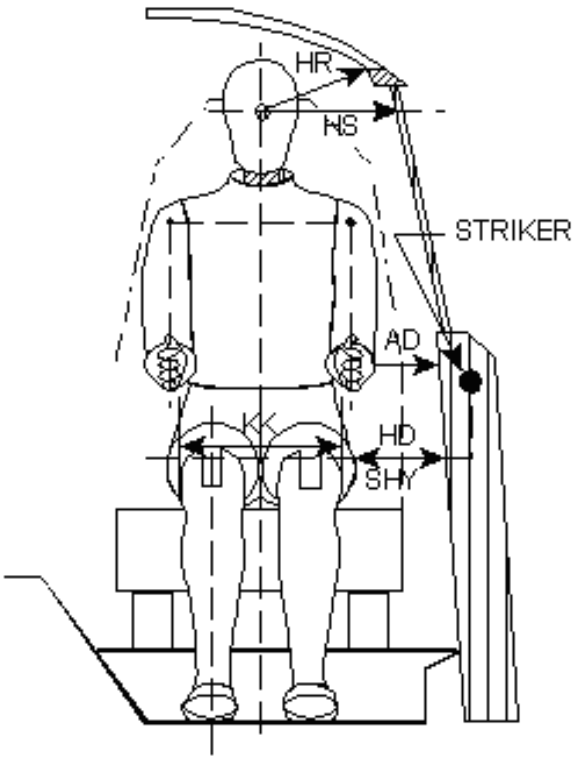
Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WAº	Windshield Angle		-43.7		
SWAº	Steering Wheel Angle		23.0		
SCAº	Steering Column Angle		67.0		
SAº	Seat Back Angle (on headrest post)		17.8		11.4
HZ	Head to Roof (Z)	246	90.0	234	90.0
HH	Head to Header	434	24.5	355	39
HW	Head to Windshield	591	0.0	515	0
NR	Nose to Rim	432	-12.6		
CD	Chest to Dash	567		360	
CS	Chest to Steering Hub	347	-11.0		
RA	Rim to Abdomen	218	-2.5		
KDL	Left Knee to Dash	135	8.4	85	14.1
KDR	Right Knee to Dash	138	9.2	85	14.6
PAº	Pelvic Angle		22.5		20.2
TAº	Tibia Angle		-38.3		-43.0
SK	Striker to Knee	629	-6.8	684	-7.3
ST	Striker to Head	522	80.1	508	58.1
SH	Striker to H-Point	247	-39.4	345	-24.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

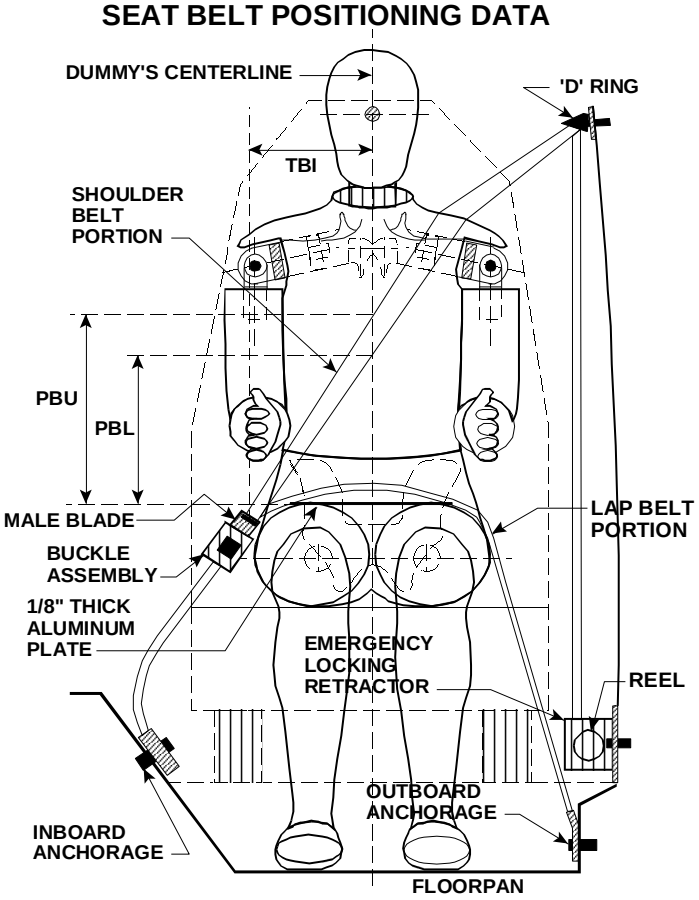


Code	Description	Driver	Passenger
AD	Arm to Door	100	58
HD	H-Point to Door	115	138
HR	Head to Side Header	208	253
HS	Head to Side Window	380	375
KK	Knee to Knee	285	166
SHY	Striker to H-Point (Y Direction)	205	230
AA	Ankle to Ankle	265	165

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	345	295
PBL — Top surface of reference to belt lower edge	mm	275	205

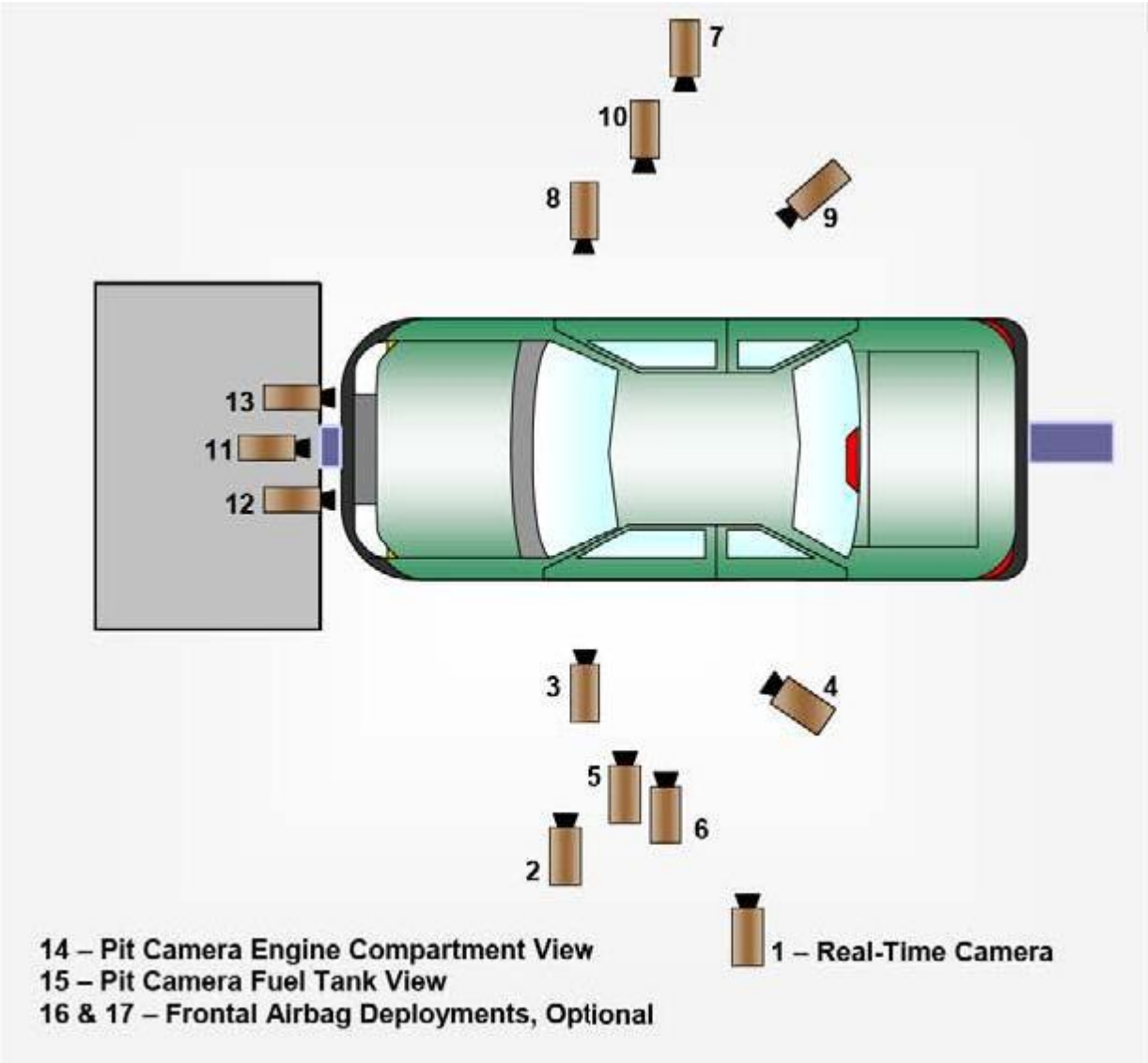
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	820	850
Lap Belt Length as measured on ATD	mm	578	515
Remainder of belt on reel	mm	952	985
Total belt length for continuous webbing systems	mm	2,350	2,350

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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

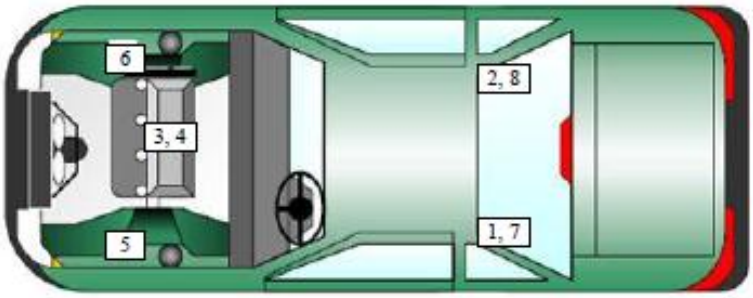
CAMERA LOCATIONS

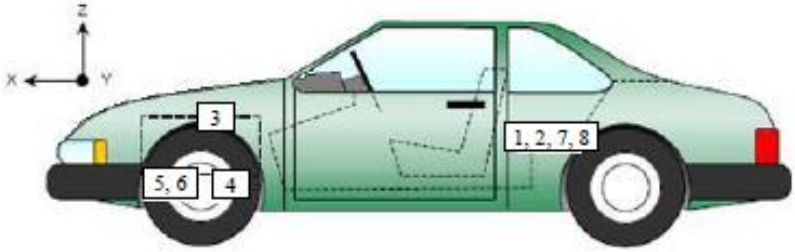
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-	Zoom	24
2	Driver Close-Up	1530	7980	1134	50	1000
3	Left Front Half	560	9116	942	50	1000
4	Left Angle	3000	2180	2130	24	1000
5	Steering Column - Top	2050	8610	1800	50	1000
6	Steering Column - Bottom	2050	8610	1178	50	1000
7	Right Overall	2130	7200	1040	24	1000
8	Passenger Close-Up	1680	6285	1200	50	1000
9	Right Front Half	1100	8800	1060	50	1000
10	Right Angle	2900	3750	2176	28	1000
11	Windshield	-670	0	2930	28	500
12	Driver Windshield	0	500	1950	24	500
13	Passenger Windshield	0	500	1950	24	500
14	Pit Front	730	0	-3200	12.5	1000
15	Pit Rear	2200	0	-3200	12.5	1000
16	Onboard Driver Airbag (Optional)					
17	Onboard Passenger Airbag (Optional)					

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

DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1,883	-615	448
2	Right Rear Accelerometer – X Direction	1,867	623	447
3	Engine Top X	3,578	-145	945
4	Engine Bottom X	4,055	-310	349
5	Left Brake Caliper X	3672	-765	461
6	Right Brake Caliper X	3680	797	436
7	Left Rear Accelerometer – Z Direction	1,883	-615	448
8	Right Rear Accelerometer – Z Direction	1,867	623	447

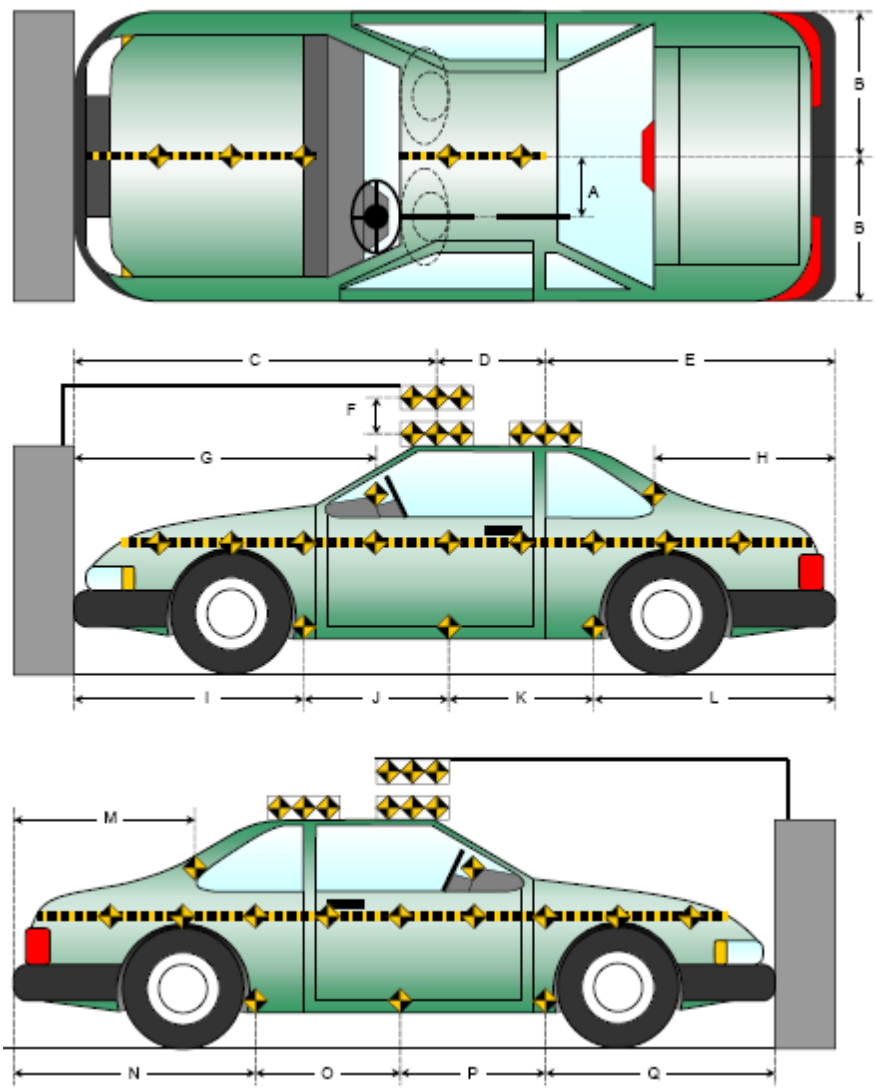
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

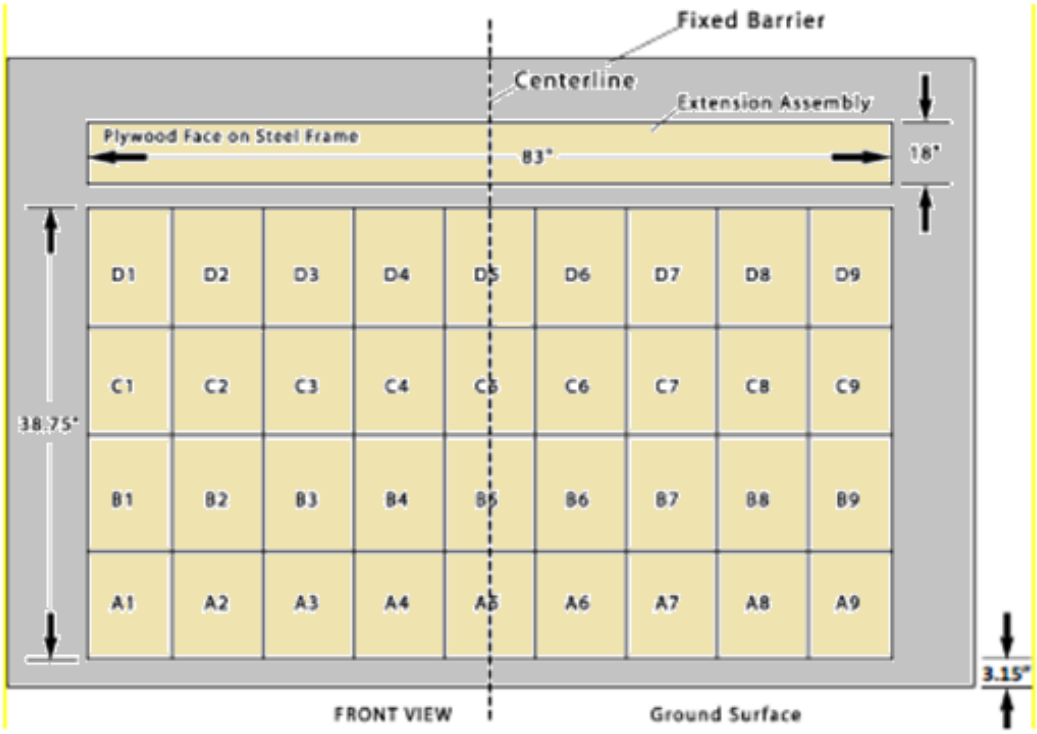
Item	Value
A	398
B	893
C	2,254
D	1,220
E	1,021
F	--
G	1,642
H	1,150
I	1,232
J	869
K	871
L	1,523
M	1,149
N	1,525
O	865
P	880
Q	1,225

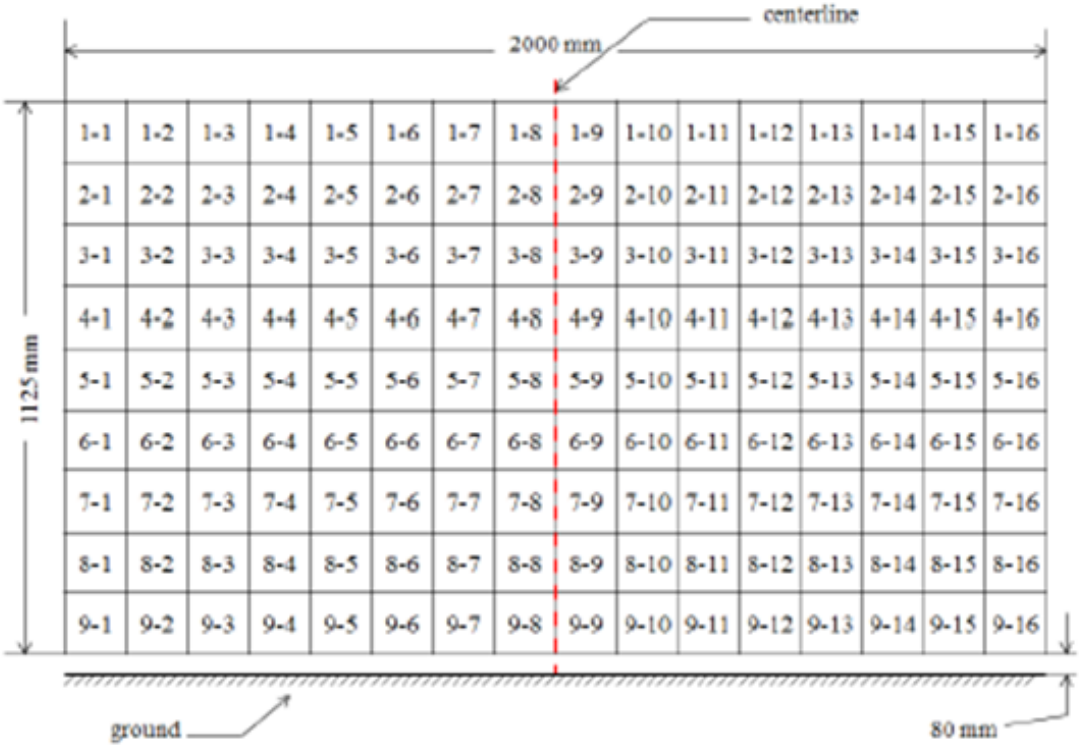
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011





DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	42
Passenger Dummy Accelerometers	42
Vehicle Structure Accelerometers	8
Total	132

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
Total	15

DATA SHEET NO. 11 - POST TEST OBSERVATIONS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type/Serial No.	64	273
Head Contact	Frontal Airbag and Head Rest	Frontal Airbag and Head Rest
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Locked	Locked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	No Shift	No Shift
Seat Back Failure	No Failure	No Failure
Glazing Damage	None	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

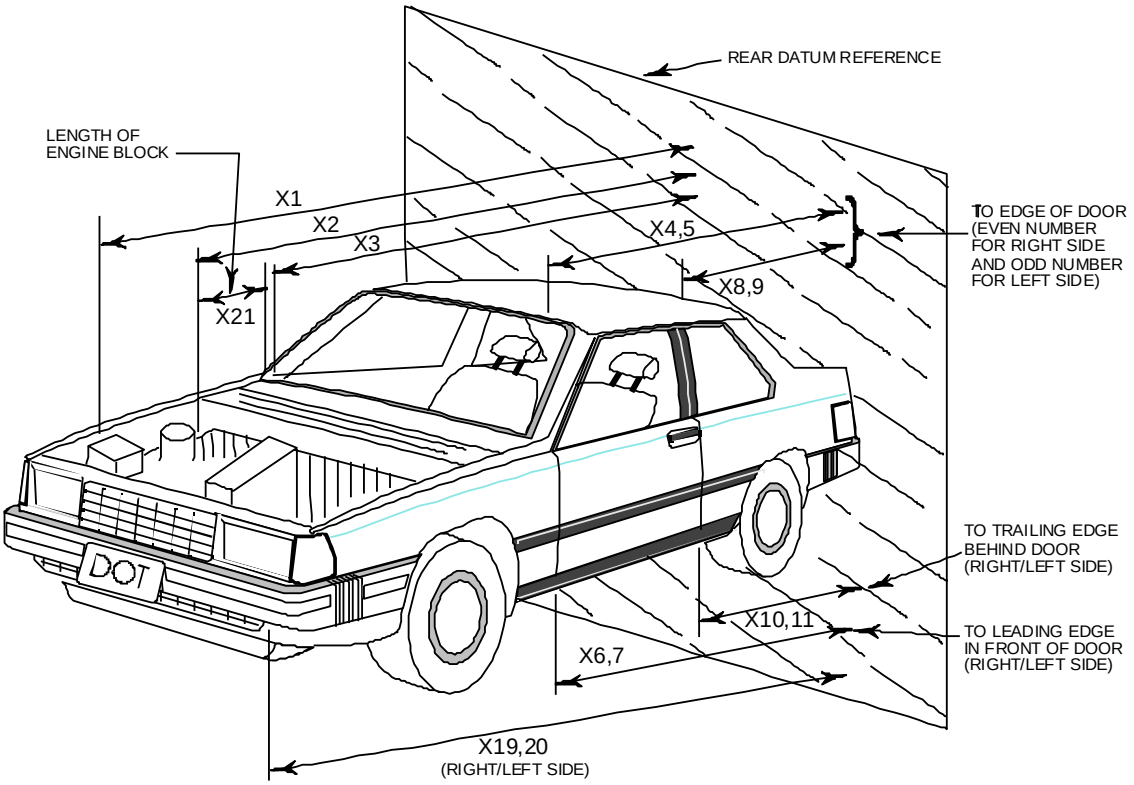
Measured Parameter	Units	Value
Left Side	mm	505
Center	mm	486
Right Side	mm	500
Average	mm	497

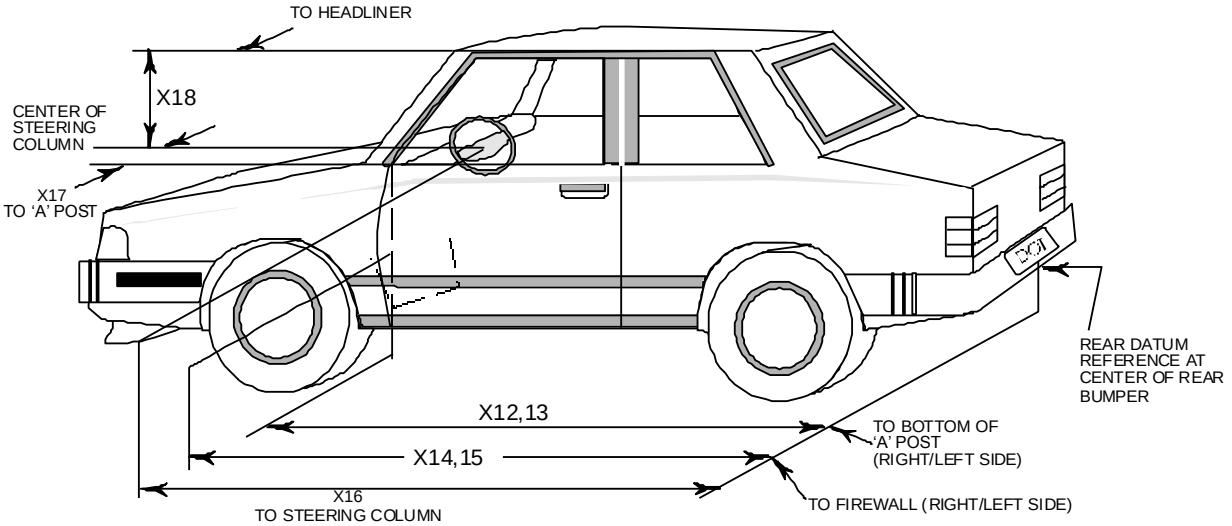
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Curtain Airbag	Yes	No	Yes	No
Knee Airbag	NA	NA	NA	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011





DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4,495	4,130	-365
2	Rear Surface of Vehicle (RSOV) to Front of Engine	3,858	3,667	-191
3	RSOV to Firewall	3,387	3,356	-31
4	RSOV to Upper Leading Edge of Right Door	3,111	3,109	-2
5	RSOV to Upper Leading Edge of Left Door	3,111	3,095	-16
6	RSOV to Lower Leading Edge of Right Door	3,104	3,103	-1
7	RSOV to Lower Leading Edge of Left Door	3,105	3,103	-2
8	RSOV to Upper Trailing Edge of Right Door	2,052	2,052	0
9	RSOV to Upper Trailing Edge of Left Door	2,053	2,050	-3
10	RSOV to Lower Trailing Edge of Right Door	2,051	2,054	3
11	RSOV to Lower Trailing Edge of Left Door	2,052	2,051	-1
12	RSOV to Bottom of “A” Post of Right Side	3,089	3,086	-3
13	RSOV to Bottom of “A” Post of Left Side	3,091	3,088	-3
14	RSOV to Firewall, Right Side	3,423	3,405	-18
15	RSOV to Firewall, Left Side	3,421	3,418	-3
16	RSOV to Steering Column illiterate	2,668	2,676	8
17	Center of Steering Column to “A” Post	287	278	9
18	Center of Steering Column to Headliner	436	399	-37
19	RSOV to Right Side of Front Bumper	4,462	4,111	351
20	RSOV to Left Side of Front Bumper	4,462	4,107	355
21	Length of Engine Block	427	427	0
RD	RSOV to Right Side of Dash Panel	2,844	2,844	0
CD	RSOV to Center of Dash Panel	2,868	2,868	0
LD	RSOV to Left Side of Dash Panel	2,861	2,859	-2

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

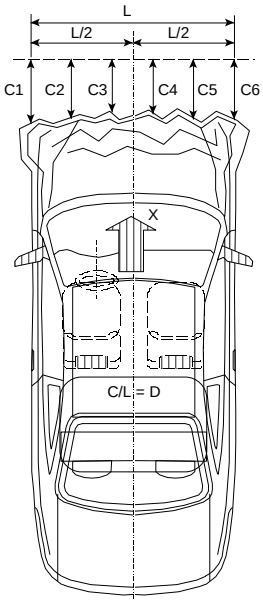
Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

VEHICLE INFORMATION

VIN	1C4PJMAK3CW102834	Wheelbase (mm)	2,698
Vehicle Size Category	Passenger – 4 Door SUV	Test Weight (kg)	2,113

ACCELEROMETER DATA

Accelerometer Locations:	As Described in Data Sheet No. 7
Cal. Procedure/Interval:	Calspan Procedure / 6 month
Integration Algorithm:	Trapezoidal
Linearity:	> 99%
Impact Velocity (km/h):	56.6
Velocity Change (km/h):	56.6
Time of Separation (ms):	180



CRUSH PROFILE

Collision Deformation Classification:	12FDEW4
Midpoint of Damage:	Vehicle Centerline
Damage Region Length (mm):	1,461
Impact Mode:	Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4,374	4,043	-331
C2	Crush zone 2 at left side	mm	4,469	4,113	-356
C3	Crush zone 3 at left side	mm	4,492	4,128	-364
C4	Crush zone 4 at right side	mm	4,492	4,121	-371
C5	Crush zone 5 at right side	mm	4,469	4,106	-363
C6	Crush zone 6 at right side	mm	4,372	4,069	-303
L	C1 to C6	mm	1,461	1,475	14

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

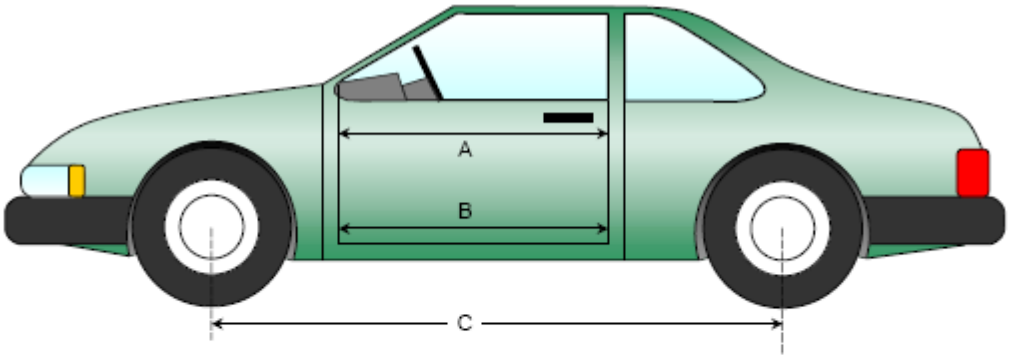
Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

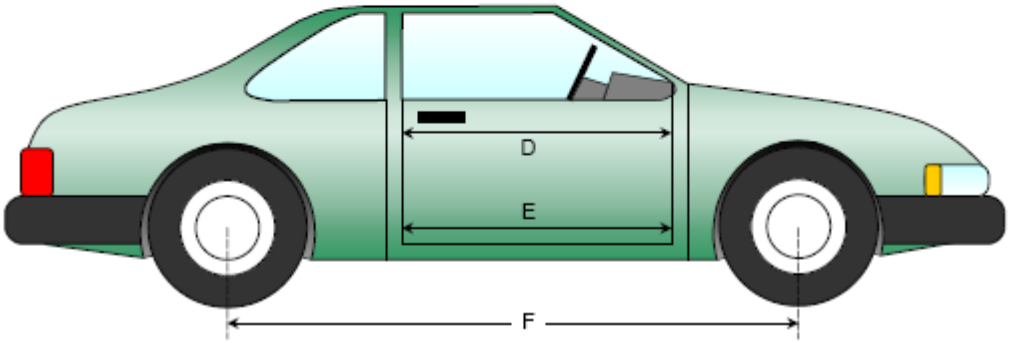
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	938	936	-2
B	Left Side Lower	mm	920	919	-1
D	Right Side Upper	mm	943	942	-1
E	Right Side Lower	mm	917	916	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2,698	2,619	-78
F	Right Side Wheelbase	mm	2,698	2,621	-77





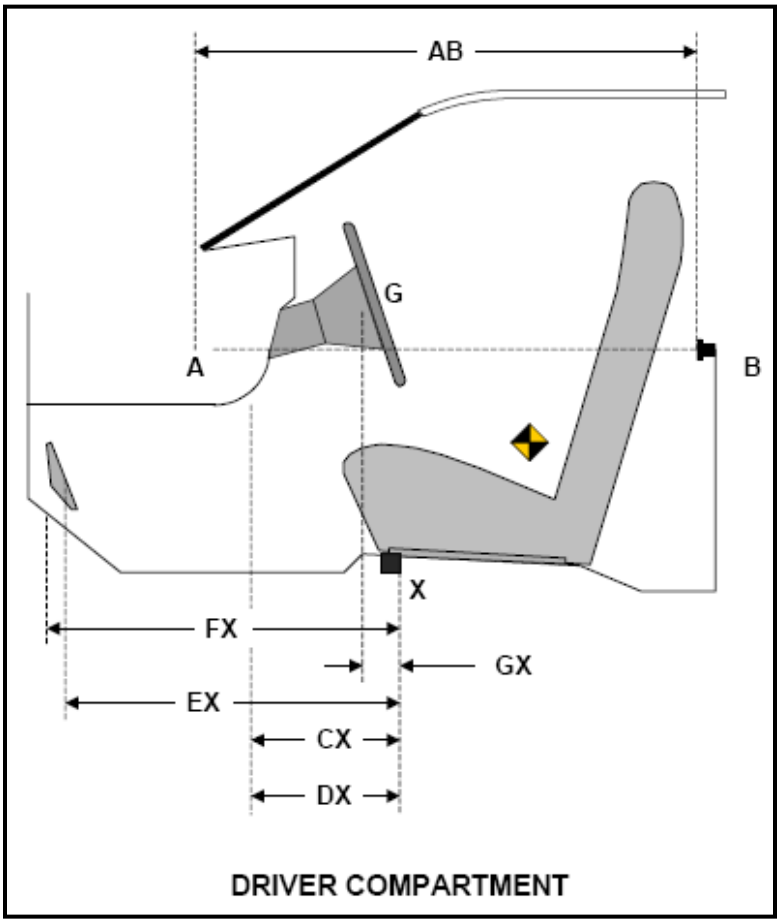
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

DRIVER COMPARTMENT INTRUSION

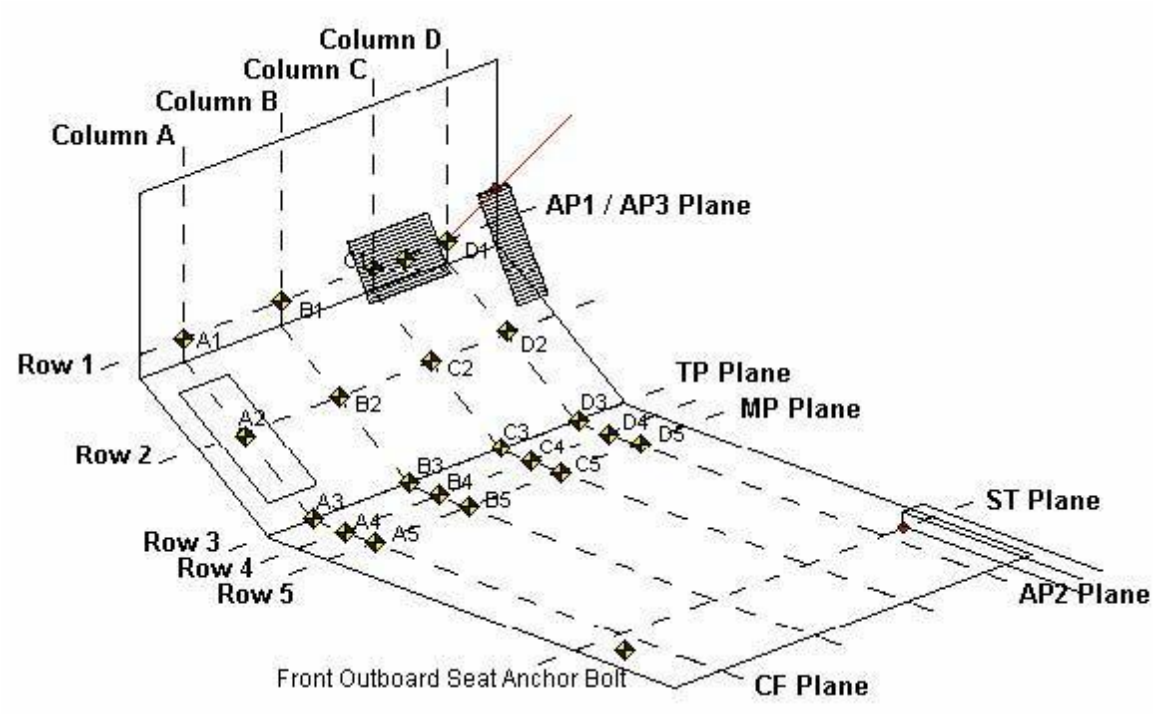
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	618	617	-1
CX	Left Knee Bolster to X	mm	269	266	-3
DX	Right Knee Bolster to X	mm	275	258	-17
EX	Brake Pedal to X	mm	512	476	-36
FX	Foot Rest to X	mm	644	666	-22
GX	Center of Steering Column Wheel Hub to X	mm	65	71	6

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011



AP1: Y-Z plane passing through D1
AP2: X-Z plane passing through D1
AP3: X-Y plane passing through D1
MP: Y-Z plane, halfway between the ST plane and AP1 plane
CF Plane: X-Z plane passes through center of footrest.
BP Plane: X-Z plane passes through center of brake pedal
TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard
Column A: intersection of vehicle and CF plane
Column D: Intersection of vehicle and AP2 plane
Row 1: intersection of the vehicle and the AP3 Plane
Row 3: intersection of the vehicle and TP plane
Row 5: intersection of the vehicle and MP plane
Row 2: evenly spaced between row 1 and 3
Row 4: evenly spaced between row 3 and 5

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

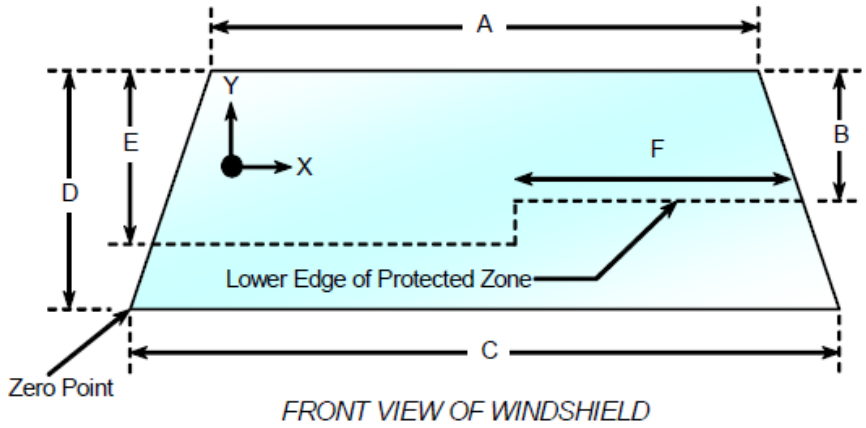
Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

Please provide windshield mounting details. 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	1,994	1994	100%
Right Side	1,994	1994	100%
Total	3,988	3988	100%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1345
B	mm	398
C	mm	1535
D	mm	555
E	mm	398
F	mm	510

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:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

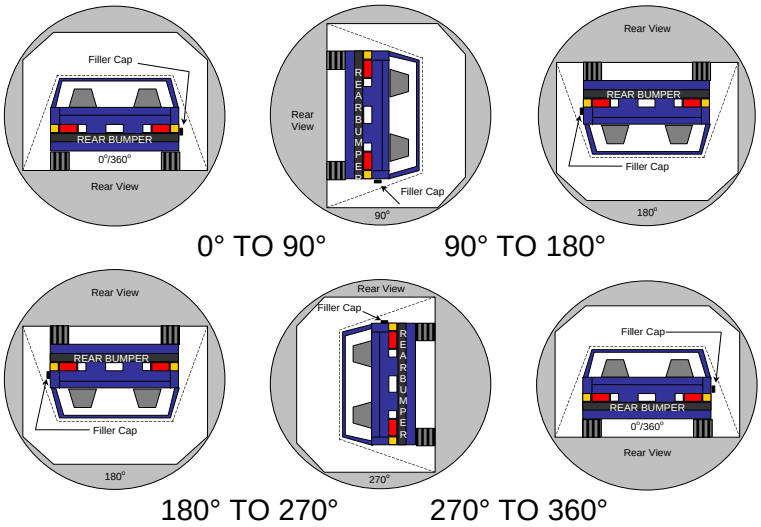
Temperature at Time of Impact: 2° C Test Time: 5:20PM

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011



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).
3. Details of Stoddard Solvent spillage: None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	67	300	367
90° to 180°	66	300	366
180° to 270°	66	300	366
270° to 360°	67	300	367

FMVSS 301 SPILLAGE TABLE

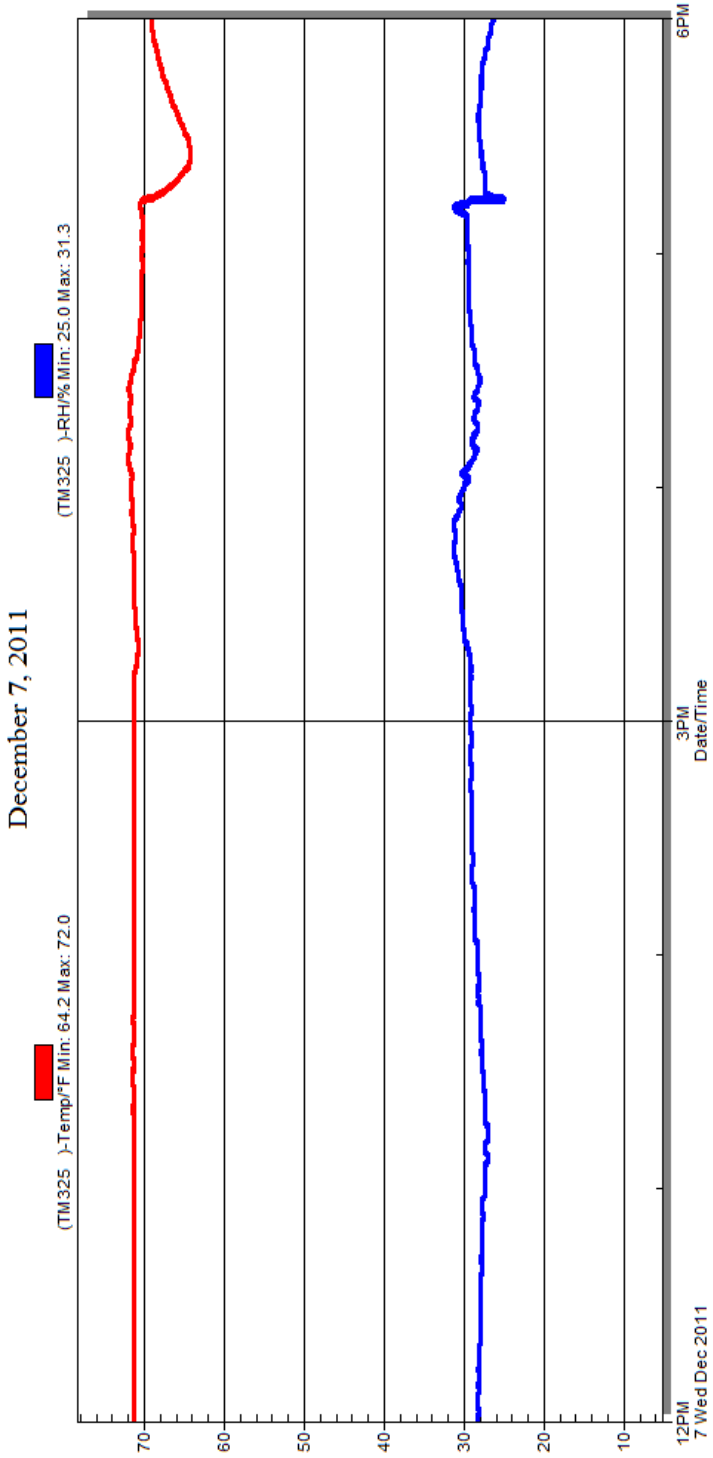
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	--	--
90° to 180°	0	0	--	--
180° to 270°	0	0	--	--
270° to 360°	0	0	--	--

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle:	2012 Jeep Liberty Sport 4X4	NHTSA No:	MC0334
Test Program:	NCAP Frontal Barrier Impact Test	Test Date	12/7/2011



Temperature Stabilization Chart/Data

APPENDIX A
PHOTOGRAPHS

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[1]**NOTE**: *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*

Figure A-1: Load Cell Location

Figure A-2: Load Cell Wall

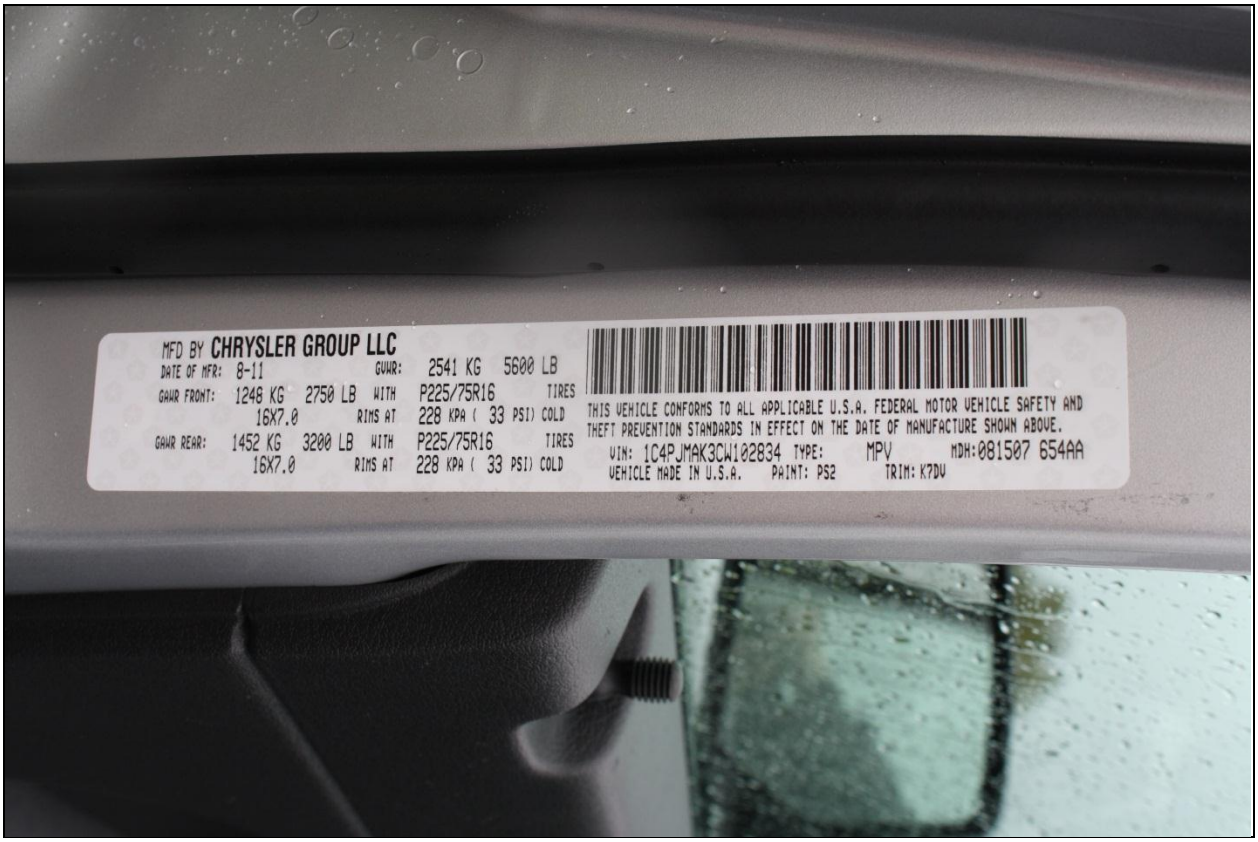


Figure A-3: Manufacturer's Label

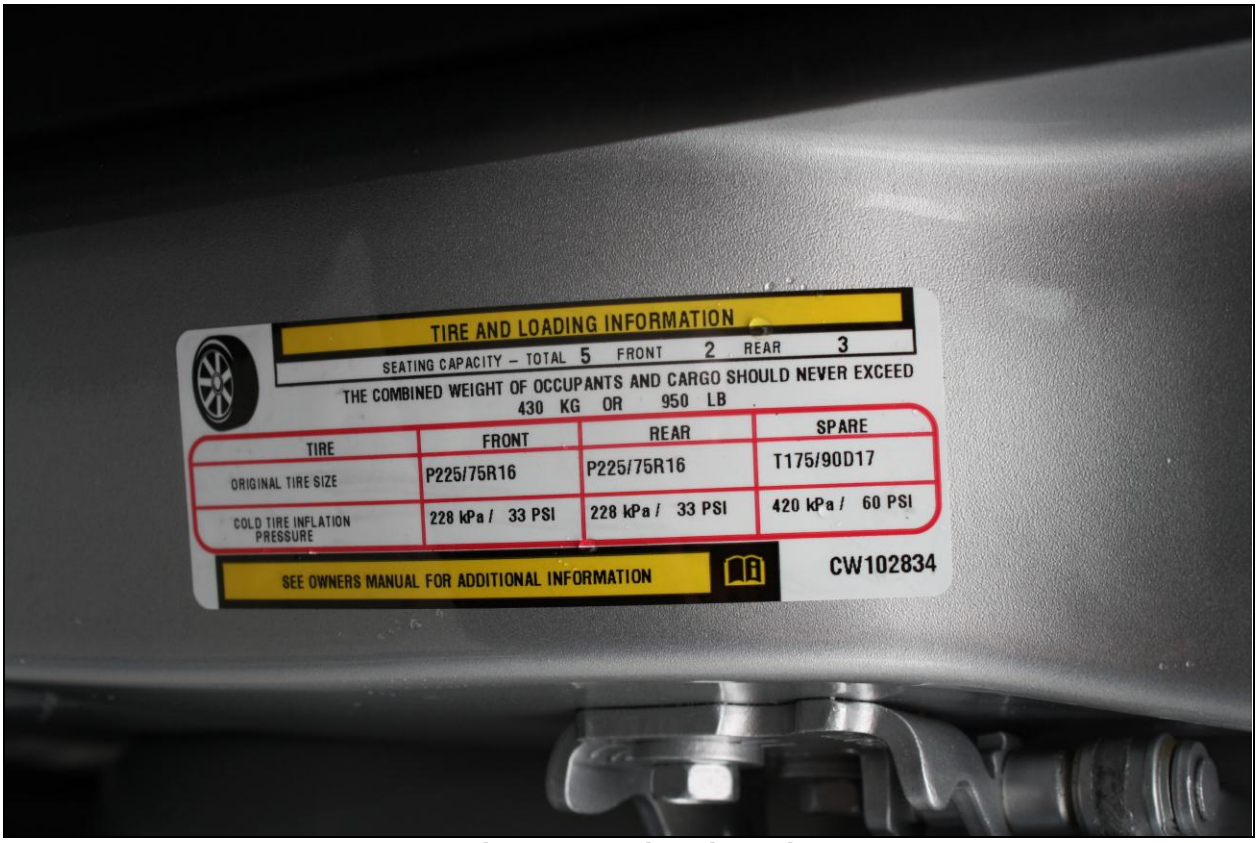


Figure A-4: Tire Placard

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

Figure A-6: Left Rear 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 Test Vehicle

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

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

Figure A-13: Pre-Test Right Front 3-4 View

Figure A-14: Post-Test Right Front 3-4 View

Figure A-15: Pre-Test Left Rear 3/4 View

Figure A-16: Post-Test Left Rear3/4 View

Figure A-17: Pre-Test Windshield View

Figure A-18: Post-Test Windshield View

Figure A-19: Pre-Test Engine Compartment View

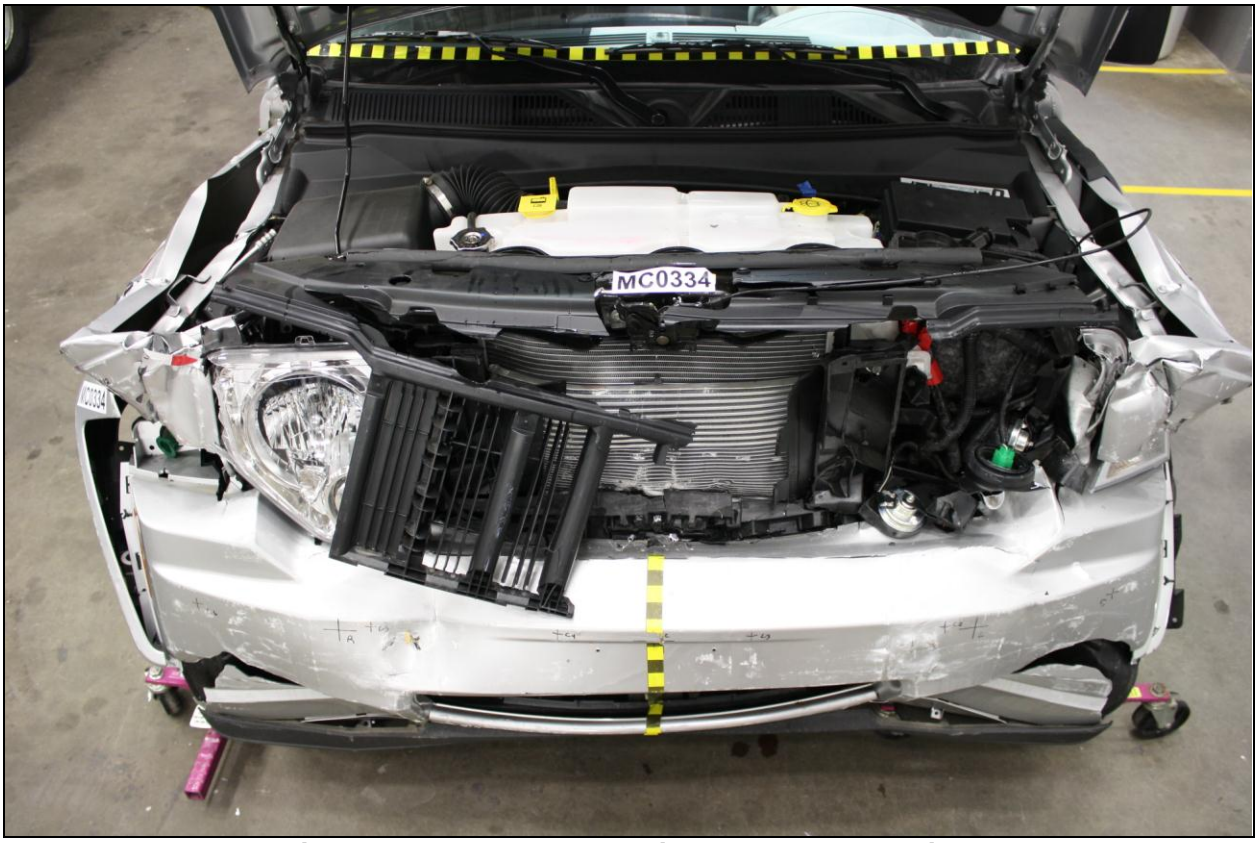


Figure A-20: Post-Test Engine Compartment View

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

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

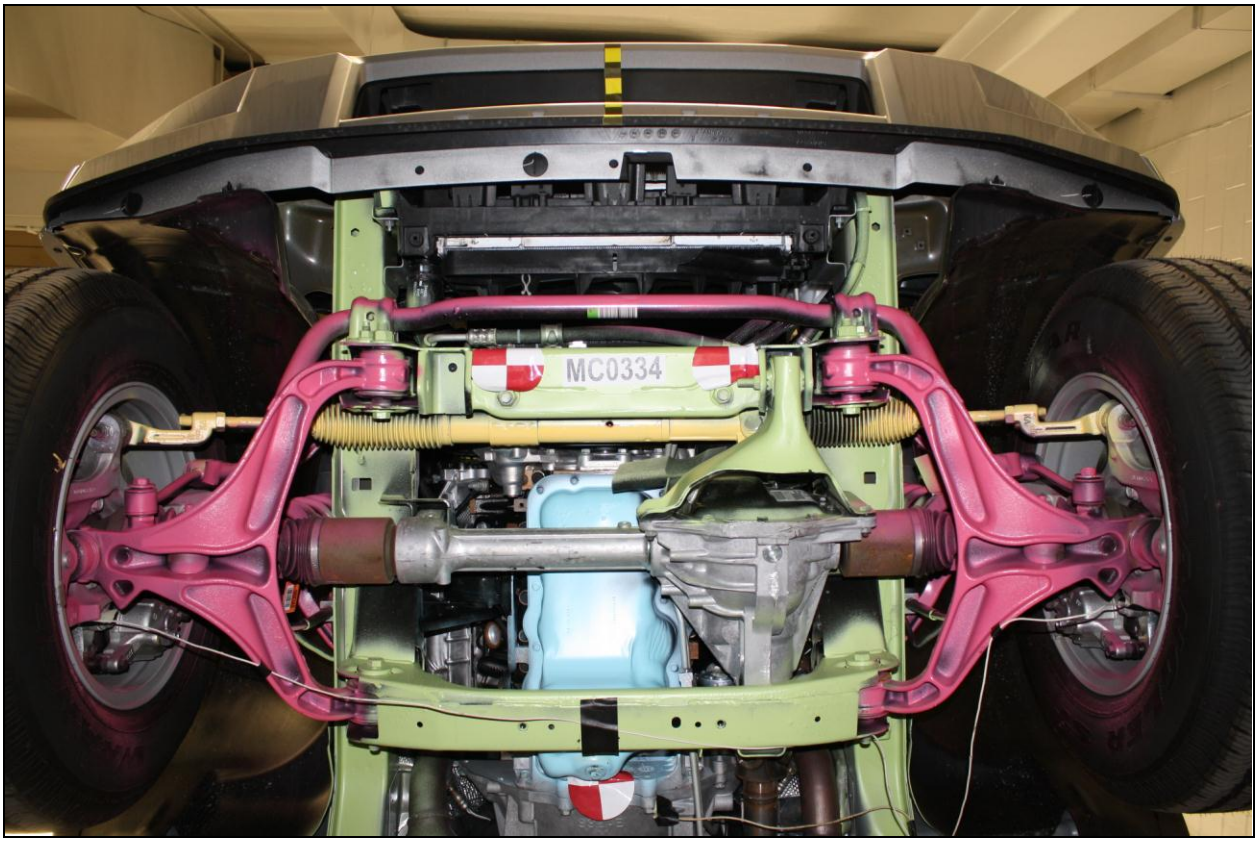


Figure A-23: Pre-Test Front Underbody View

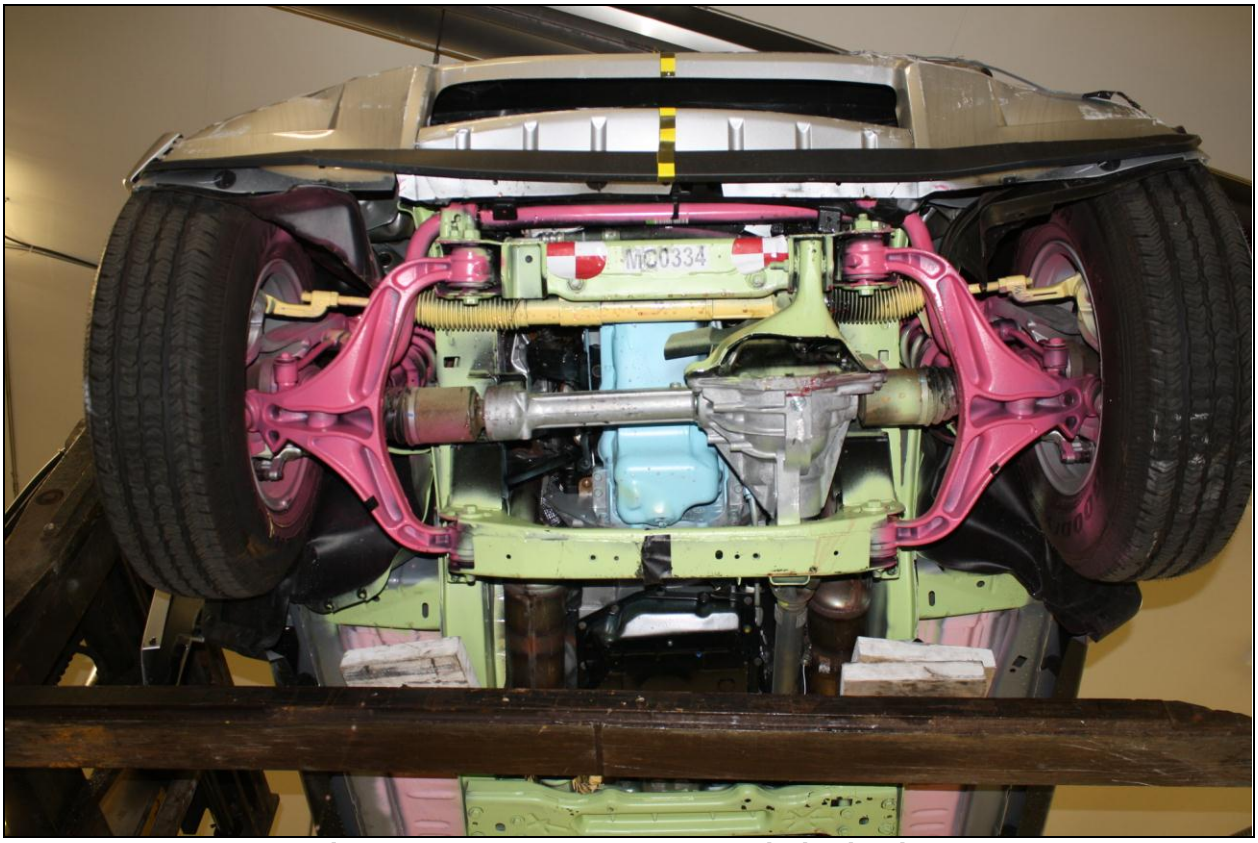


Figure A-24: Post-Test Front Underbody View

Figure A-25: Pre-Test Rear Underbody View

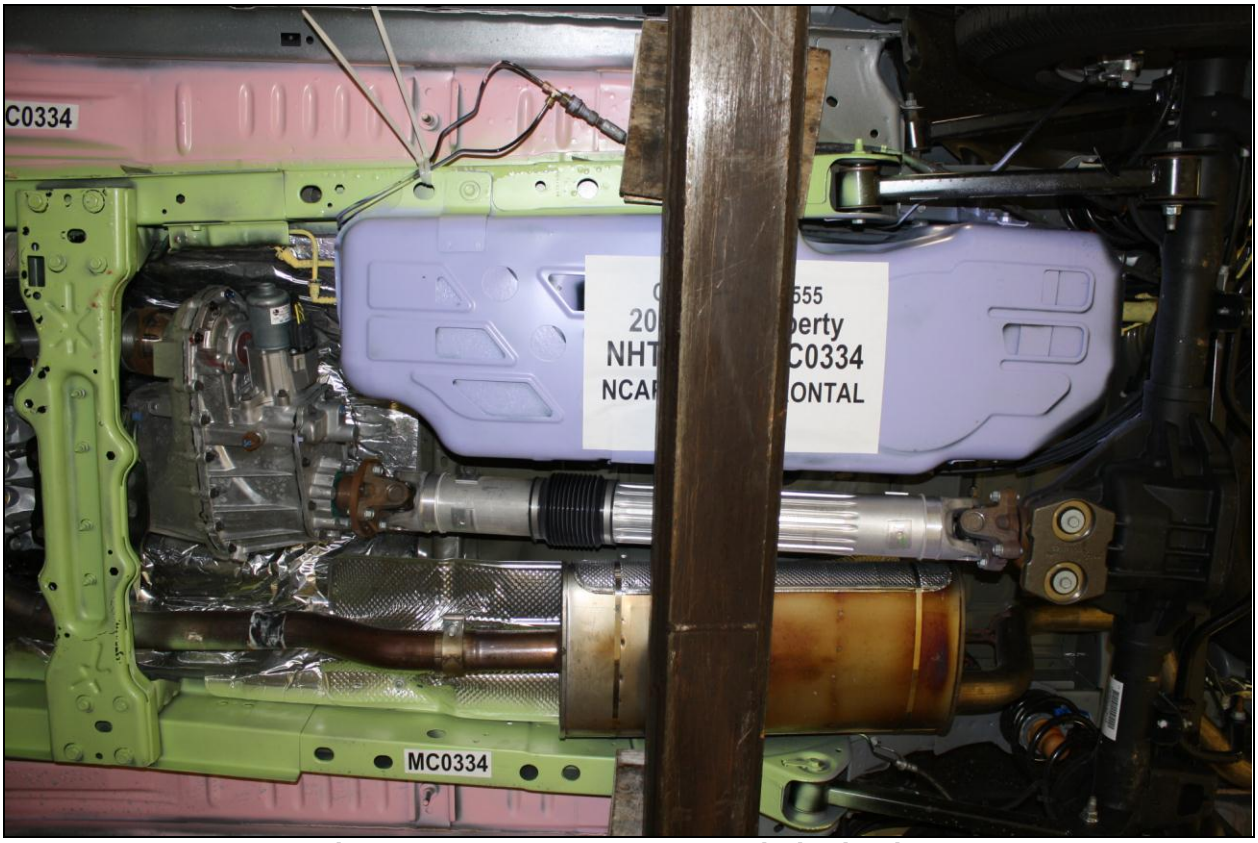


Figure A-26: Post-Test Rear Underbody View

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 Floorpan

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

Figure A-43: Post-Test Driver Dummy Face

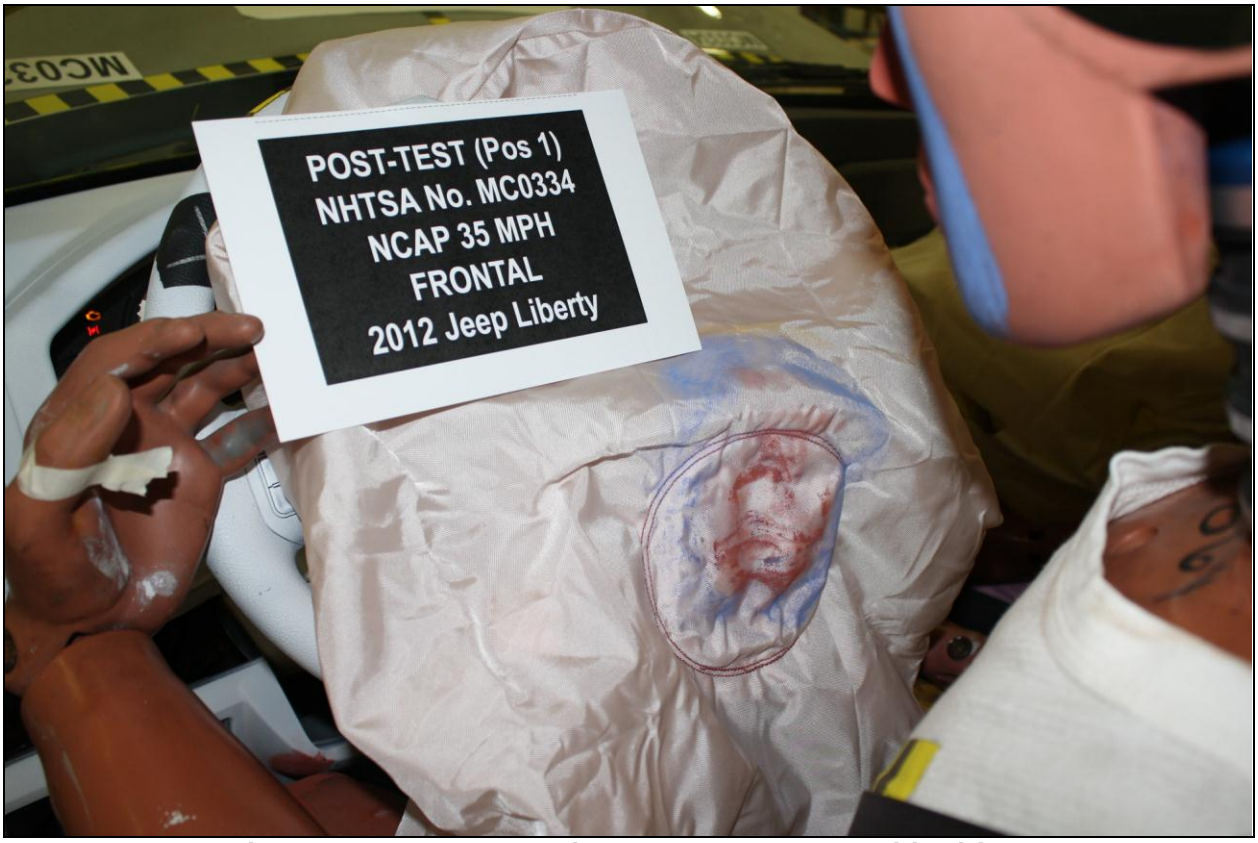


Figure A-44: Post-Test Diver Dummy Contact With Airbag

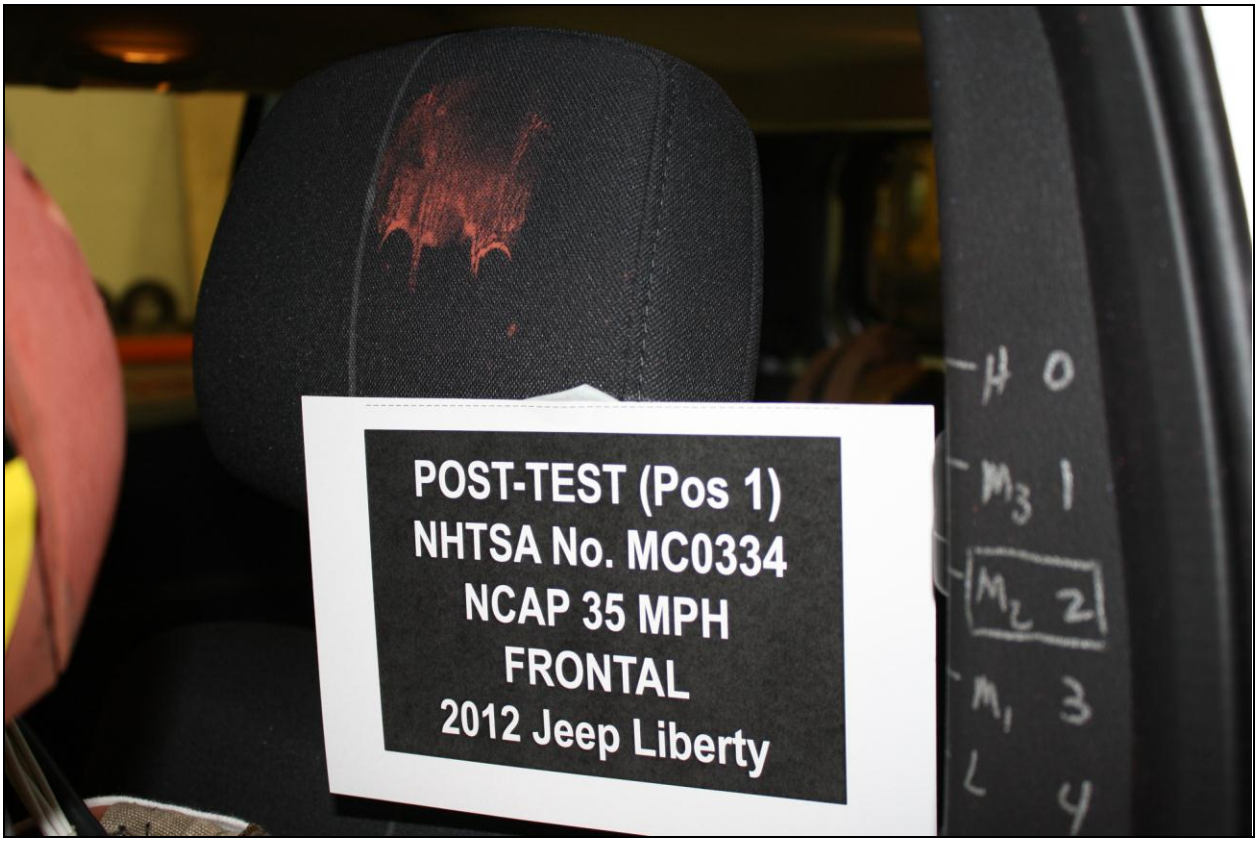


Figure A-45: Post-Test Driver Dummy Contact with Headrest

Figure A-46: Pre-Test View of the Steering Wheel

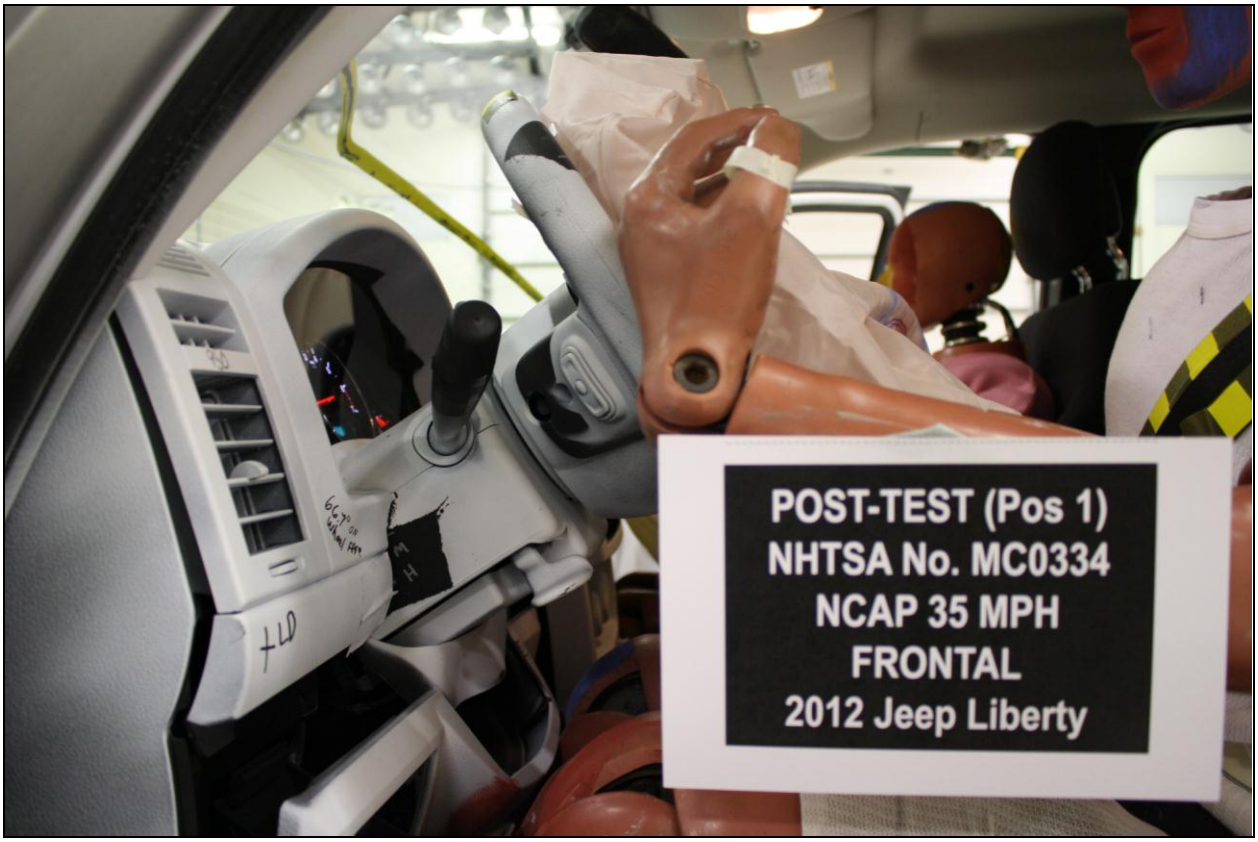


Figure A-47: Post-Test View of the Steering Wheel

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

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

Figure A-50: Pre-Test Passenger Dummy Window View

Figure A-51: Post-Test Passenger Dummy Window View

Figure A-52: Pre-Test Passenger Dummy and Vehicle Interior View

Figure A-53: Post-Test Passenger Dummy and Vehicle Interior View

Figure A-54: Pre-Test Passenger's Seat Fore-Aft Markings

Figure A-55: Post-Test Passenger's Seat Fore-Aft Markings

Figure A-56: Pre-Test Passenger Dummy Feet

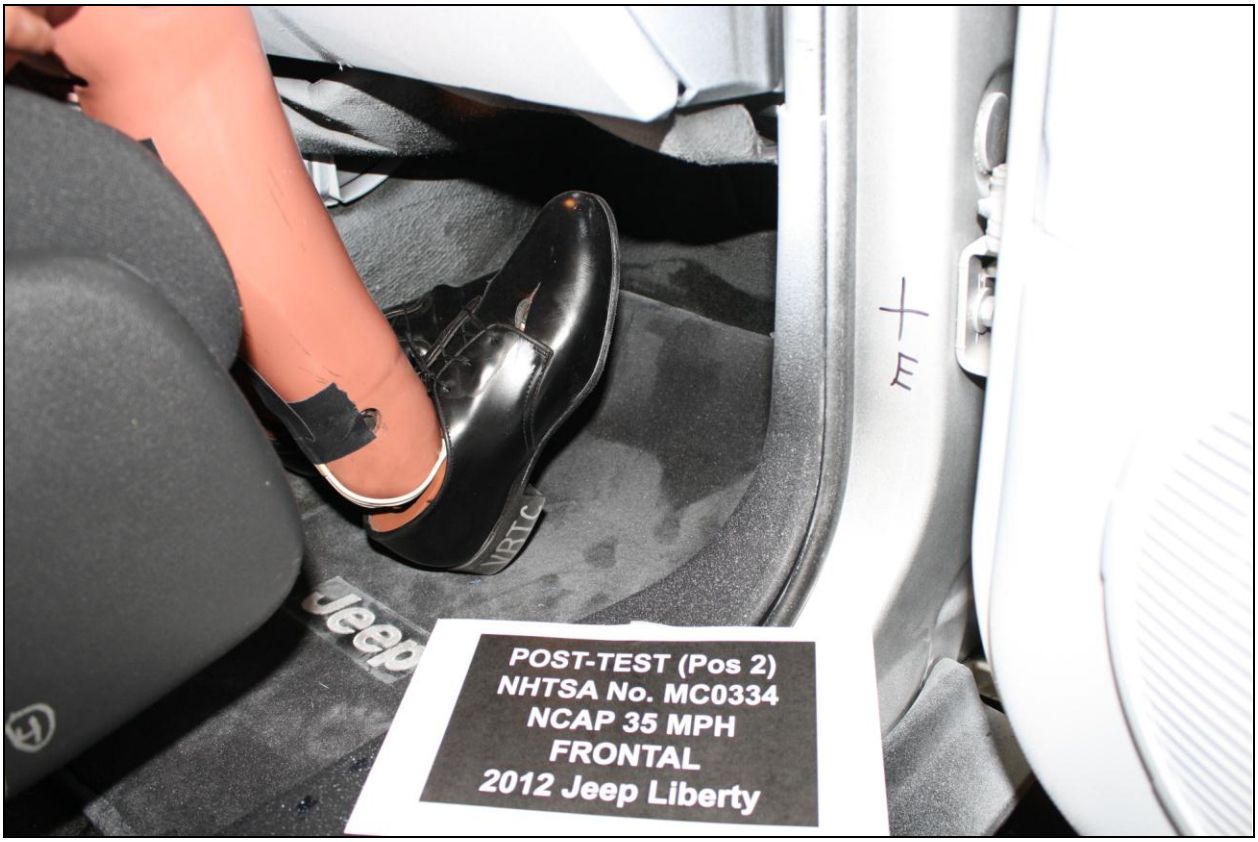


Figure A-57: Post-Test Passenger Dummy Feet

Figure A-58: Pre-Test Passenger's Side Knee Bolster

Figure A-59: Post-Test Passenger's Side Knee Bolster

Figure A-60: Pre-Test Passenger's Side Floorpan

Figure A-61: Post-Test Passenger's Side Floorpan

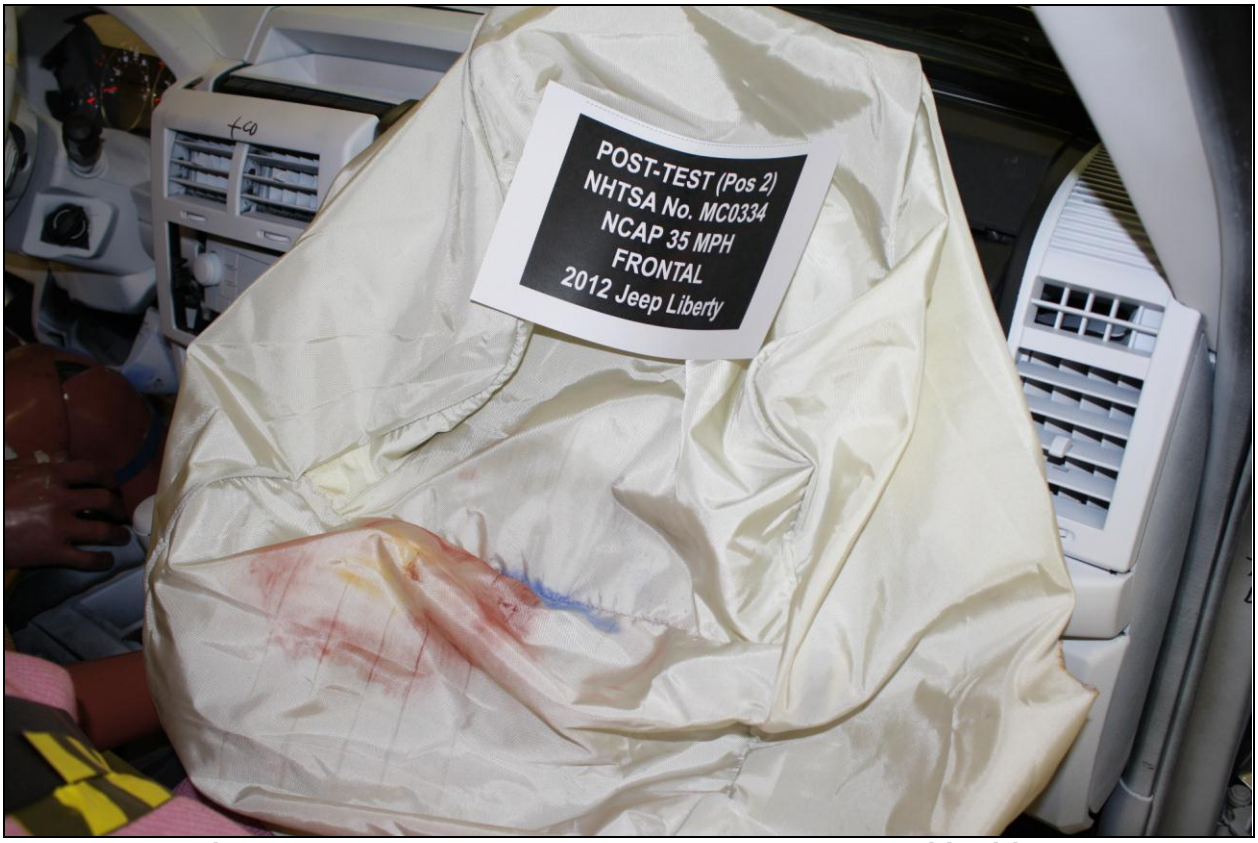


Figure A-62: Post-Test Passenger Dummy Contact with Airbag

Figure A-62a: Post-Test Passenger Dummy Contact with Headrest

Figure A-63: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-64: Post-Test Stoddard Solvent Spillage Location View, if required

Figure A-65: Post-Test Speed Trap Read-Out

Figure A-66: Vehicle at 0º on Static Rollover Device

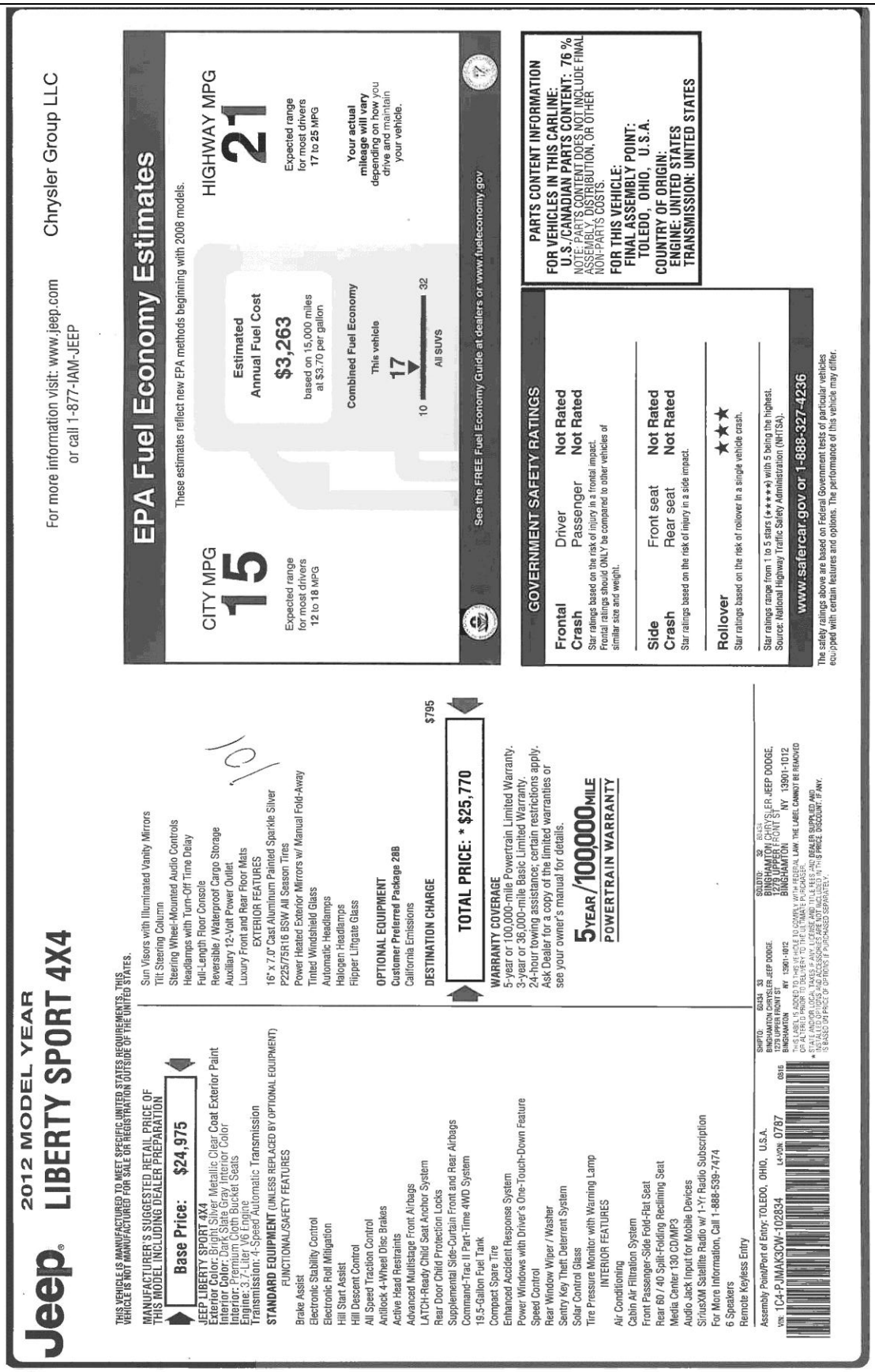
Figure A-67: Vehicle at 90º on Static Rollover Device

Figure A-68: Vehicle at 180º on Static Rollover Device

Figure A-69: Vehicle at 270º on Static Rollover Device

Figure A-70: Vehicle at 360º on Static Rollover Device

Figure A-71: 2012 Jeep Liberty Sport 4X4 Frontal Impact Event



Jeep® 2012 MODEL YEAR
LIBERTY SPORT 4X4

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

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

Base Price: $24,975

JEEP LIBERTY SPORT 4X4
Exterior Color: Bright Silver Metallic Clear Coat Exterior Paint
Interior Color: Dark Slate Gray Interior Color
Interior: Premium Cloth Bucket Seats
Engine: 3.7 Liter V6 Engine
Transmission: 4-Speed Automatic Transmission
STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)
FUNCTIONAL/SAFETY FEATURES
Brake Assist
Electronic Stability Control
Electronic Roll Mitigation
Hill Start Assist
Hill Descent Control
All Speed Traction Control
Antilock 4-Wheel Disc Brakes
Active Head Restraints
Advanced Multistage Front Airbags
LATCH-Ready Child Seat Anchor System
Rear Door Child Protection Locks
Supplemental Side-Curtain Front and Rear Airbags
Command-Trac II Part-Time 4WD System
19.5-Gallon Fuel Tank
Compact Spare Tire
Enhanced Accident Response System
Power Windows with Driver's One-Touch-Down Feature
Speed Control
Rear Window Wiper / Washer
Sentry Key Theft Deterrent System
Solar Control Glass
Tire Pressure Monitor with Warning Lamp
INTERIOR FEATURES
Air Conditioning
Cabin Air Filtration System
Front Passenger-Side Fold-Flat Seat
Rear 60 / 40 Split-Folding Reclining Seat
Media Center 130 CD/MP3
Audio Jack Input for Mobile Devices
SiriusXM Satellite Radio w/ 1-Yr Radio Subscription
For More Information, Call 1-888-539-7474
6 Speakers
Remote Keyless Entry
Sun Visors with Illuminated Vanity Mirrors
Tilt Steering Column
Steering Wheel-Mounted Audio Controls
Headlamps with Turn-Off Time Delay
Full-Length Floor Console
Reversible / Waterproof Cargo Storage
Auxiliary 12-Volt Power Outlet
Luxury Front and Rear Floor Mats
EXTERIOR FEATURES
16" x 7.0" Cast Aluminum Painted Sparkle Silver
P225/75R16 BSW All Season Tires
Power Heated Exterior Mirrors w/ Manual Fold-Away
Tinted Windshield Glass
Automatic Headlamps
Halogen Headlamps
Flipper Liftgate Glass
OPTIONAL EQUIPMENT
Customer Preferred Package 28B
California Emissions
DESTINATION CHARGE $795
TOTAL PRICE: * $25,770
WARRANTY COVERAGE
5-year or 100,000-mile Powertrain Limited Warranty.
3-year or 36,000-mile Basic Limited Warranty.
24-hour towing assistance; certain restrictions apply.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.
5YEAR/100,000MILE
POWERTRAIN WARRANTY
Assembly Point/Port of Entry: TOLEDO, OHIO, U.S.A.
VIN: 1C4-PJMAK3CW-102834 L4-VON: 0787 0816
SHIPTO: 60434 33 BINGHAMTON CHRYSLER JEEP DODGE, 1270 UPPER MIDDLE FRONT ST BINGHAMTON, NY 13901-1012
SOLDTO: 32 60434 BINGHAMTON CHRYSLER JEEP DODGE, 1270 UPPER MIDDLE FRONT ST BINGHAMTON, NY 13901-1012
THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.
* STATE AND/OR LOCAL TAXES, PLATES AND TITLE FEES ARE DEALER SUPPLIED AND NOT INCLUDED IN THE MANUFACTURER'S SUGGESTED RETAIL PRICE. TOTAL PRICE DOES NOT INCLUDE ANY (S) BASED OPTIONS IF PURCHASED SEPARATELY.

For more information visit: www.jeep.com
or call 1-877-IAM-JEEP

Chrysler Group LLC

EPA Fuel Economy Estimates
These estimates reflect new EPA methods beginning with 2008 models.
CITY MPG 15 — Expected range for most drivers 12 to 18 MPG
Estimated Annual Fuel Cost $3,263 based on 15,000 miles at $3.70 per gallon
HIGHWAY MPG 21 — Expected range for most drivers 17 to 25 MPG
Combined Fuel Economy: This vehicle 17; 10 — 32 All SUVs
Your actual mileage will vary depending on how you drive and maintain your vehicle.
See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

GOVERNMENT SAFETY RATINGS
Frontal Crash: Driver Not Rated; Passenger Not Rated
Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.
Side Crash: Front seat Not Rated; Rear seat Not Rated
Star ratings based on the risk of injury in a side impact.
Rollover ★★★
Star ratings based on the risk of rolover 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
The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

PARTS CONTENT INFORMATION
FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 76 %
NOTE: PART'S CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
TOLEDO, OHIO, U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

Figure A-72: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

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

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

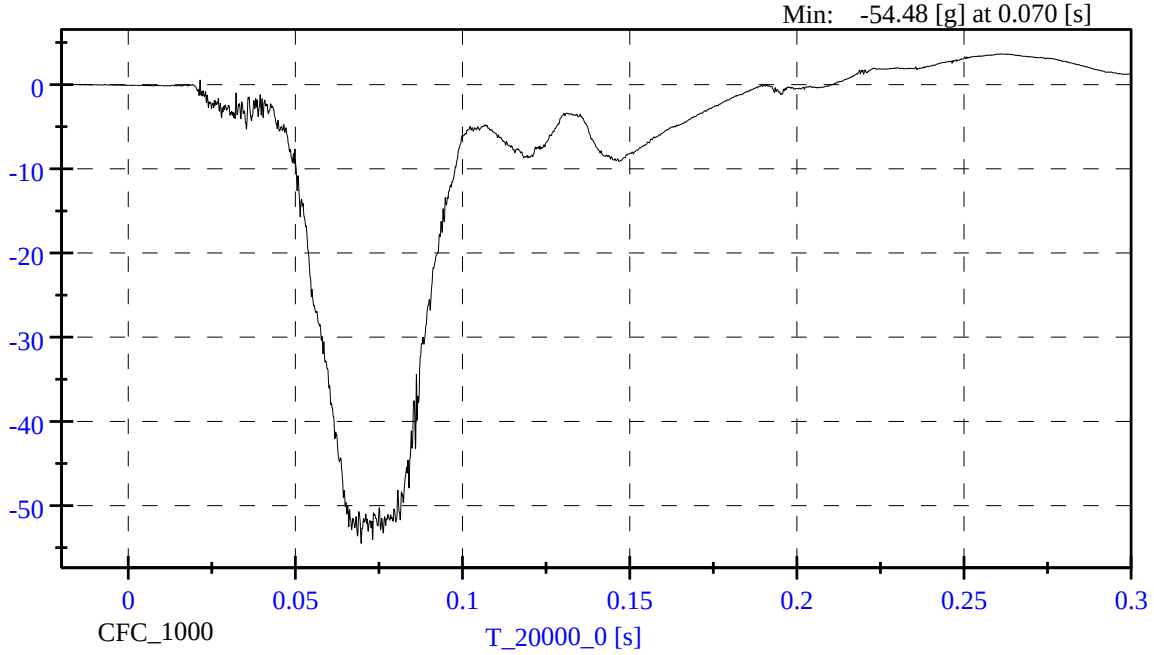
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant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

V1P1 Head CG x [g , CFC_1000]

Max: 3.65 [g] at 0.261 [s]

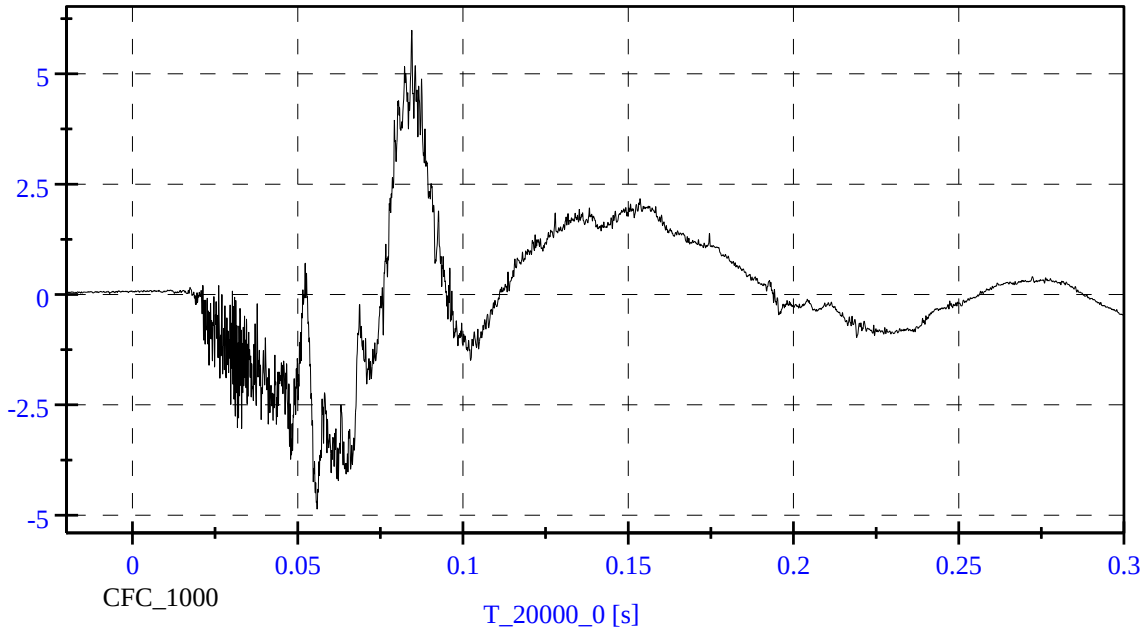
Min: -54.48 [g] at 0.070 [s]



V1P1 Head CG y [g , CFC_1000]

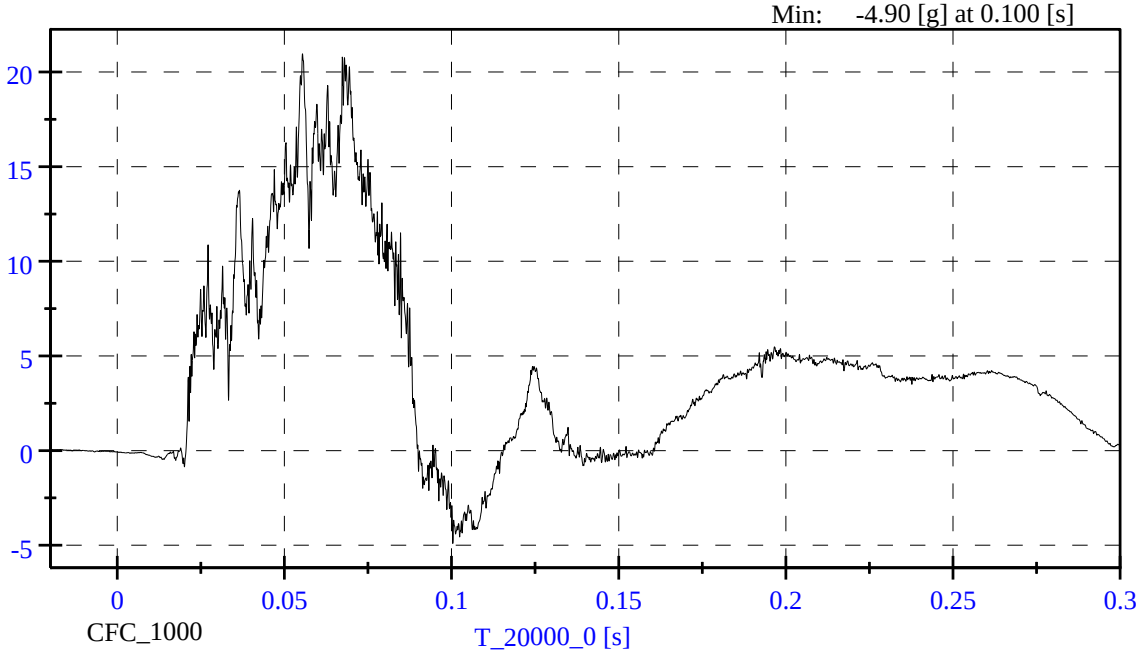
Max: 5.98 [g] at 0.085 [s]

Min: -4.86 [g] at 0.056 [s]



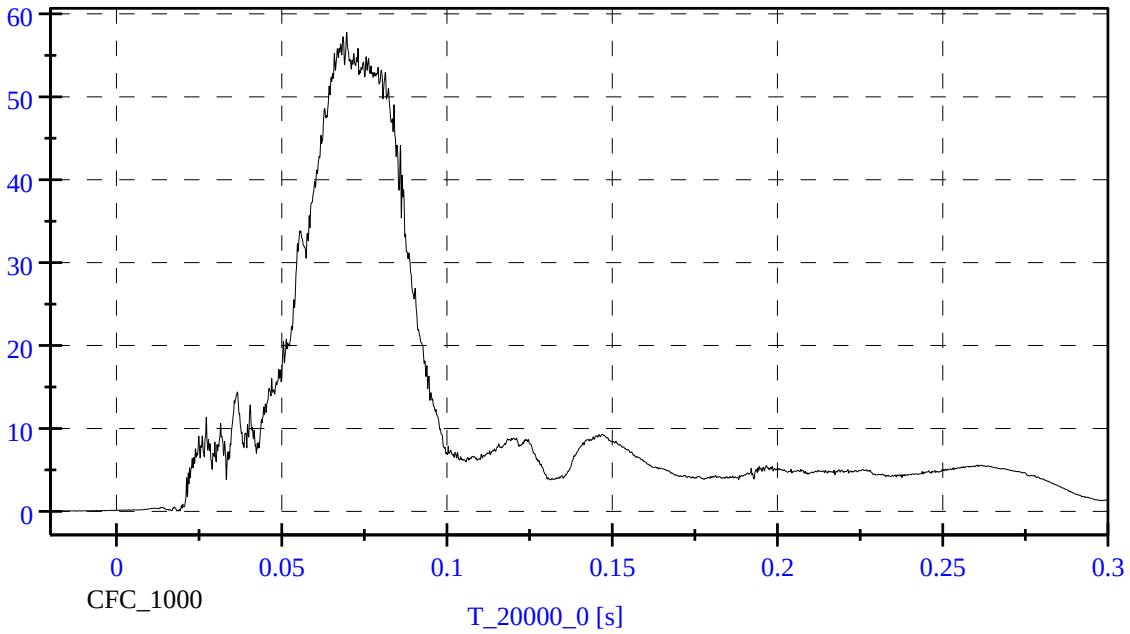
V1P1 Head CG z [g , CFC_1000]

Max: 20.96 [g] at 0.055 [s]
Min: -4.90 [g] at 0.100 [s]



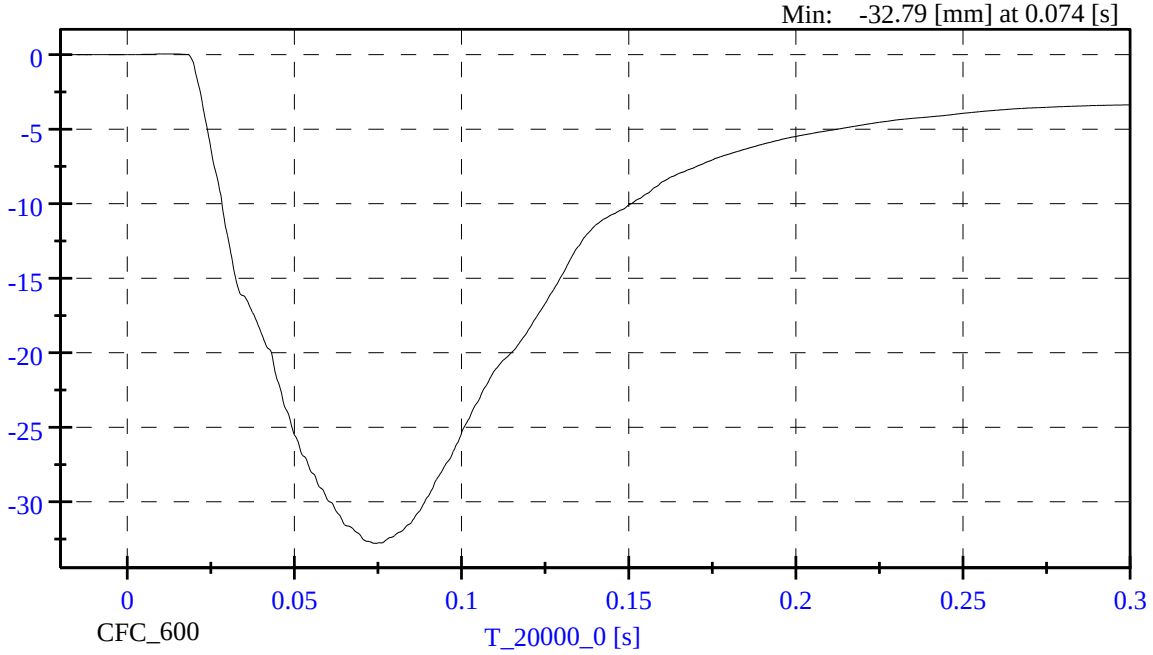
V1P1 Headform Resultant [g, CFC_1000]

Max: 57.77 [g] at 0.070 [s]
Min: 0.04 [g] at 0.019 [s]



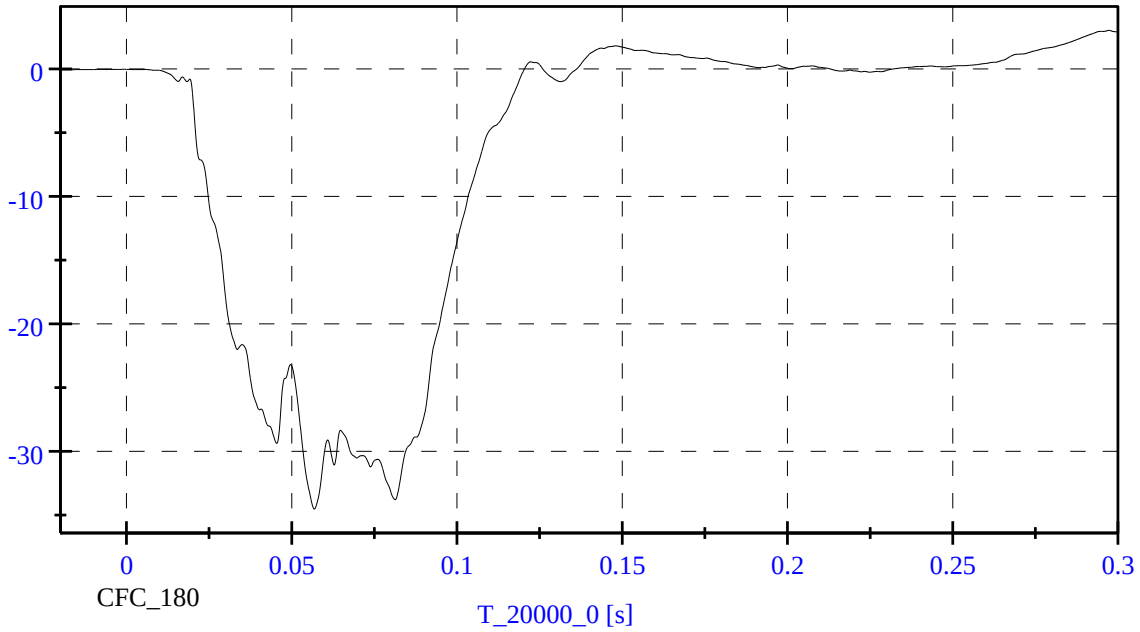
V1P1 Chest Displacement x [mm , CFC_600]

Max: 0.05 [mm] at 0.010 [s]
Min: -32.79 [mm] at 0.074 [s]



V1P1 Chest x [g , CFC_180]

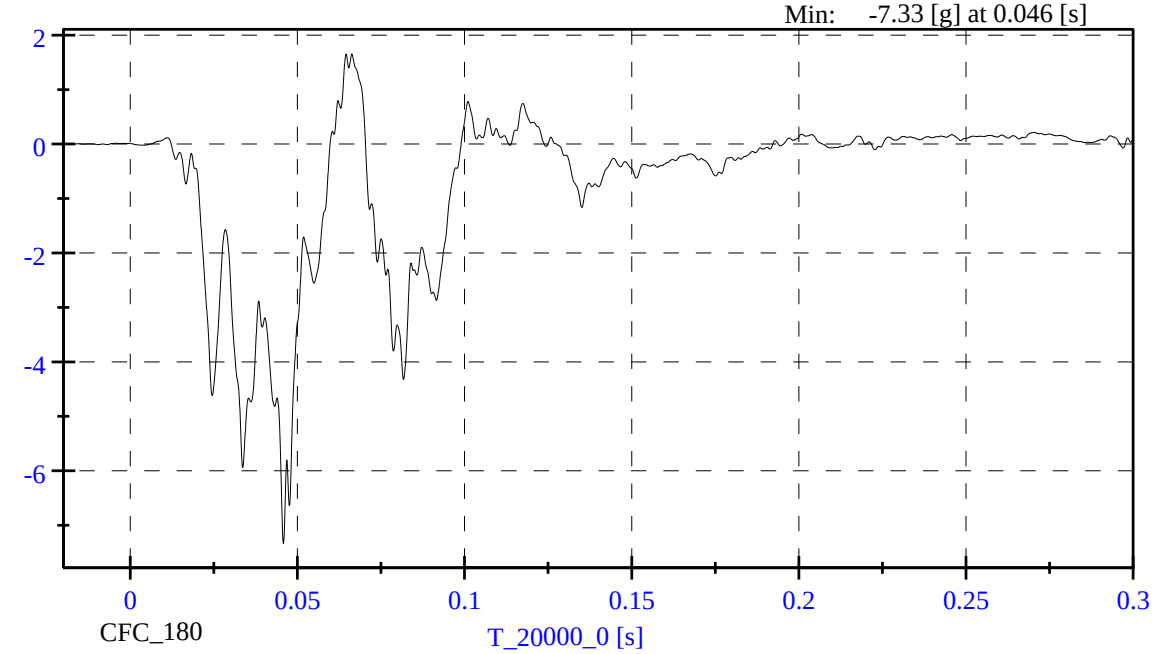
Max: 3.03 [g] at 0.297 [s]
Min: -34.53 [g] at 0.057 [s]



V1P1 Chest y [g , CFC_180]

Max: 1.66 [g] at 0.066 [s]

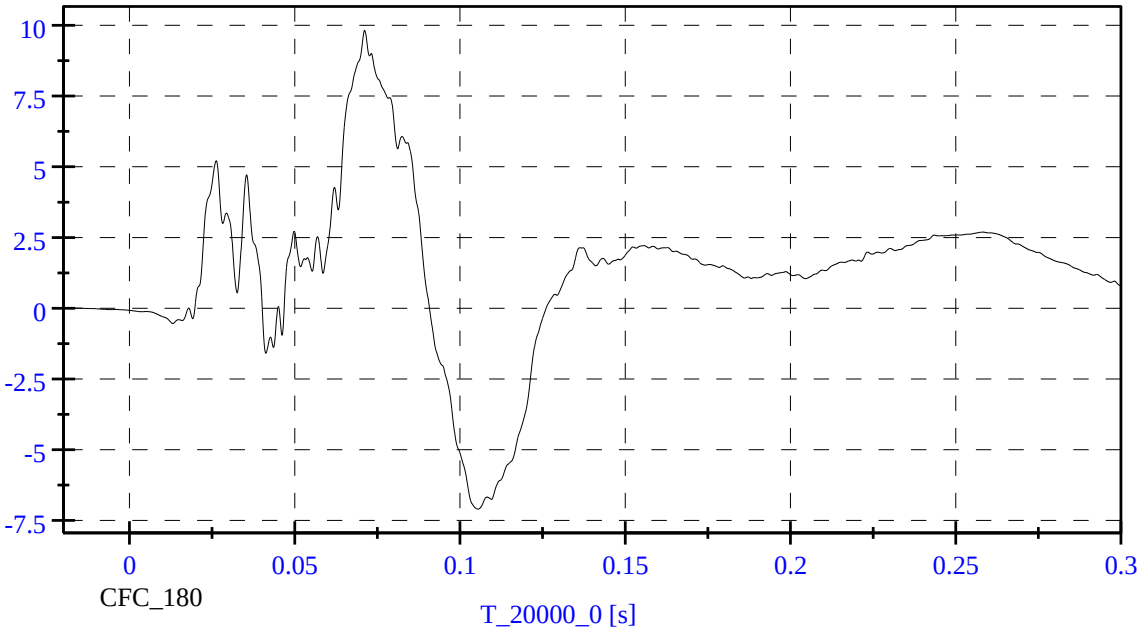
Min: -7.33 [g] at 0.046 [s]



V1P1 Chest z [g , CFC_180]

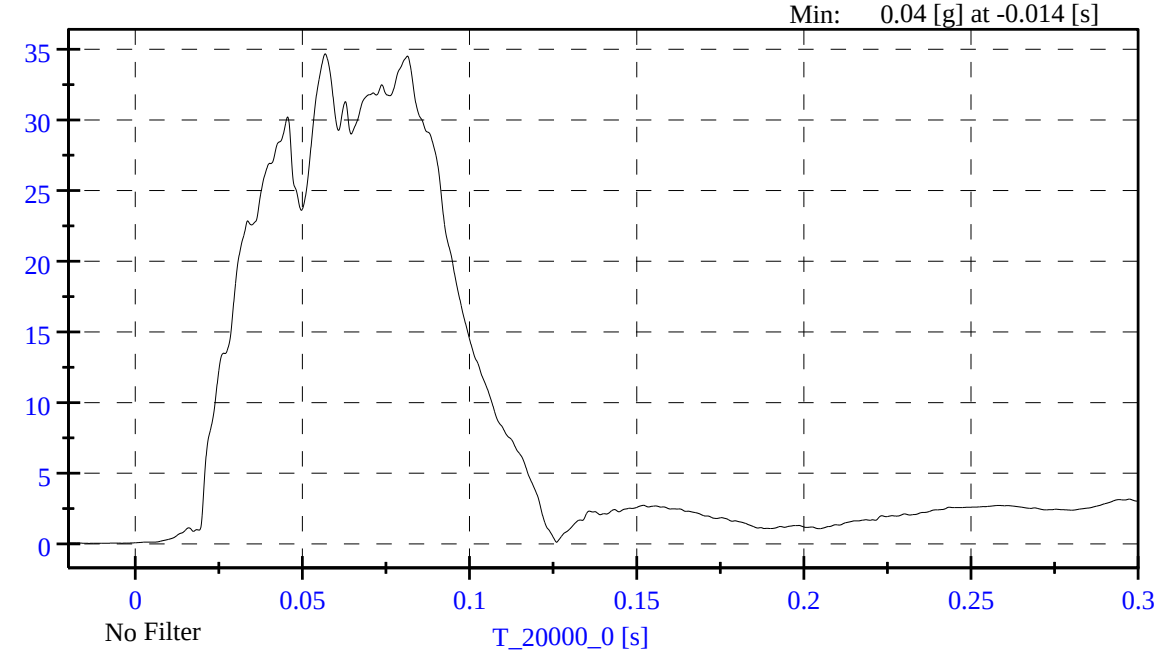
Max: 9.82 [g] at 0.071 [s]

Min: -7.10 [g] at 0.106 [s]



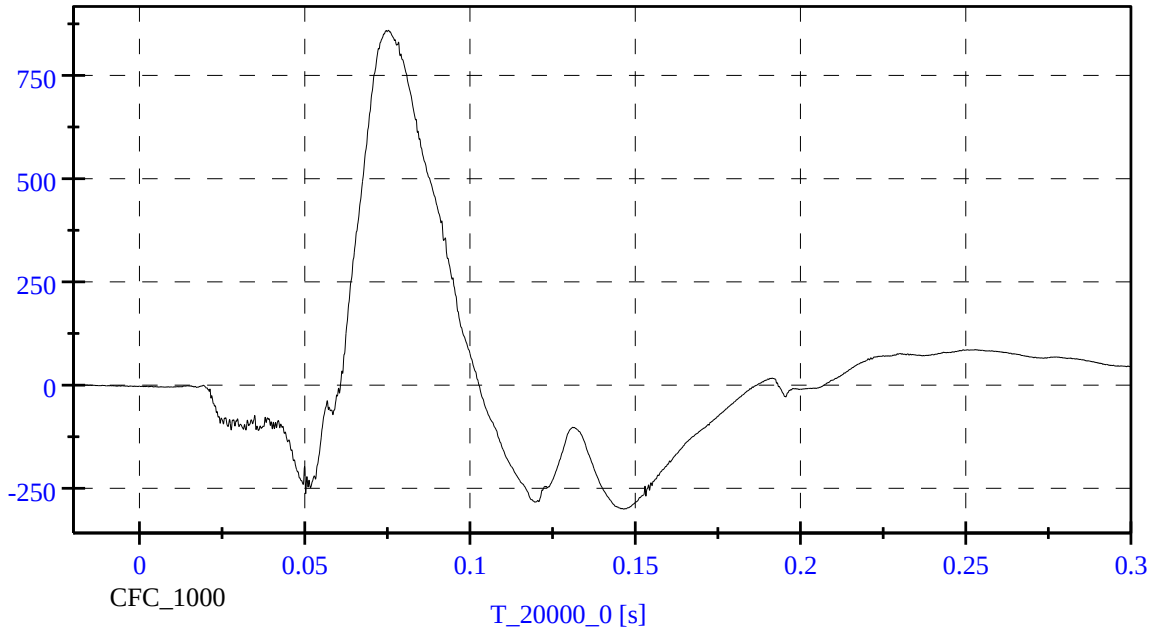
V1P1 Chest Resultant

Max: 34.67 [g] at 0.057 [s]
Min: 0.04 [g] at -0.014 [s]



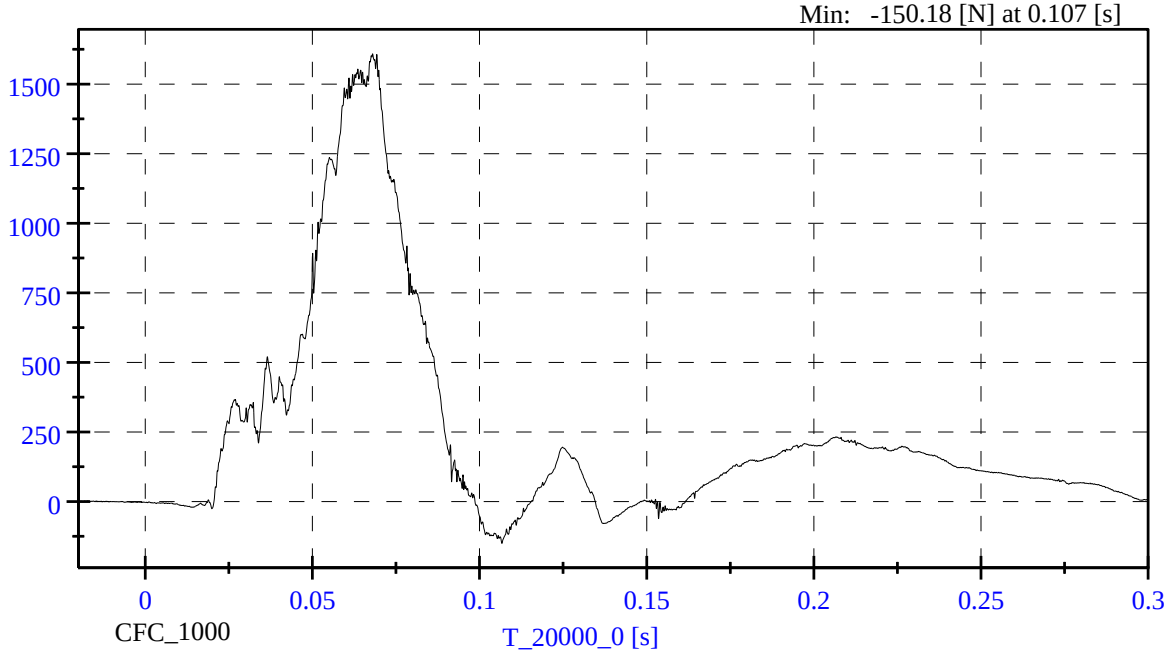
V1P1 Upper Neck Fx [N , CFC_1000]

Max: 859.20 [N] at 0.075 [s]
Min: -300.20 [N] at 0.147 [s]



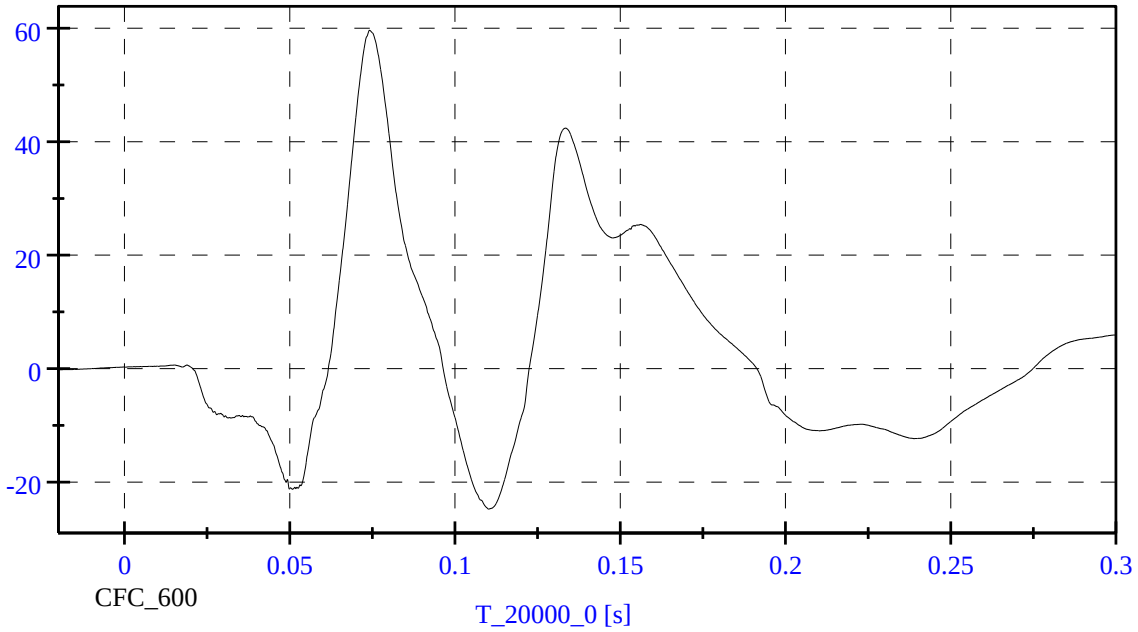
V1P1 Upper Neck Fz [N , CFC_1000]

Max: 1608.53 [N] at 0.068 [s]
Min: -150.18 [N] at 0.107 [s]



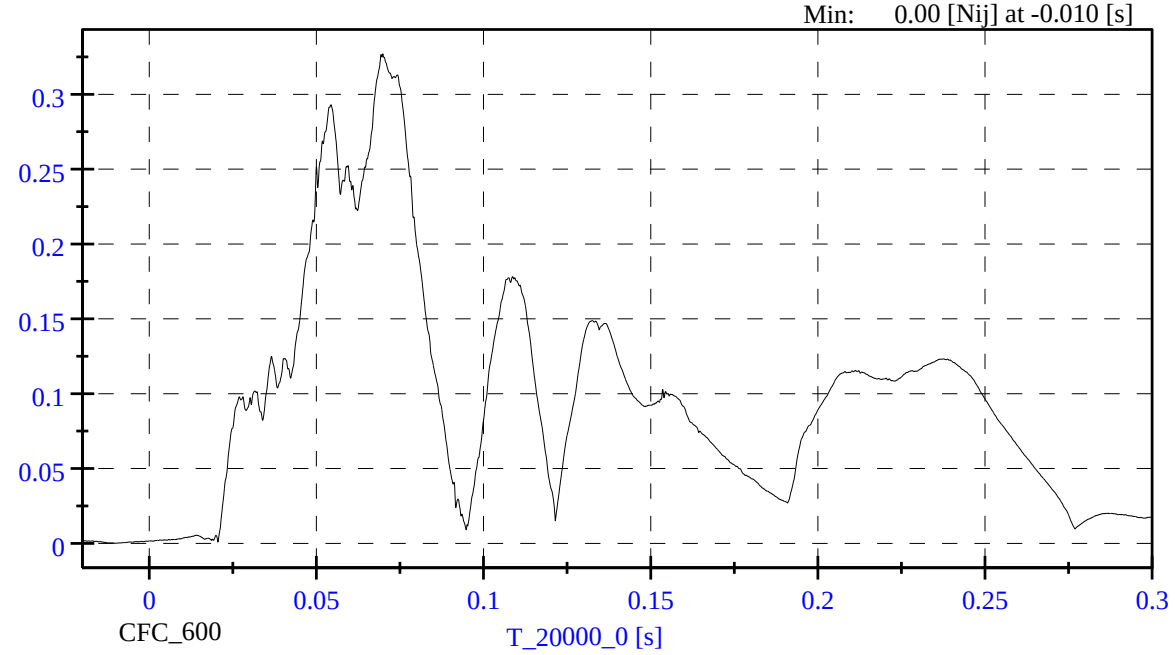
V1P1 Upper Neck My [N-m , CFC_600]

Max: 59.63 [N-m] at 0.074 [s]
Min: -24.75 [N-m] at 0.110 [s]



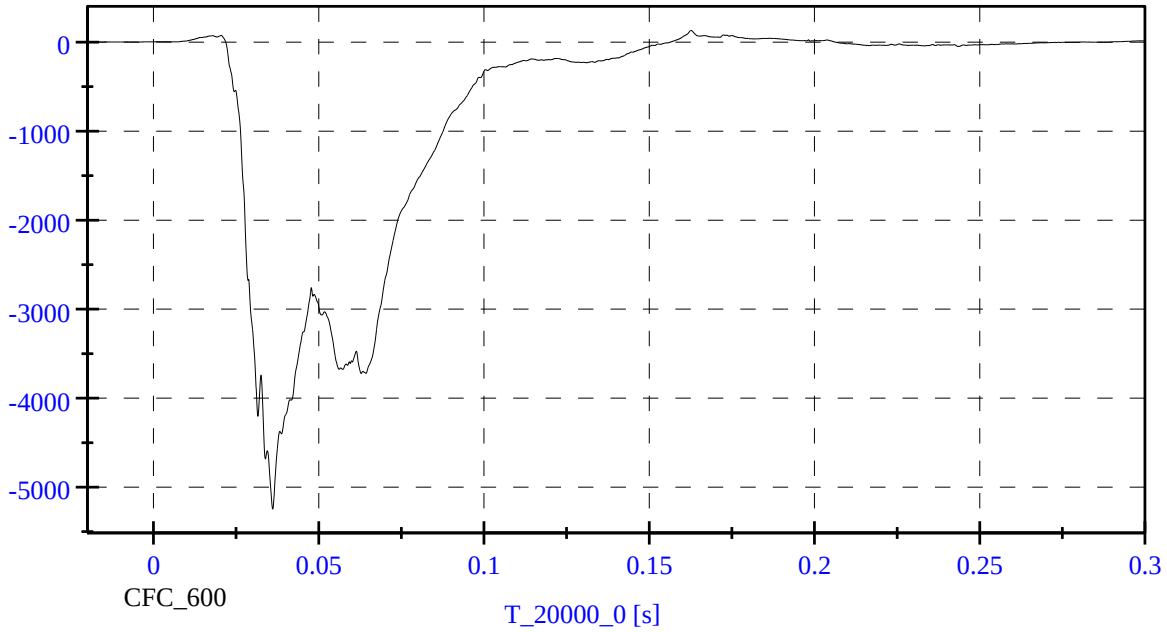
V1P1 Upper Neck Nij [Nij, CFC_600]

Max: 0.33 [Nij] at 0.070 [s]
Min: 0.00 [Nij] at -0.010 [s]



V1P1 Left Femur Fz [N , CFC_600]

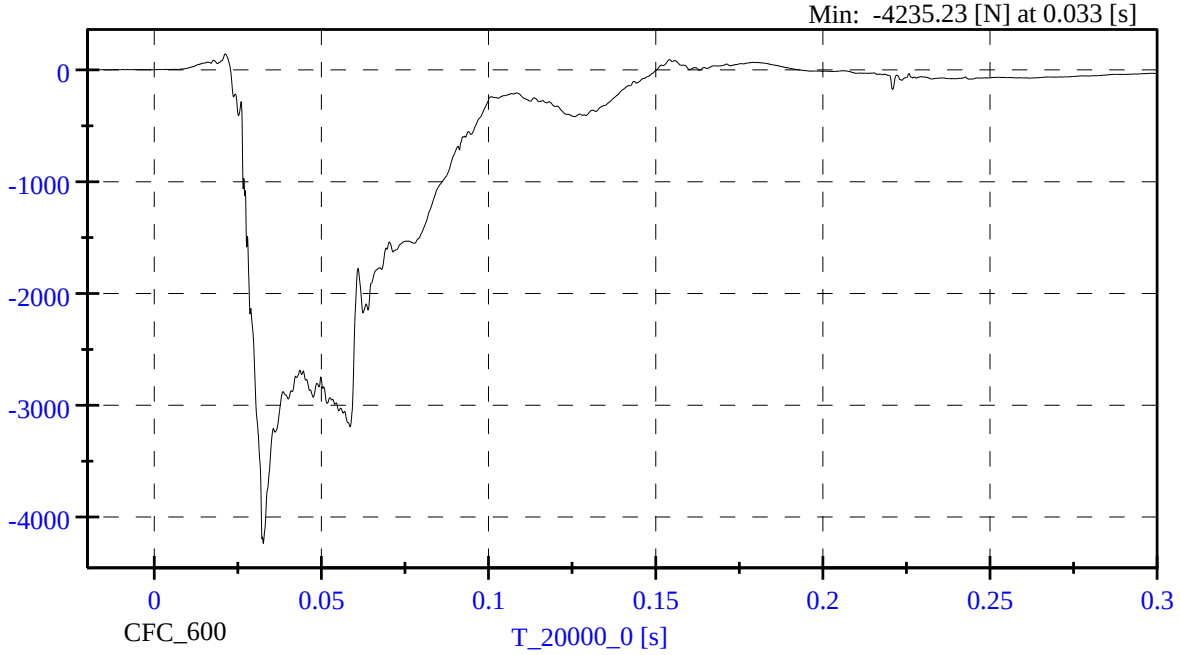
Max: 132.72 [N] at 0.163 [s]
Min: -5245.95 [N] at 0.036 [s]



V1P1 Right Femur Fz [N , CFC_600]

Max: 143.47 [N] at 0.021 [s]

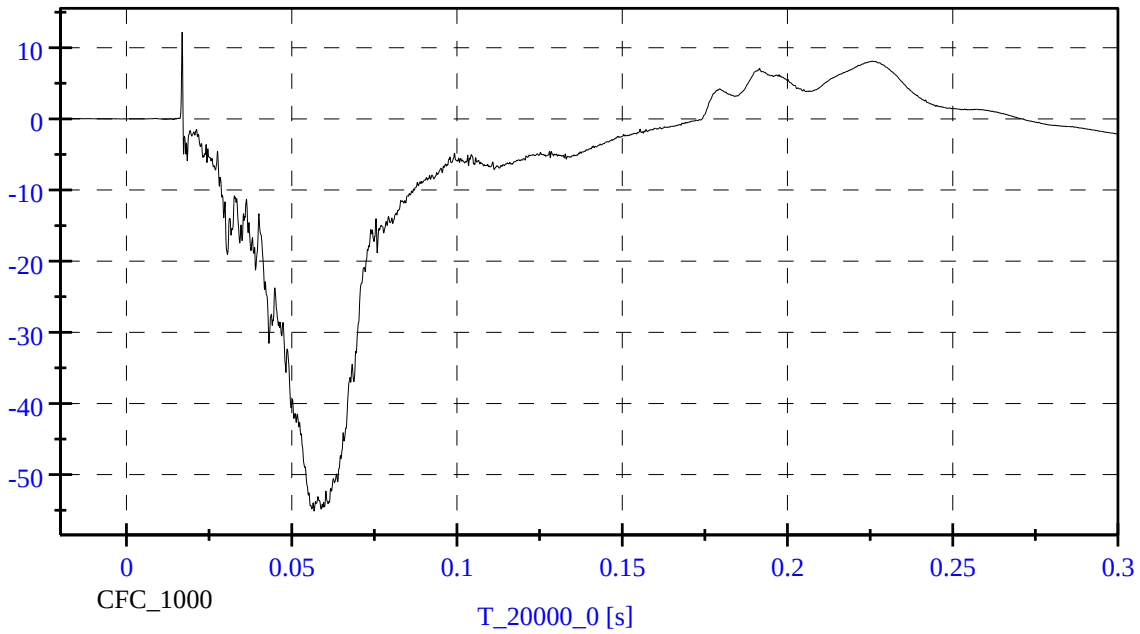
Min: -4235.23 [N] at 0.033 [s]



V1P2 Head x [g , CFC_1000]

Max: 12.16 [g] at 0.017 [s]

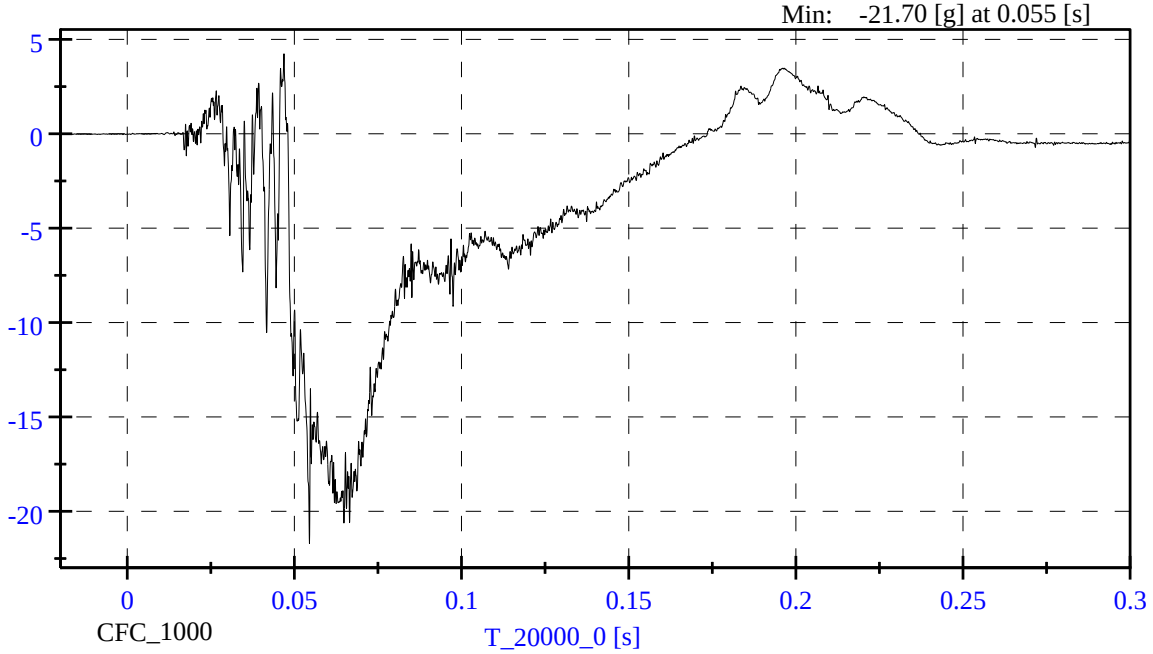
Min: -55.12 [g] at 0.057 [s]



V1P2 Head y [g , CFC_1000]

Max: 4.23 [g] at 0.047 [s]

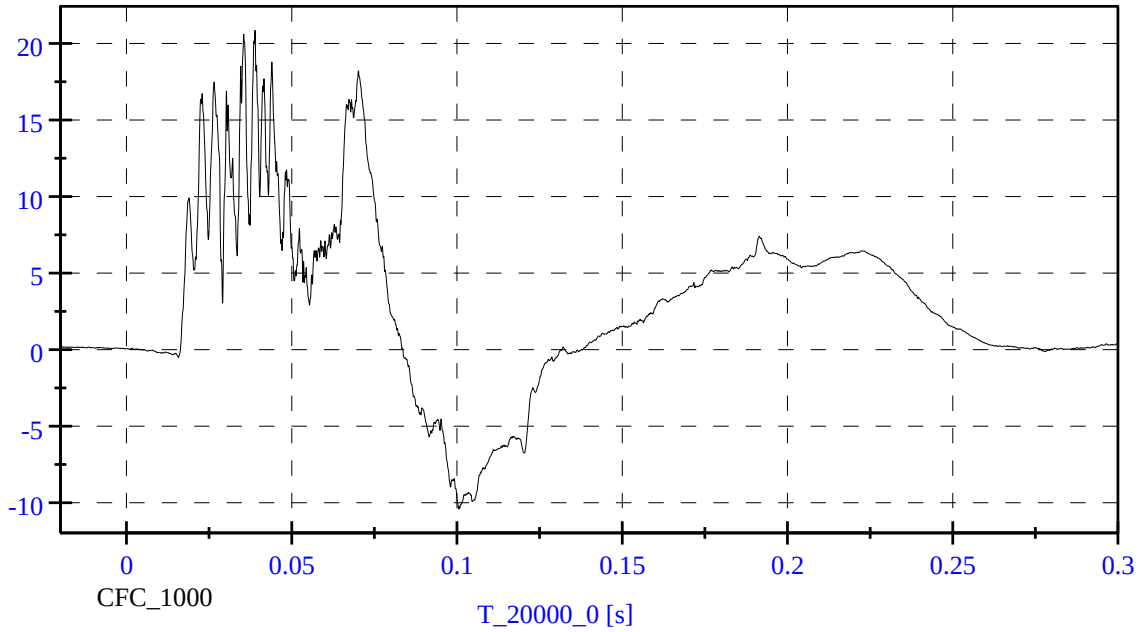
Min: -21.70 [g] at 0.055 [s]



V1P2 Head z [g , CFC_1000]

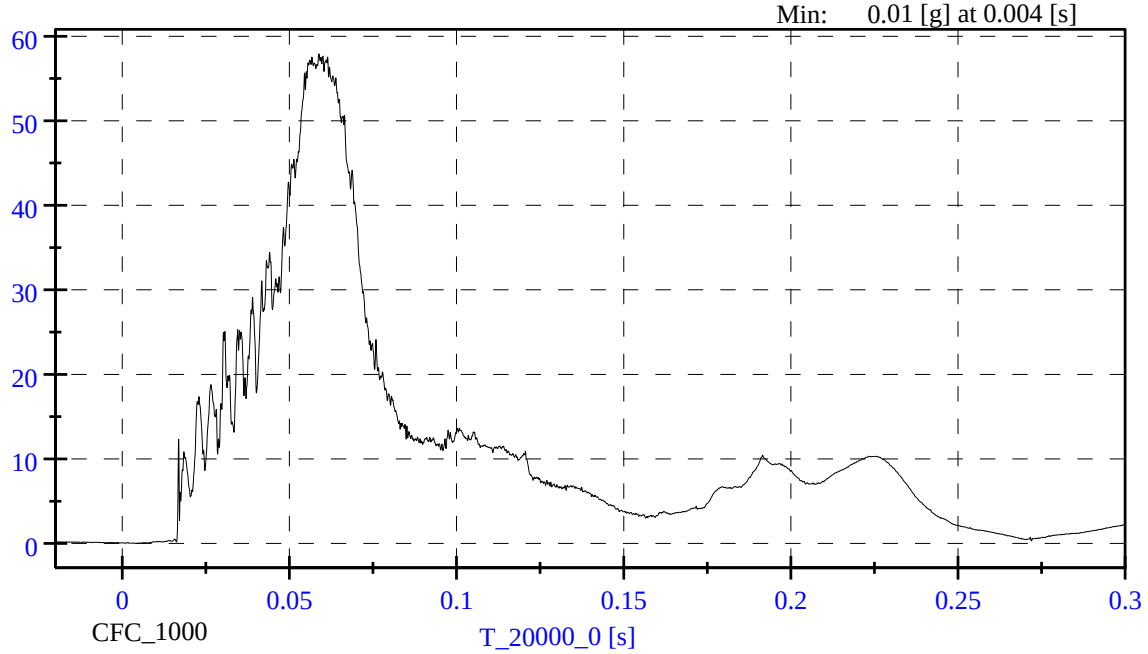
Max: 20.85 [g] at 0.039 [s]

Min: -10.41 [g] at 0.101 [s]



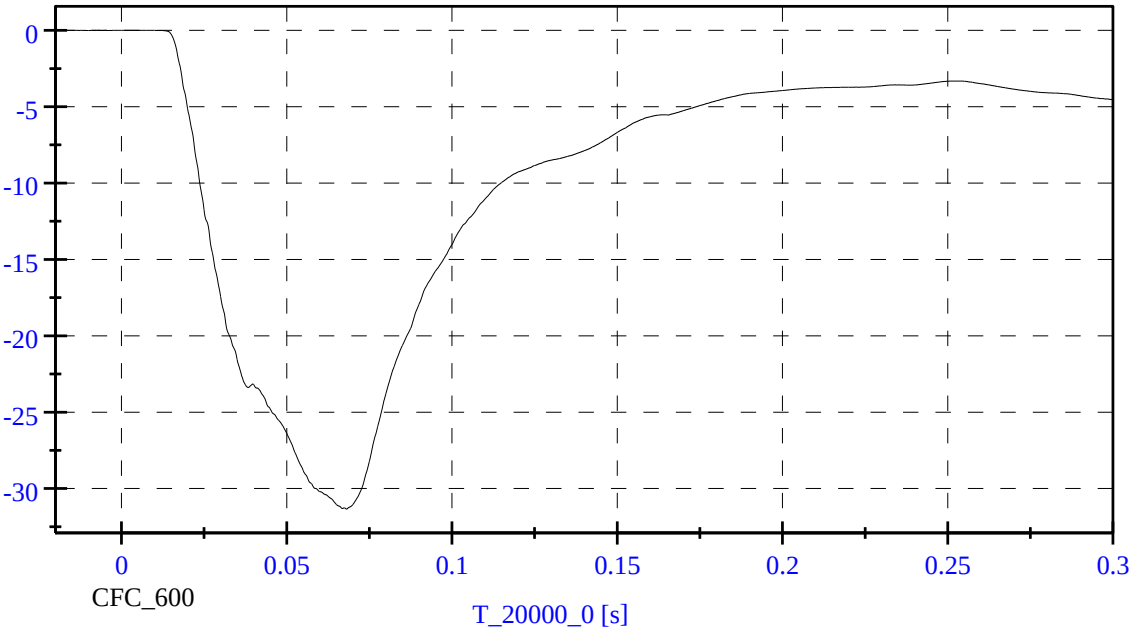
V1P2 Headform Resultant [g, CFC_1000]

Max: 57.91 [g] at 0.059 [s]
Min: 0.01 [g] at 0.004 [s]



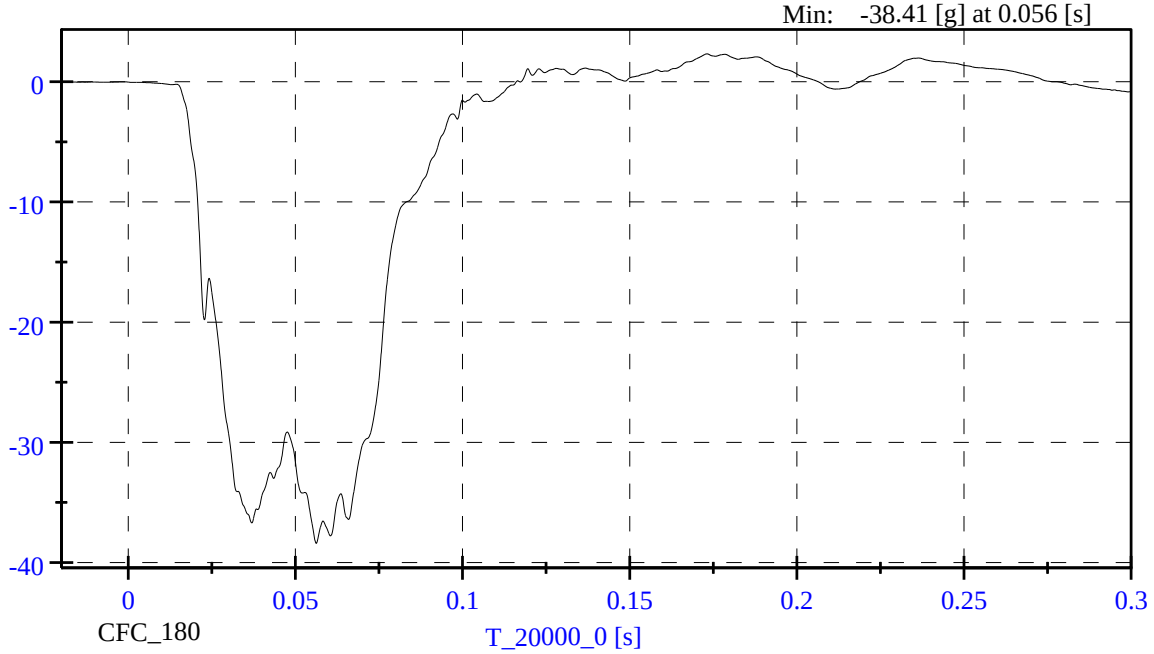
V1P2 Chest Displacement [mm , CFC_600]

Max: 0.00 [mm] at 0.009 [s]
Min: -31.34 [mm] at 0.068 [s]



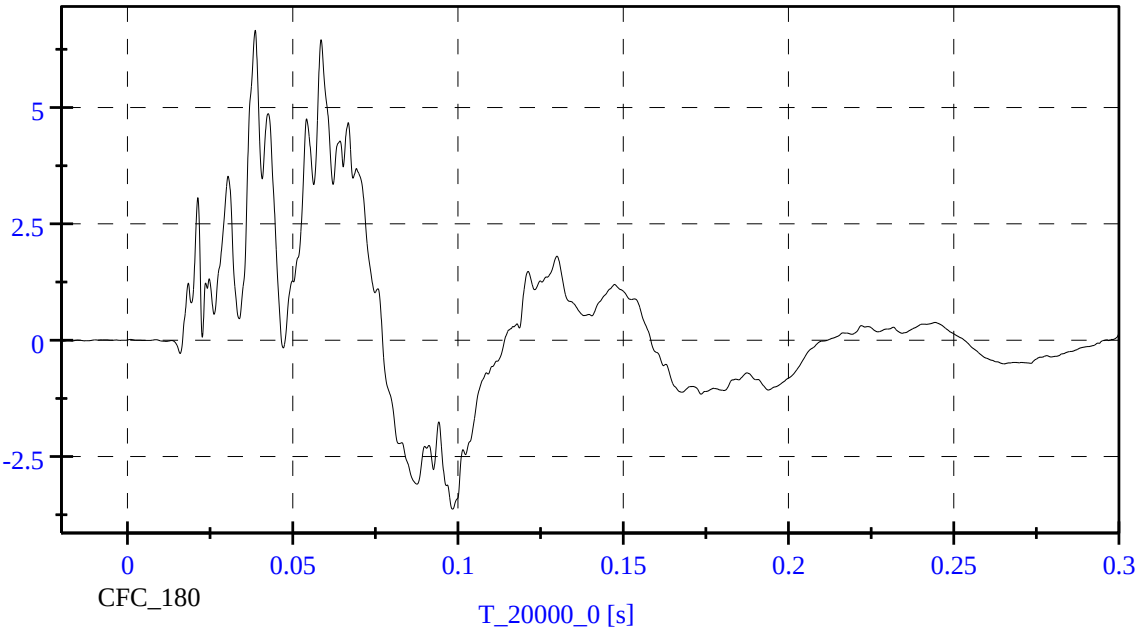
V1P2 Chest x [g , CFC_180]

Max: 2.32 [g] at 0.173 [s]
Min: -38.41 [g] at 0.056 [s]



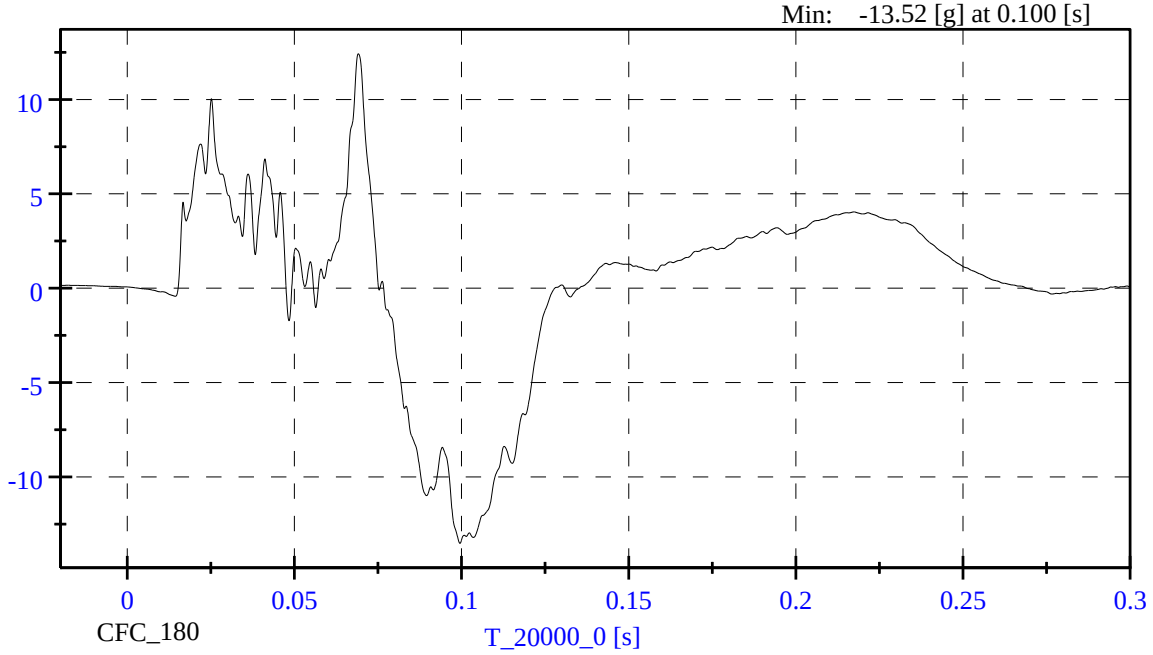
V1P2 Chest y [g , CFC_180]

Max: 6.66 [g] at 0.039 [s]
Min: -3.63 [g] at 0.098 [s]



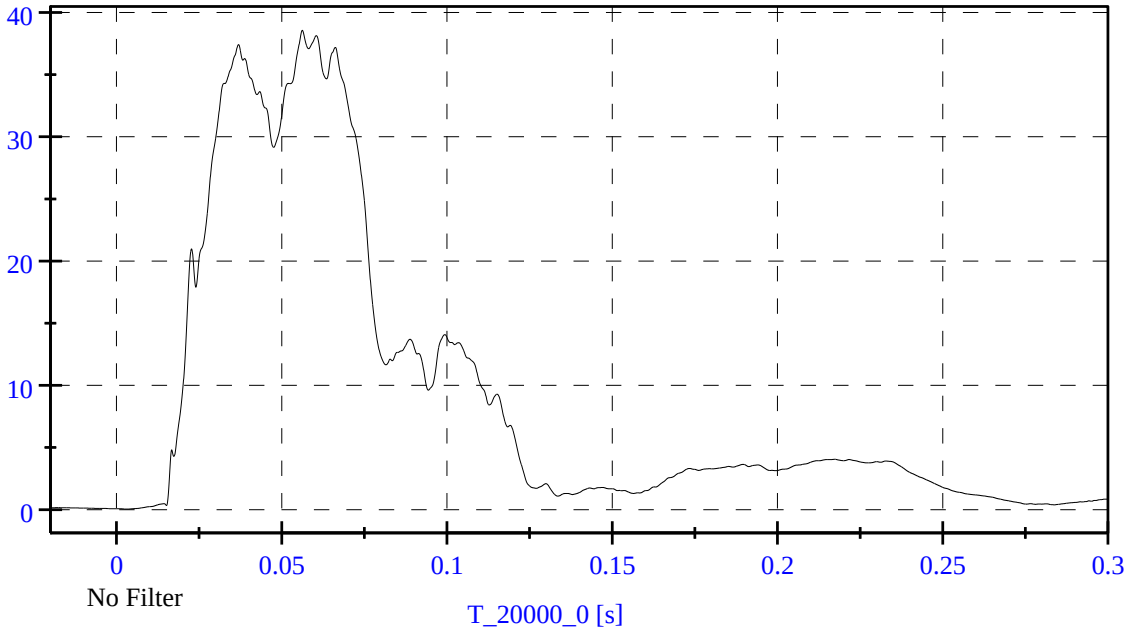
V1P2 Chest z [g , CFC_180]

Max: 12.42 [g] at 0.069 [s]
Min: -13.52 [g] at 0.100 [s]



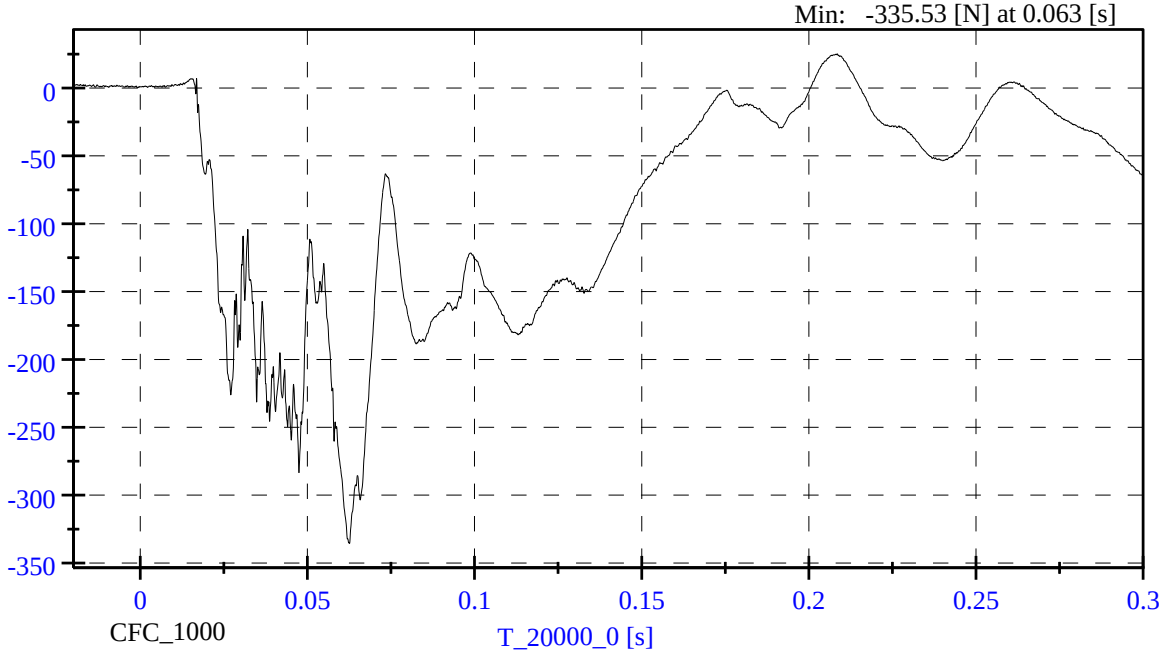
V1P2 Chest Resultant

Max: 38.56 [g] at 0.056 [s]
Min: 0.05 [g] at 0.003 [s]



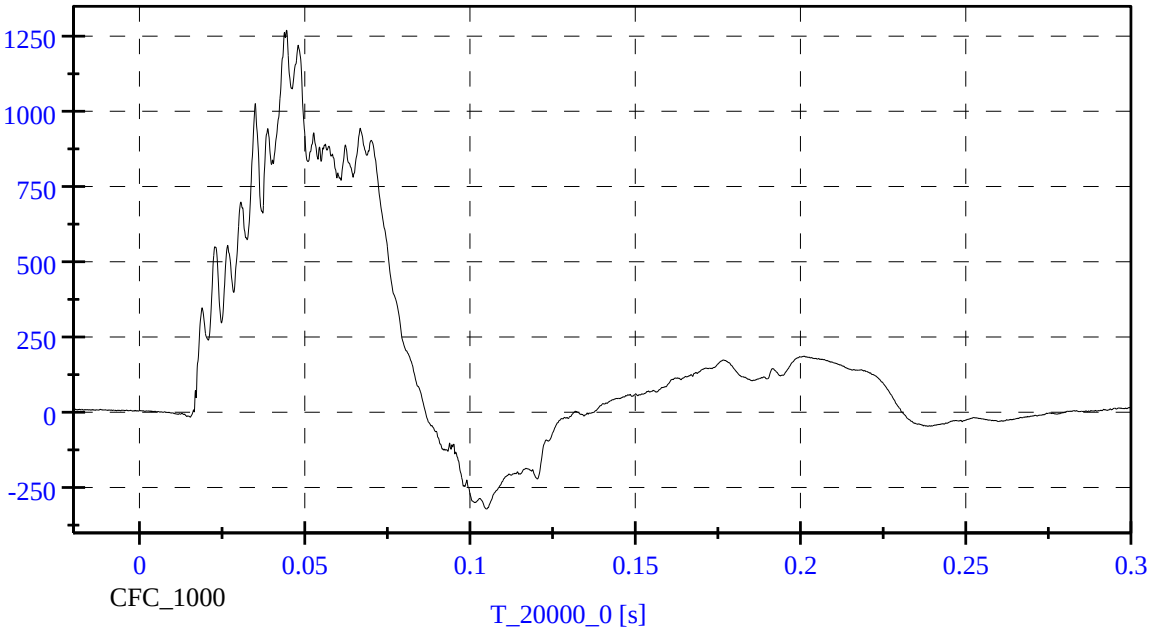
V1P2 Upper Neck Fx [N , CFC_1000]

Max: 25.18 [N] at 0.209 [s]
Min: -335.53 [N] at 0.063 [s]



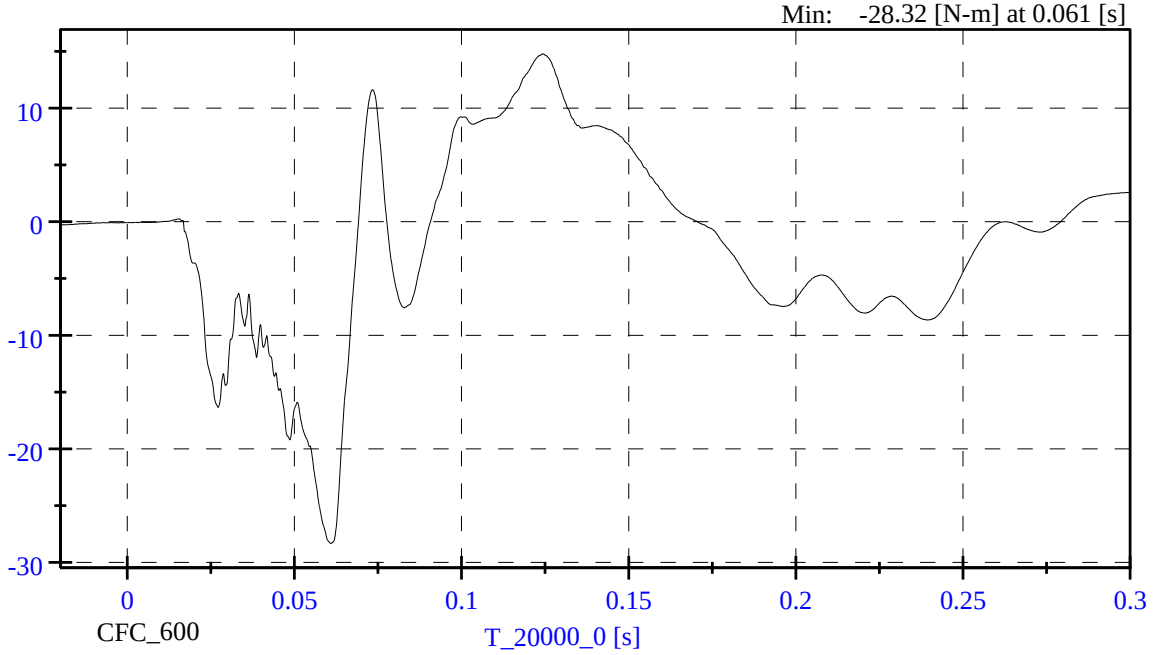
V1P2 Upper Neck Fz [N , CFC_1000]

Max: 1269.17 [N] at 0.045 [s]
Min: -321.85 [N] at 0.105 [s]



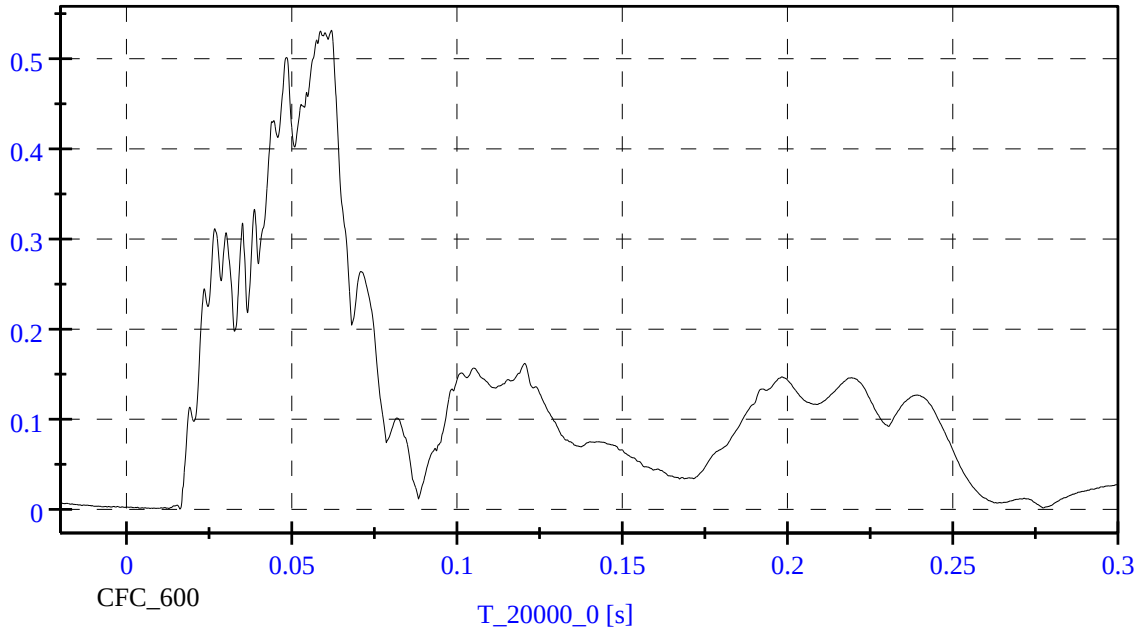
V1P2 Upper Neck My [N-m , CFC_600]

Max: 14.78 [N-m] at 0.124 [s]
Min: -28.32 [N-m] at 0.061 [s]



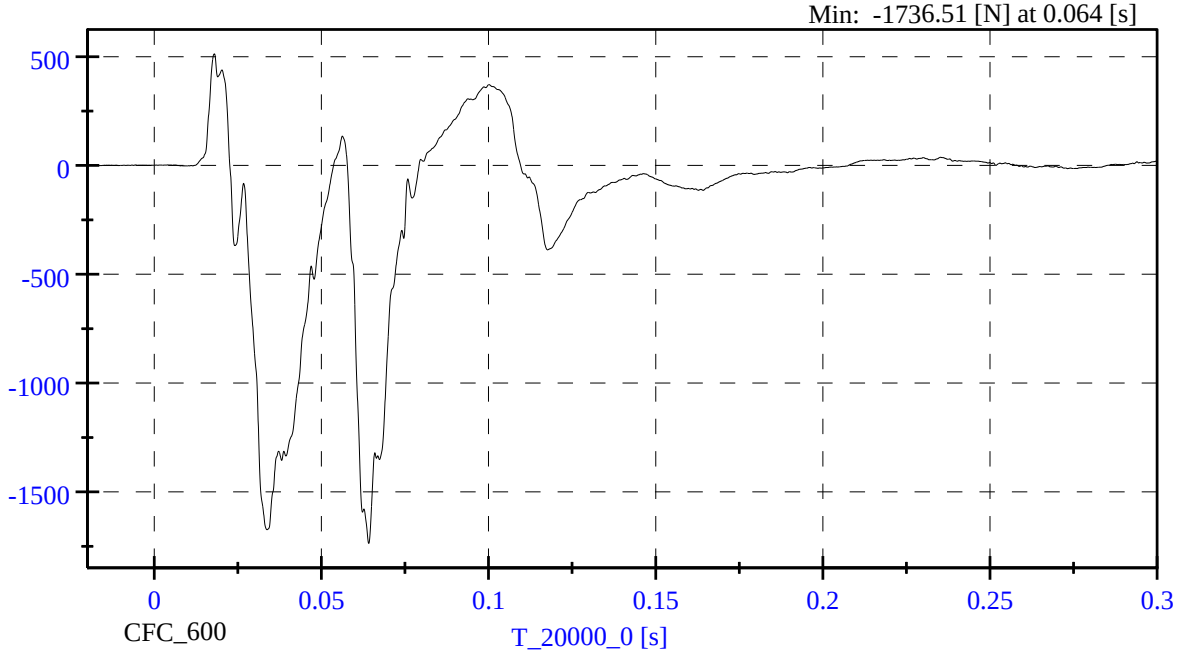
V1P2 Upper Neck Nij [Nij, CFC_600]

Max: 0.53 [Nij] at 0.062 [s]
Min: 0.00 [Nij] at 0.016 [s]



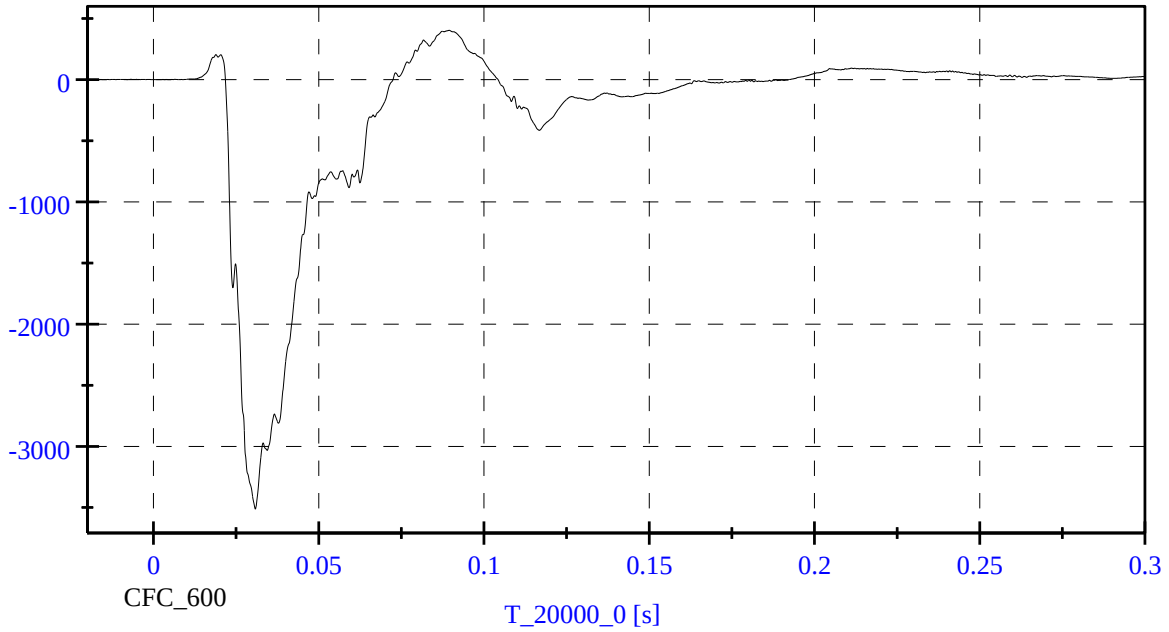
V1P2 Left Femur [N , CFC_600]

Max: 512.76 [N] at 0.018 [s]
Min: -1736.51 [N] at 0.064 [s]



V1P2 Right Femur [N , CFC_600]

Max: 403.57 [N] at 0.090 [s]
Min: -3512.57 [N] at 0.031 [s]



APPENDIX C

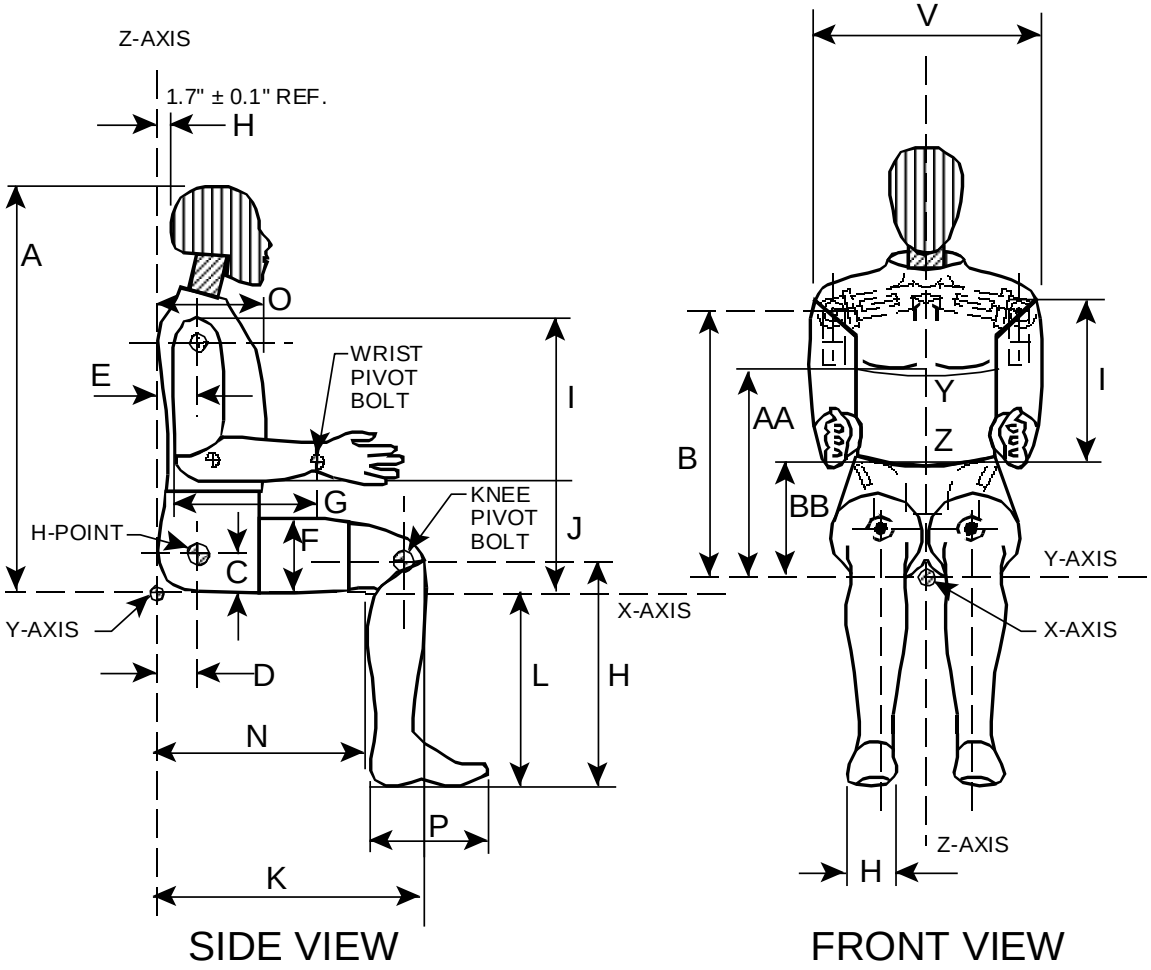
PART 572 E/O DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

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:

Position No./Location	Serial No.	Completion Date
#1/Driver	64	
#2/Right Front Passenger	273	

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: 064

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50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 – 35.0	35.0	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.4	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.5	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	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	13.3	Yes
J	Elbow Rest Height	7.5 – 8.3	7.9	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.5	Yes
L	Popliteal Height	16.9 – 17.9	17.2	Yes
M	Knee Pivot Height	19.1 – 19.7	19.1	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.2	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	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: 12/2/2011

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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:	**064**		
Test ID:		Test Date:	**12/2/2011**
Test Number:	**2**	Test Time:	**1:09:17 PM**

Component Part Number	Component Serial Number
Head Skin - 78051-228	**7997**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.9**	deg C	P
Humidity	10	--	70	**30**	%RH	P
Resultant Acceleration	225	--	275	**248**	g	P
Oscillation	0.0	--	10.0	**2.4**	%	P
Lateral Acceleration	-15.00	--	15.00	**-3.56**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **1:09:17 PM** Test Date: **12/2/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P66931**	**6/13/2011**
Endevco	**7264-2000**	**P66926**	**6/13/2011**
Endevco	**7264-2000**	**P66943**	**6/13/2011**

Test ID: Test Time: **1:09:17 PM** Test Date: **12/2/2011**

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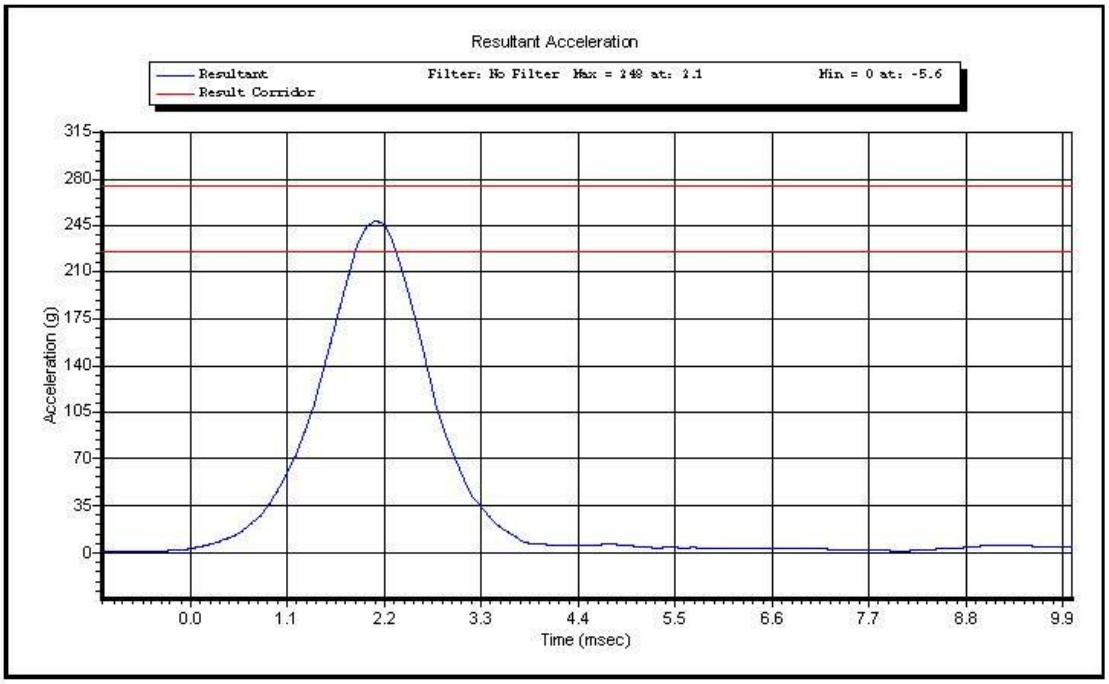
Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:		Test Date:	**12/2/2011**
Test Number:	**2**	Test Time:	**1:09:17 PM**



Test ID: Test Time: **1:09:17 PM** Test Date: **12/2/2011**

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1 of 2

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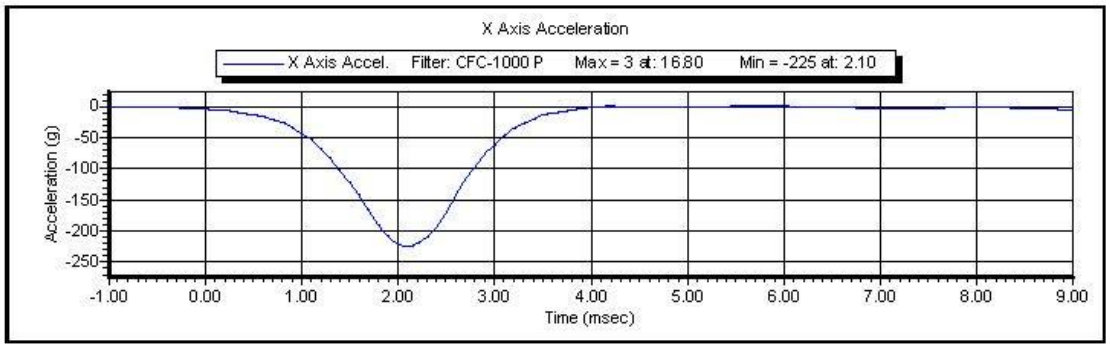

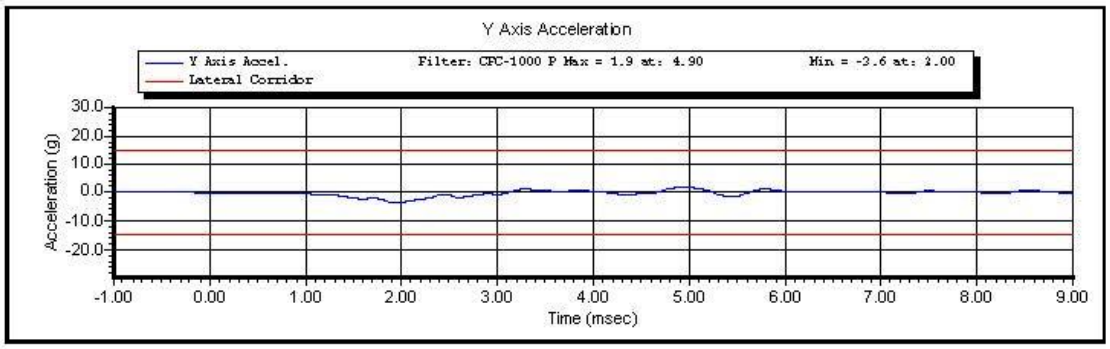

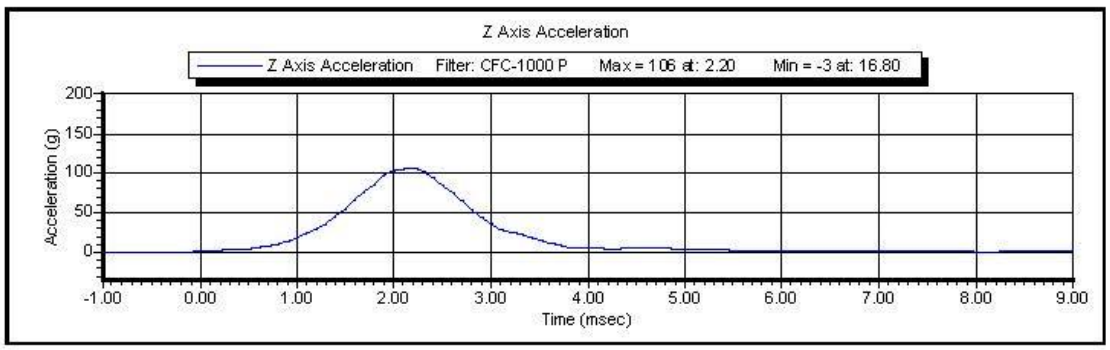

Test ID: Test Time: **1:09:17 PM** Test Date: **12/2/2011**

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2 of 2

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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:	**064**		
Test ID:		Test Date:	**12/2/2011**
Test Number:	**1**	Test Time:	**3:26:57 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**02-1692**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**22.1**	deg C	P
Humidity		10	--	70	**29**	%RH	P
Velocity		6.89	--	7.13	**7.10**	m/s	P
Pendulum Deceleration at	10 ms	22.5	--	27.5	**26.8**	g	P
Pendulum Deceleration at	20 ms	17.6	--	22.6	**21.0**	g	P
Pendulum Deceleration at	30 ms	12.5	--	18.5	**17.2**	g	P
Max Pendulum Deceleration After	30 ms	0.0	--	29.0	**17.2**	g	P
Deceleration time to	5 g	34.0	--	42.0	**35.8**	ms	P
D Plane Rotation		-78.0	--	-64.0	**-72.7**	degrees	P
Time at max rotation		57.0	--	64.0	**58.2**	ms	P
Rotation Decay to Zero		113.0	--	128.0	**113.2**	ms	P
Moment about OC		88.1	--	108.4	**97.3**	Nm	P
Time at Max Moment		47.0	--	58.0	**48.0**	ms	P
Moment Decay to Zero		97.0	--	107.0	**100.4**	ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **3:26:57 PM** Test Date: **12/2/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID: Test Time: **3:26:57 PM** Test Date: **12/2/2011**

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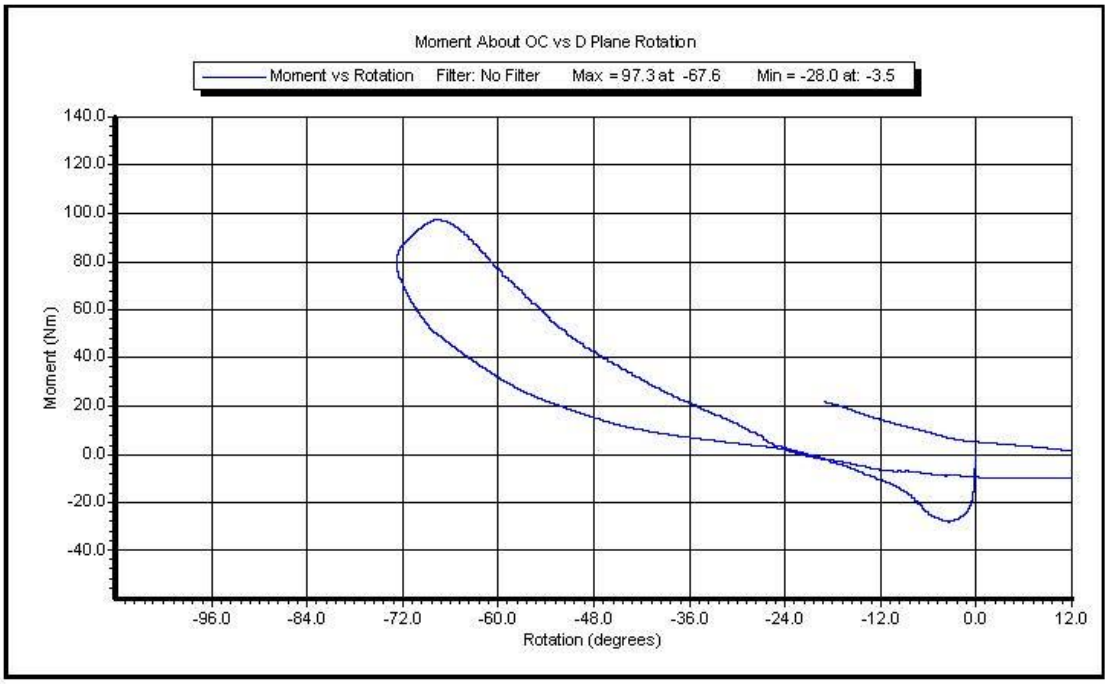
Name of Test:	**Neck Flexion**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
ID of Test:		Date:	**12/2/2011**
Number of Test:	**1**	Time of Test:	**3:26:57 PM**



ID of Test: Time of Test: **3:26:57 PM** Date of Test: **12/2/2011**

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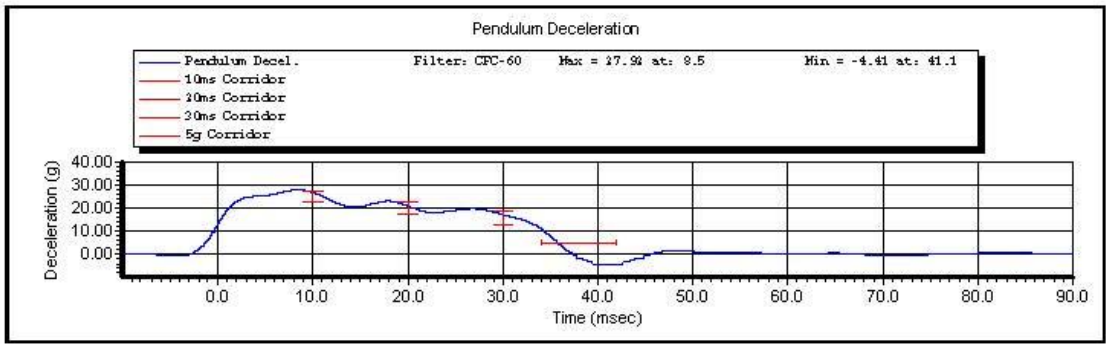
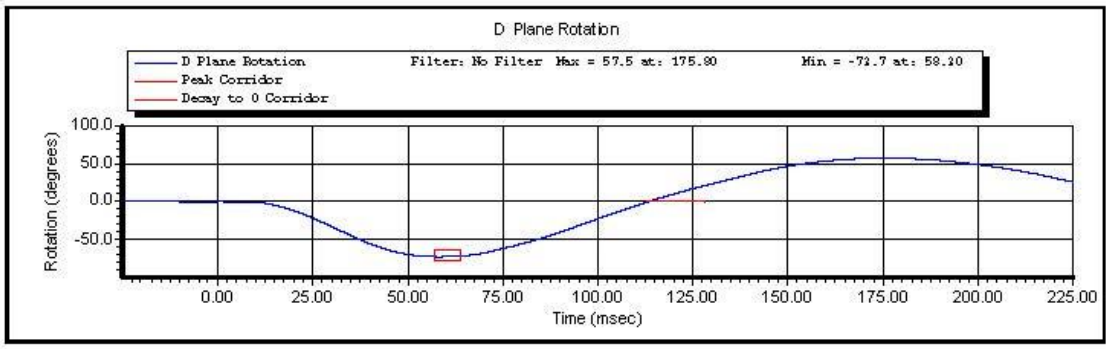
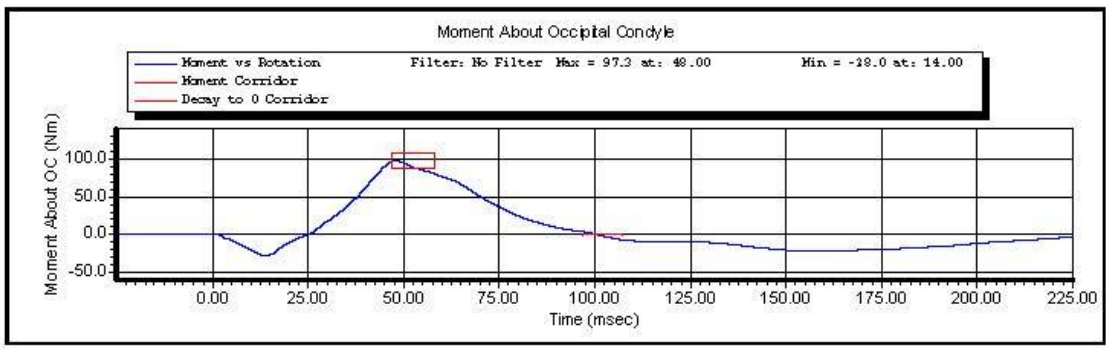
1 of 2







ID of Test: Time of Test: **3:26:57 PM** Date of Test: **12/2/2011**

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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:	**064**		
Test ID:		Test Date:	**12/6/2011**
Test Number:	**2**	Test Time:	**11:21:22 AM**

Component Part Number	Component Serial Number
Neck - 78051-336	**02-1692**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.8**	deg C	P
Humidity		10	--	70	**35**	%RH	P
Velocity		5.94	--	6.19	**6.13**	m/s	P
Pendulum Deceleration at	10 ms	17.2	--	21.2	**20.9**	g	P
Pendulum Deceleration at	20 ms	14.0	--	19.0	**17.7**	g	P
Pendulum Deceleration at	30 ms	11.0	--	16.0	**14.0**	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	**38.6**	ms	P
D Plane Rotation		81.0	--	106.0	**98.4**	degrees	P
Time at Max Rotation		72.0	--	82.0	**77.4**	ms	P
Rotation Decay to Zero		147.0	--	174.0	**155.3**	ms	P
Moment About Occipital Condyle		-80.0	--	-52.9	**-67.3**	Nm	P
Time at Max Moment		65.0	--	79.0	**72.4**	ms	P
Moment Decay to Zero		120.0	--	148.0	**143.1**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. travale**

Test ID: Test Time: **11:21:22 AM** Test Date: **12/6/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID: Test Time: **11:21:22 AM** Test Date: **12/6/2011**

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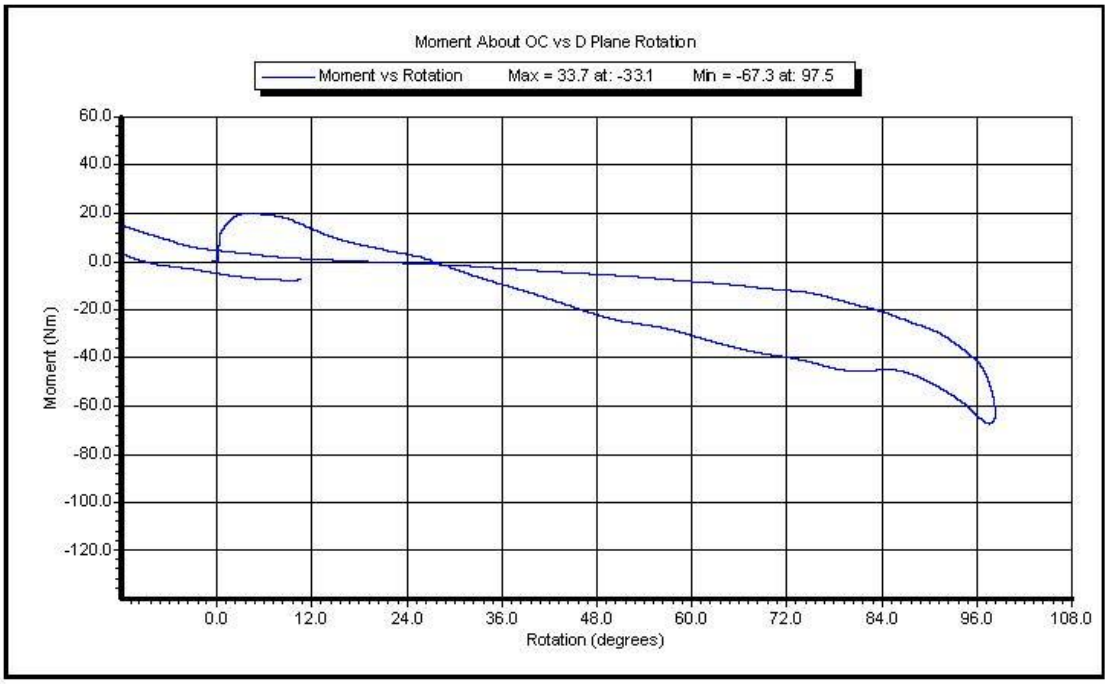
Name of Test:	**Neck Extension**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
ID of Test:		Date:	**12/6/2011**
Number of Test:	**2**	Time of Test:	**11:21:22 AM**



ID of Test: Time of Test: **11:21:22 AM** Date of Test: **12/6/2011**

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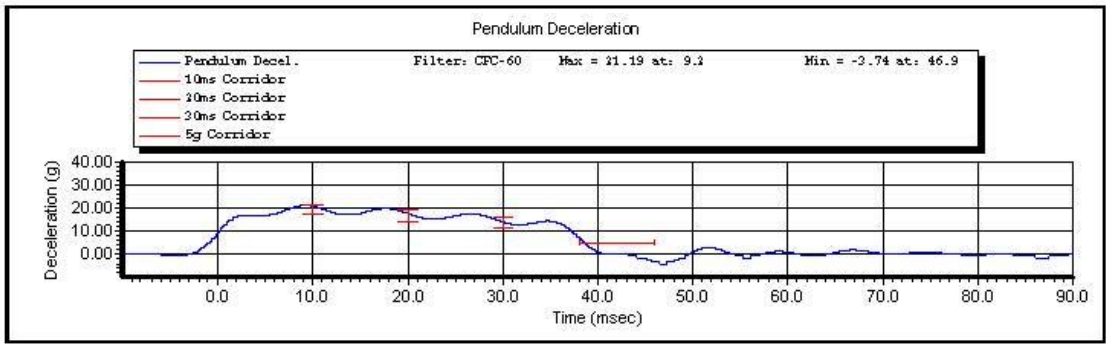

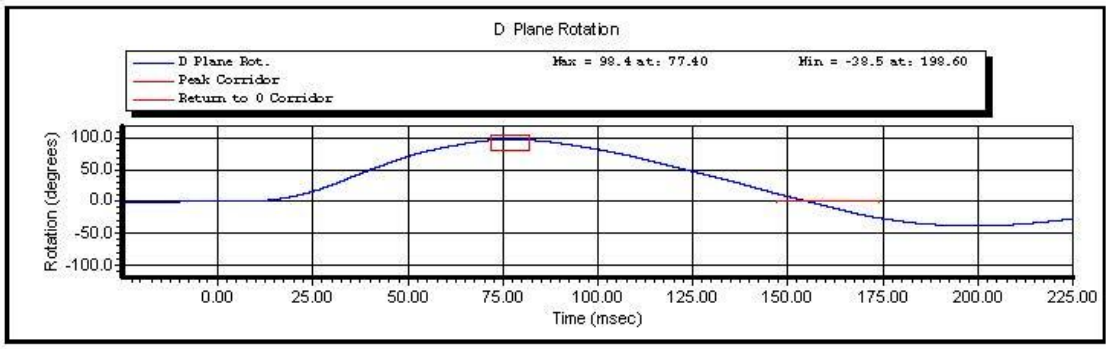

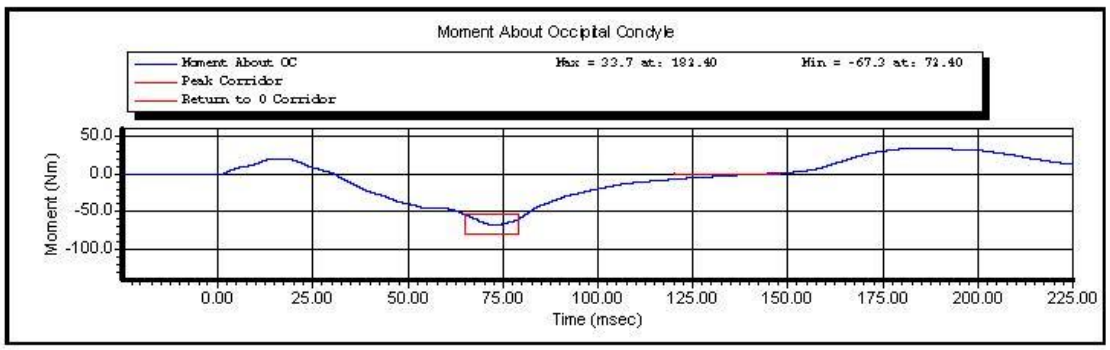

ID of Test: Time of Test: **11:21:22 AM** Date of Test: **12/6/2011**

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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:	**064**		
Test ID:		Test Date:	**12/7/2011**
Test Number:	**3**	Test Time:	**8:11:35 AM**

Component Part Number	Component Serial Number
Ribs 78051-RS	**3964**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.0**	deg C	P
Humidity	10.0	--	70.0	**31.0**	%RH	P
Velocity	6.59	--	6.83	**6.80**	m/s	P
Resistive Force	-5.894	--	-5.160	**-5.565**	kN	P
Sternum Displacement	-72.6	--	-63.5	**-66.1**	mm	P
Hysteresis	69	--	85	**75**	%	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **8:11:35 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7231CT**	**AH5M8**	**11/8/2011**
DentonATD	**78051-342**	**DS-064**	**10/13/2011**

Test ID: Test Time: **8:11:35 AM** Test Date: **12/7/2011**

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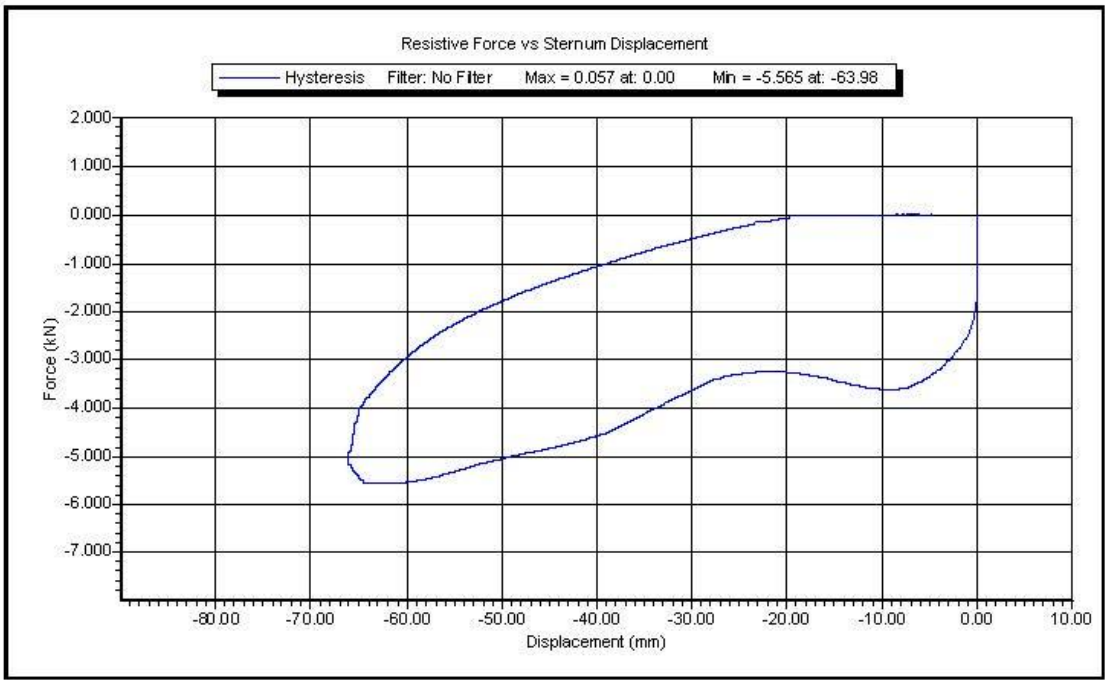
Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:		Test Date:	**12/7/2011**
Test Number:	**3**	Test Time:	**8:11:35 AM**



Test ID: Test Time: **8:11:35 AM** Test Date: **12/7/2011**

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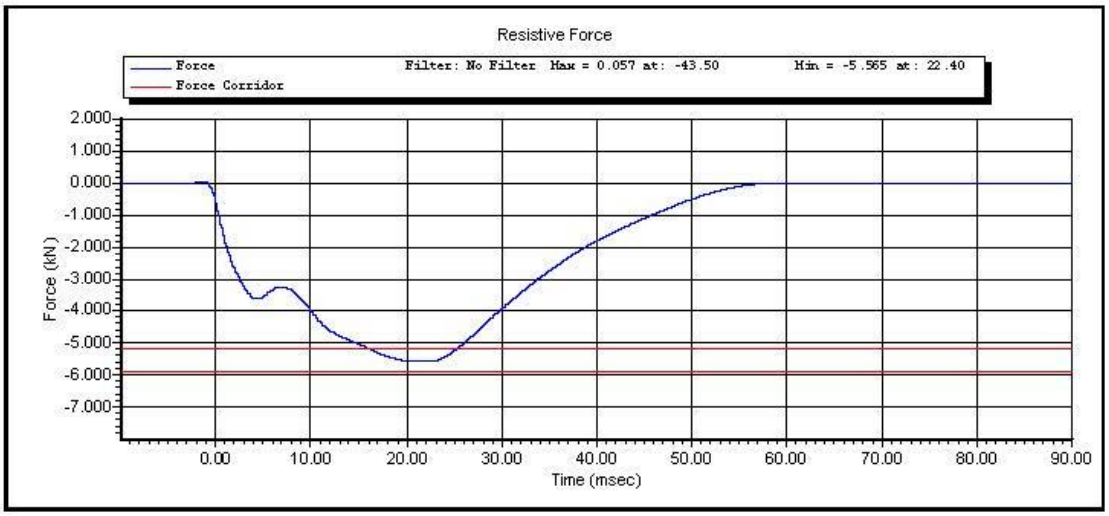

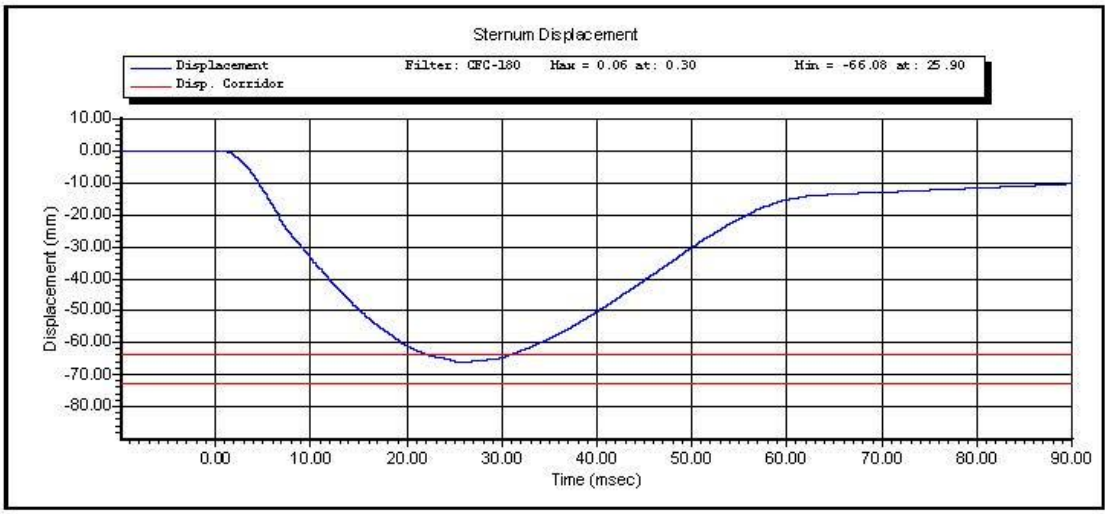

Test ID: Test Time: **8:11:35 AM** Test Date: **12/7/2011**

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CALSPAN

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

Serial Number: 064
Test Number: 1
Comments: RIGHT

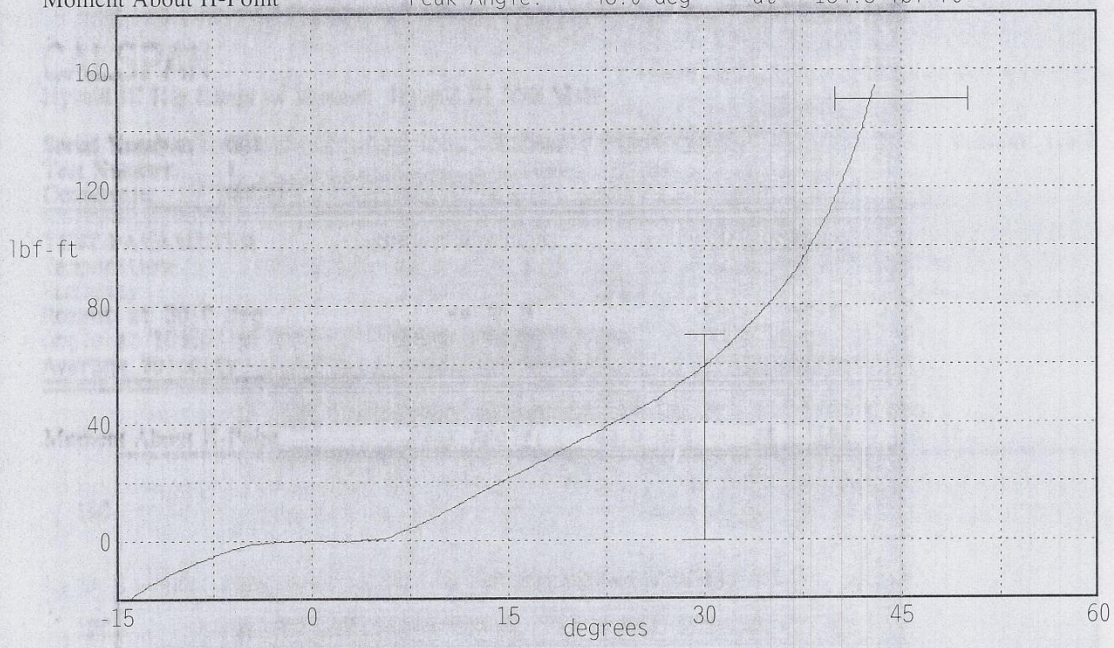
Date: 12/05/2011
Time: 13:43

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS		
Temperature	66.0 - 78.0	71.0	°F	Pass
Humidity	10 - 70	44	%	Pass
Moment at 30.0 deg	<= 70.0	59.4	lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	42.8	deg	Pass
Average Velocity	5.0 - 10.0	7.5	deg/sec	Pass

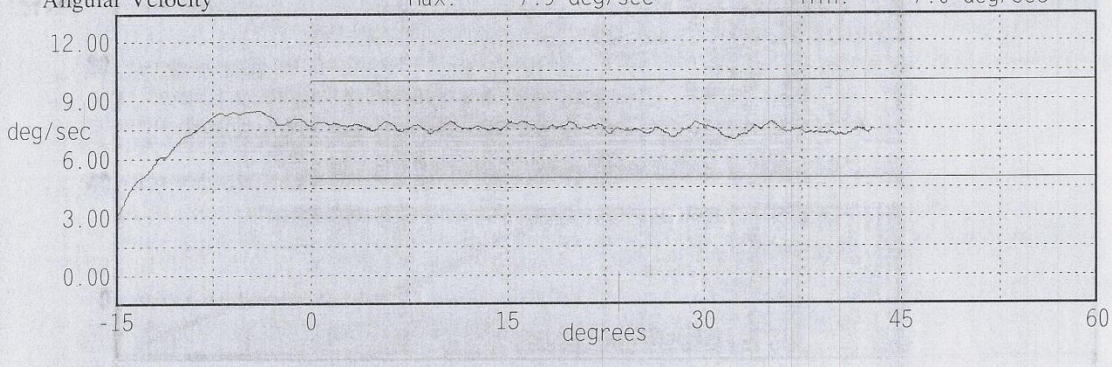
Peak Moment: 154.8 lbf-ft at 43.0 deg
Peak Angle: 43.0 deg at 154.8 lbf-ft

Moment About H-Point



Angular Velocity

Max: 7.9 deg/sec Min: 7.0 deg/sec



CALSPAN

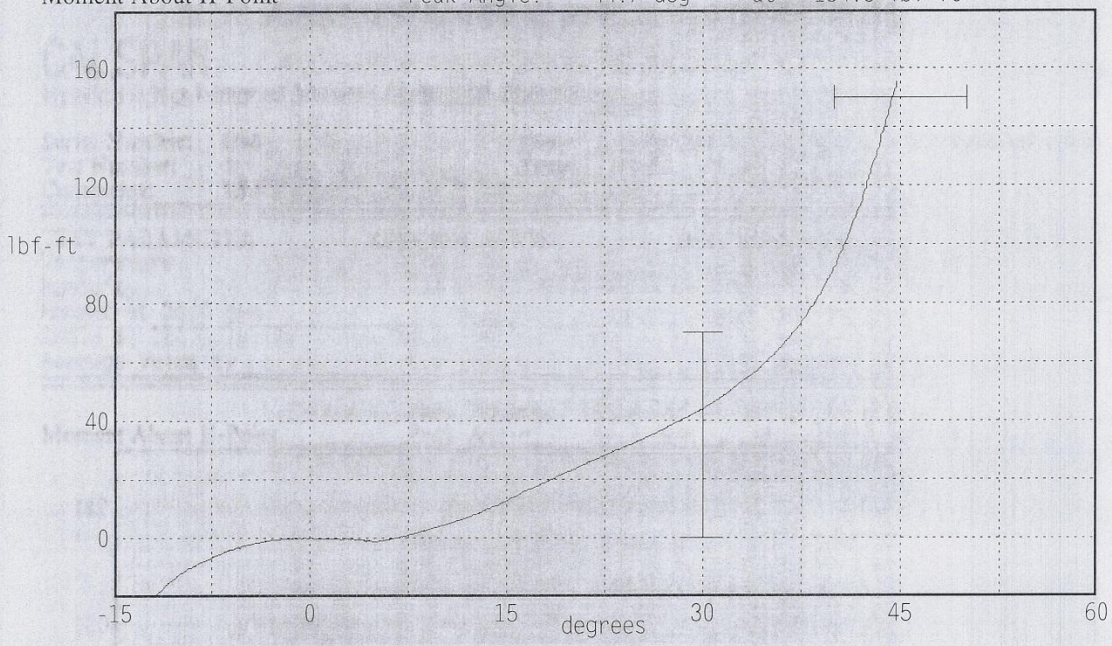
Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number: 064 Date: 12/05/2011 Version: 1.6.3
Test Number: 1 Time: 13:27
Comments: LEFT

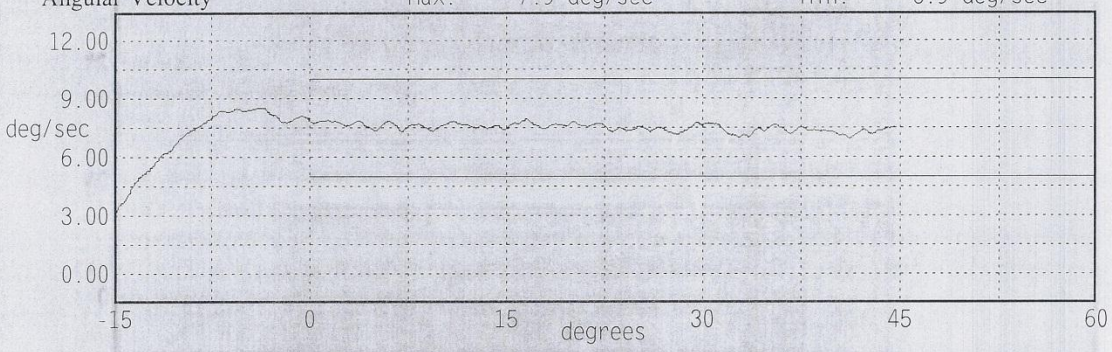
TEST PARAMETER	SPECIFICATION	TEST RESULTS		
Temperature	66.0 - 78.0	71.0	°F	Pass
Humidity	10 - 70	44	%	Pass
Moment at 30.0 deg	<= 70.0	44.2	lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.4	deg	Pass
Average Velocity	5.0 - 10.0	7.5	deg/sec	Pass

Peak Moment: 155.4 lbf-ft at 44.7 deg
Peak Angle: 44.7 deg at 154.3 lbf-ft

Moment About H-Point



Angular Velocity Max: 7.9 deg/sec Min: 6.9 deg/sec



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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Left Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**9:38:27 AM**

Component Part Number	Component Serial Number
Knee Skin - 78051	**2792**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**31.0**	%RH	P
Velocity	2.07	--	2.13	**2.09**	m/s	P
Resistive Force	-5.78	--	-4.72	**-4.88**	kN	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Left Knee** Test Time: **9:38:27 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7264-2000**	**P71267**	**11/2/2011**

Test ID: **Left Knee** Test Time: **9:38:27 AM** Test Date: **12/7/2011**

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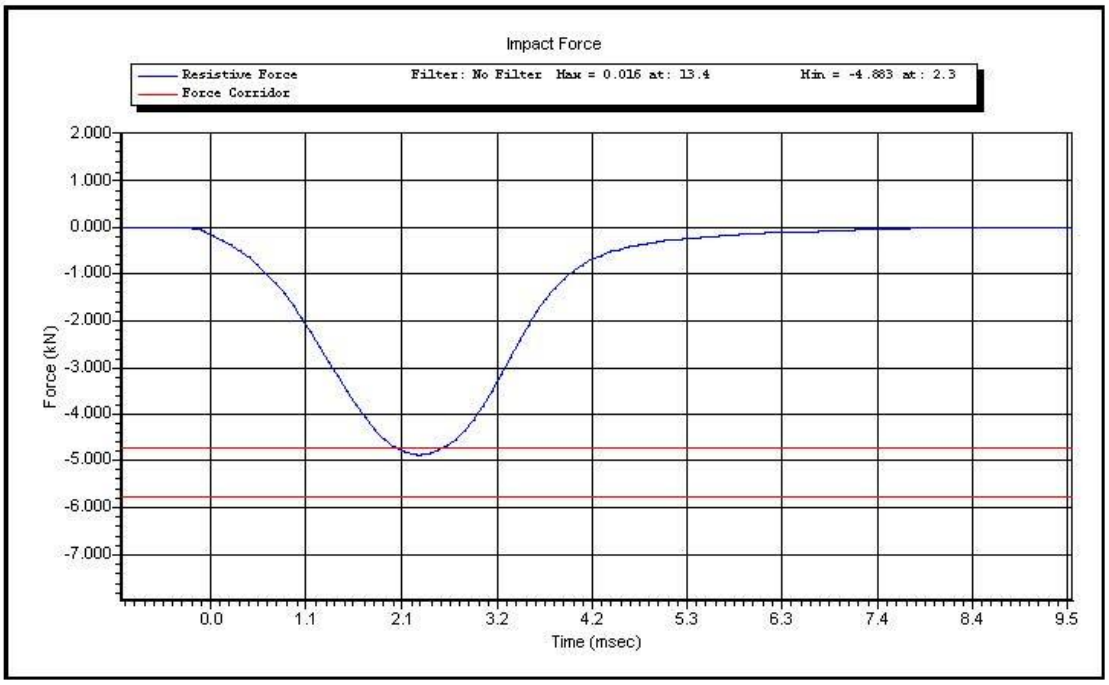
Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Left Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**9:38:27 AM**



Test ID: **Left Knee** Test Time: **9:38:27 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Right Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**9:10:55 AM**

Component Part Number	Component Serial Number
Knee Skin - 78056	**2880**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**31.0**	%RH	P
Velocity	2.07	--	2.13	**2.09**	m/s	P
Resistive Force	-5.78	--	-4.72	**-5.25**	kN	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee** Test Time: **9:10:55 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7264-2000**	**P71267**	**11/2/2011**

Test ID: **Right Knee** Test Time: **9:10:55 AM** Test Date: **12/7/2011**

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Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Right Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**9:10:55 AM**

Test ID: **Right Knee** Test Time: **9:10:55 AM** Test Date: **12/7/2011**

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CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

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External Measurements

5th Female SN 273

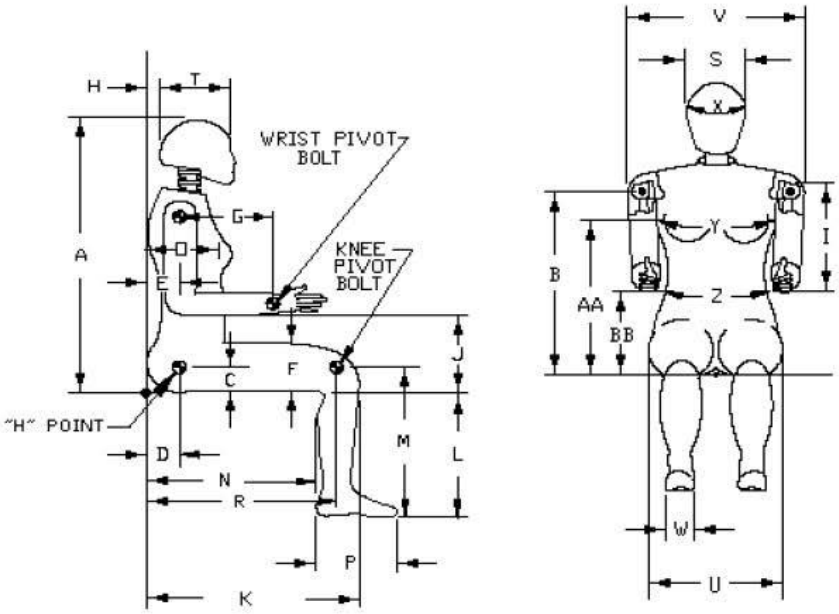
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	192	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	397	Yes
N	Buttock Popliteal Length	414 – 439.4	422	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 - 94	82	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	860	Yes
Z	Waist Circumference	759.5 – 789.9	770	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: 12/2/2011

Hybrid III 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:		Test Date:	**12/2/2011**
Test Number:	**1**	Test Time:	**9:52:37 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.9**	deg C	P
Humidity	10	--	70	**29**	%RH	P
Resultant Acceleration	250	--	300	**294**	g	P
Oscillation	0.0	--	10.0	**1.6**	%	P
Lateral Acceleration	-15.00	--	15.00	**-2.08**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **9:52:37 AM** Test Date: **12/2/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P66931**	**6/13/2011**
Endevco	**7264-2000**	**P66926**	**6/13/2011**
Endevco	**7264-2000**	**P66943**	**6/13/2011**

Test ID: Test Time: **9:52:37 AM** Test Date: **12/2/2011**

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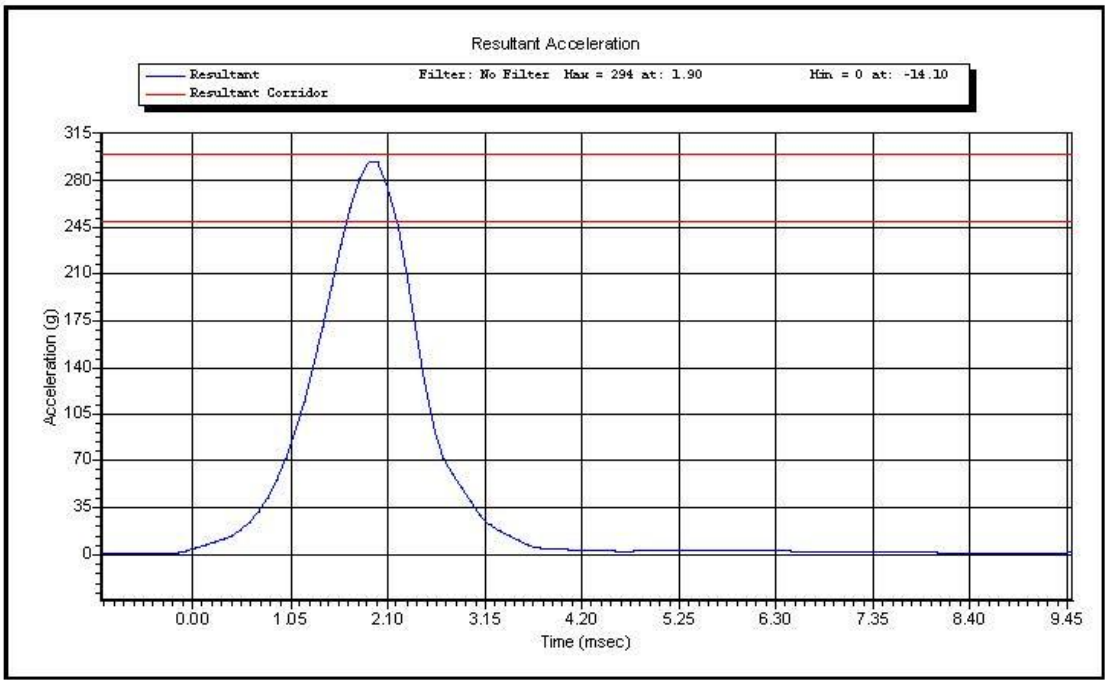
Test Name:	**Head Drop**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**12/2/2011**
Test Number:	**1**	Test Time:	**9:52:37 AM**



Test ID: Test Time: **9:52:37 AM** Test Date: **12/2/2011**

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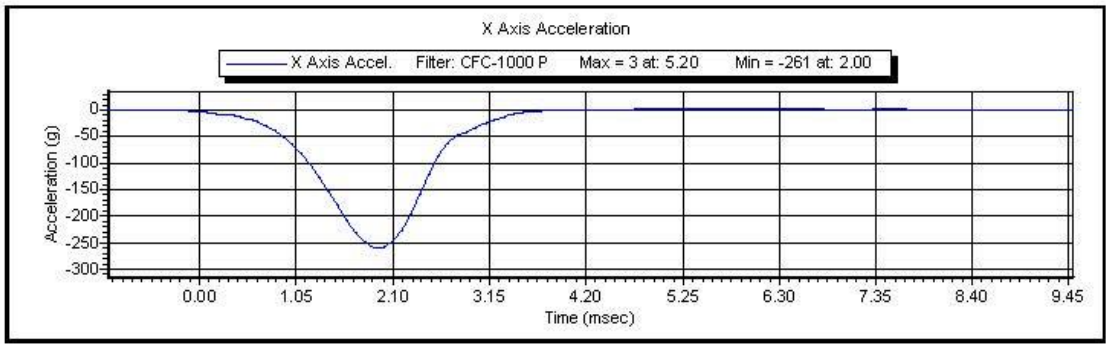
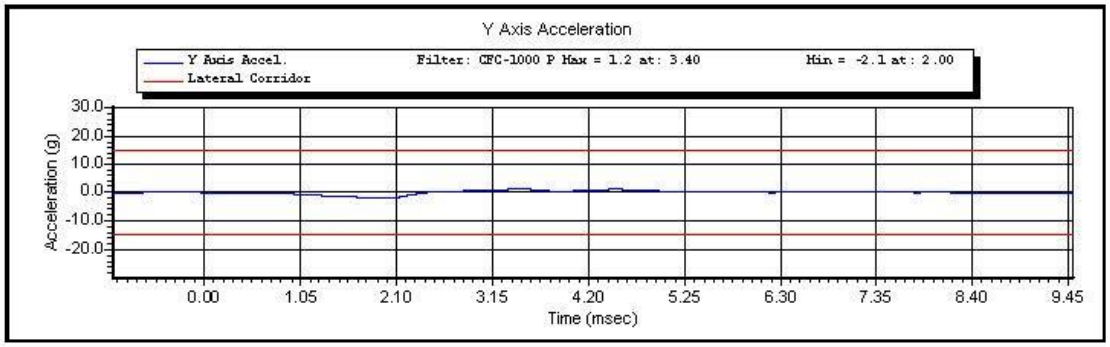
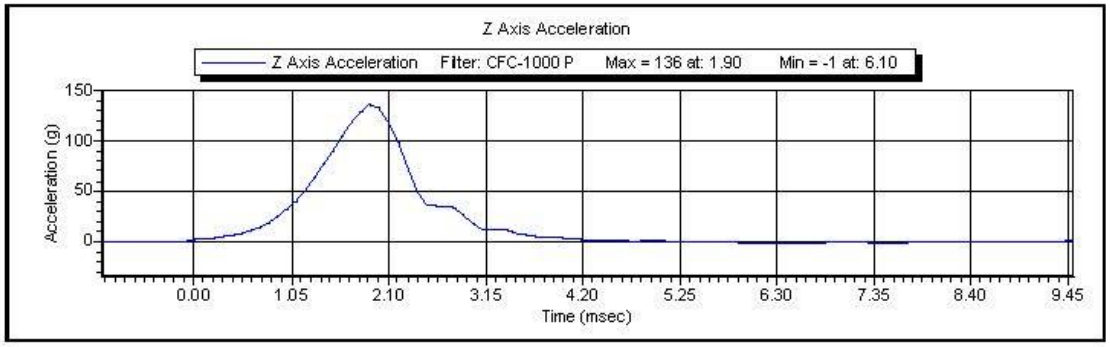
1 of 2







Test ID: Test Time: **9:52:37 AM** Test Date: **12/2/2011**

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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:		Test Date:	**12/5/2011**
Test Number:	**3**	Test Time:	**12:00:51 PM**

Component Part Number	Component Serial Number
Neck - 880105-255	**660**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.4**	deg C	P
Humidity		10	--	70	**44**	%RH	P
Velocity		6.89	--	7.13	**7.11**	m/s	P
Pendulum Impulse at	10 ms	2.10	--	2.50	**2.41**	m/s	P
Pendulum Impulse at	20 ms	4.00	--	5.00	**4.48**	m/s	P
Pendulum Impulse at	30 ms	5.80	--	7.00	**6.16**	m/s	P
D Plane Rotation		-91.0	--	-77.0	**-78.7**	degrees	P
Moment During Rotation Interval		69.0	--	83.0	**70.2**	Nm	P
Moment Decay to 10.0 Nm		80.0	--	100.0	**87.1**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **12:00:51 PM** Test Date: **12/5/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

Test ID: Test Time: **12:00:51 PM** Test Date: **12/5/2011**

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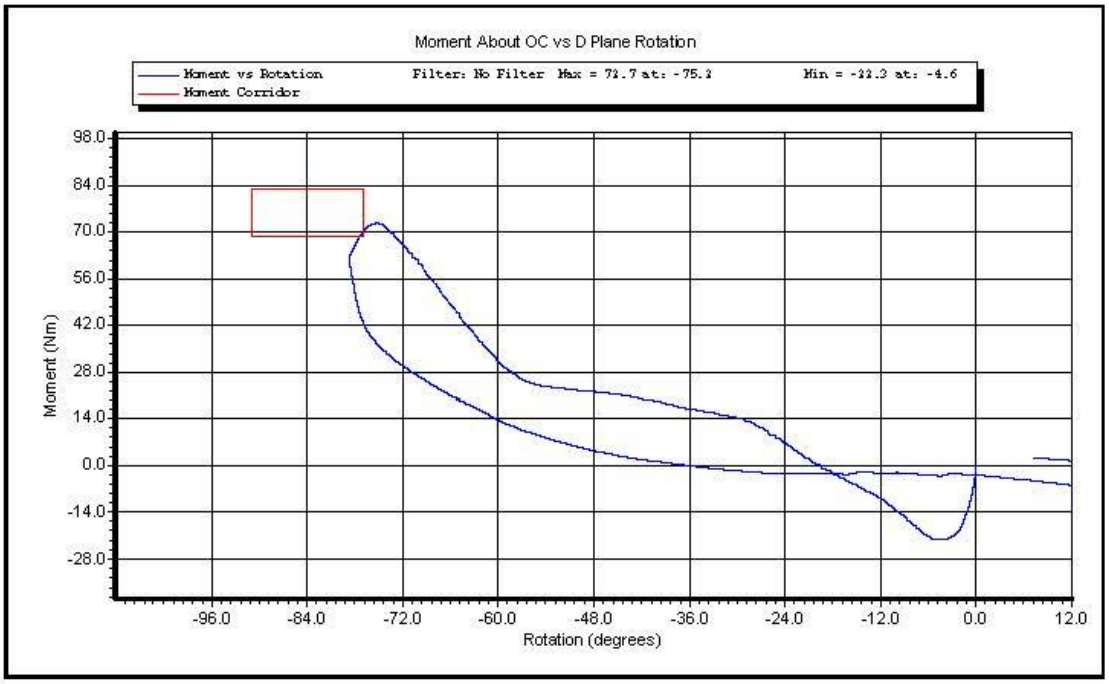
Test Name:	**Neck Flexion**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**12/5/2011**
Test Number:	**3**	Test Time:	**12:00:51 PM**



Test ID: Test Time: **12:00:51 PM** Test Date: **12/5/2011**

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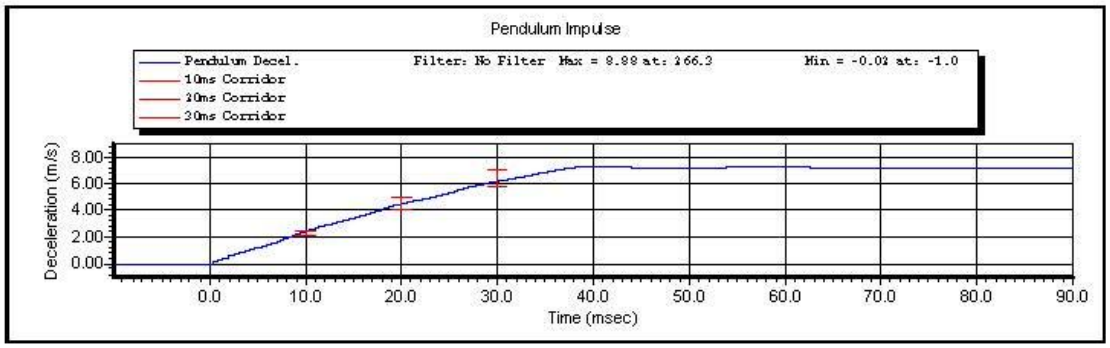

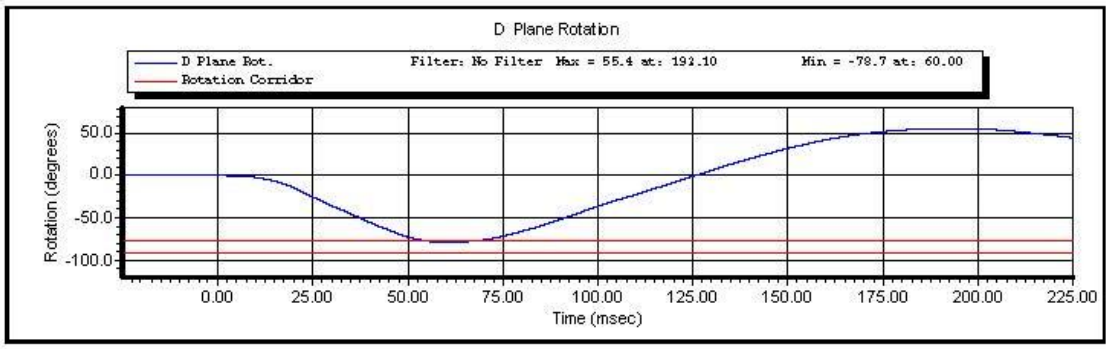

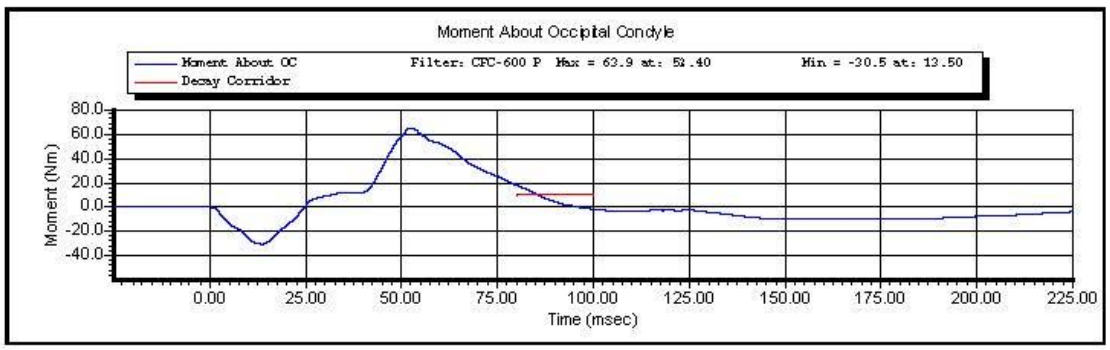

Test ID: Test Time: **12:00:51 PM** Test Date: **12/5/2011**

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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:		Test Date:	**12/6/2011**
Test Number:	**3**	Test Time:	**8:33:31 AM**

Component Part Number	Component Serial Number
Neck - 880105-255	**660**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.4**	deg C	P
Humidity		10	--	70	**36**	%RH	P
Velocity		5.95	--	6.19	**6.15**	m/s	P
Pendulum Impulse at	10 ms	1.50	--	1.90	**1.87**	m/s	P
Pendulum Impulse at	20 ms	3.10	--	3.90	**3.68**	m/s	P
Pendulum Impulse at	30 ms	4.60	--	5.60	**5.37**	m/s	P
D Plane Rotation		99.0	--	114.0	**104.6**	degrees	P
Moment During Rotation Interval		-65.0	--	-53.0	**-56.2**	Nm	P
Moment Decay to -10.0 Nm		94.0	--	114.0	**101.7**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **8:33:31 AM** Test Date: **12/6/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7231CT**	**C16510**	**10/3/2011**
DentonATD	**78051-342**	**PENDULUM POT**	**2/7/2011**
DentonATD	**78051-342**	**CONDYLE POT**	**2/7/2011**
Denton	**1716A**	**LC-1629My**	**6/3/2011**
Denton	**1716A**	**LC-1629Fx**	**6/3/2011**

Test ID: Test Time: **8:33:31 AM** Test Date: **12/6/2011**

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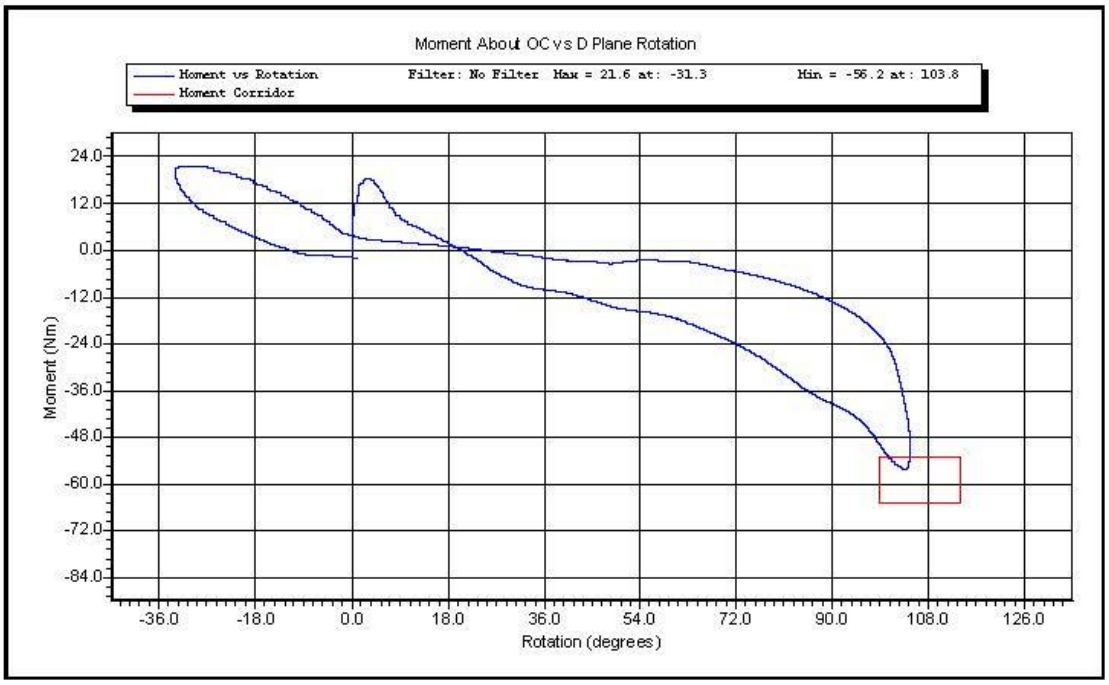
Test Name:	**Neck Extension**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**12/6/2011**
Test Number:	**3**	Test Time:	**8:33:31 AM**



Test ID: Test Time: **8:33:31 AM** Test Date: **12/6/2011**

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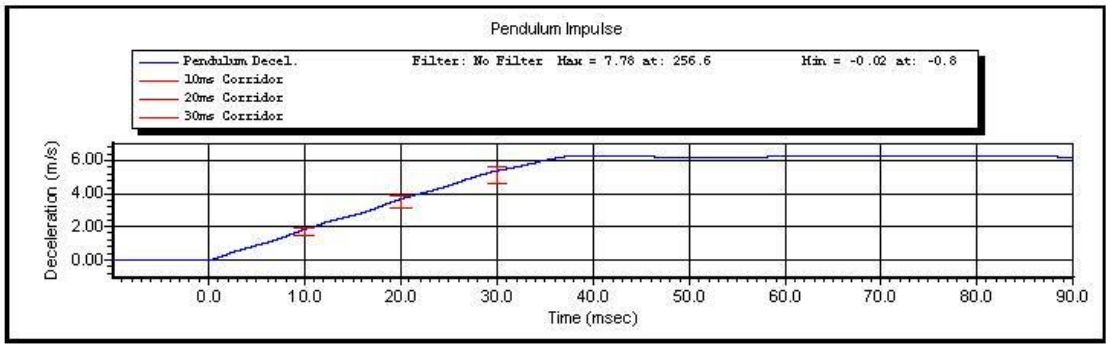

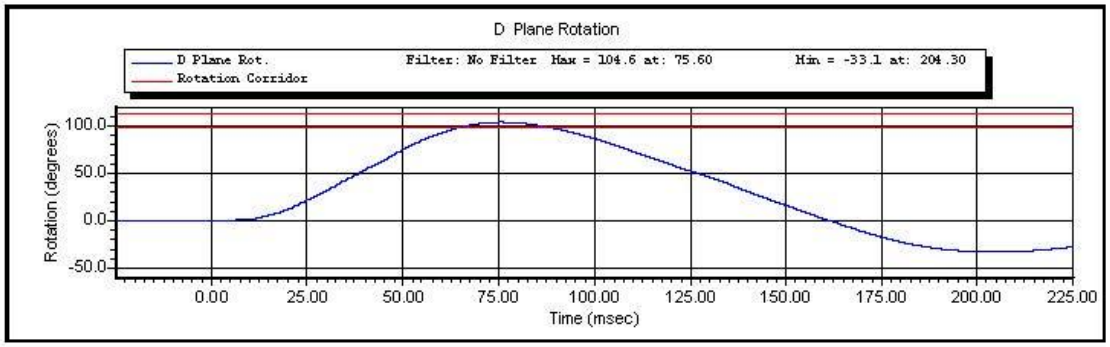

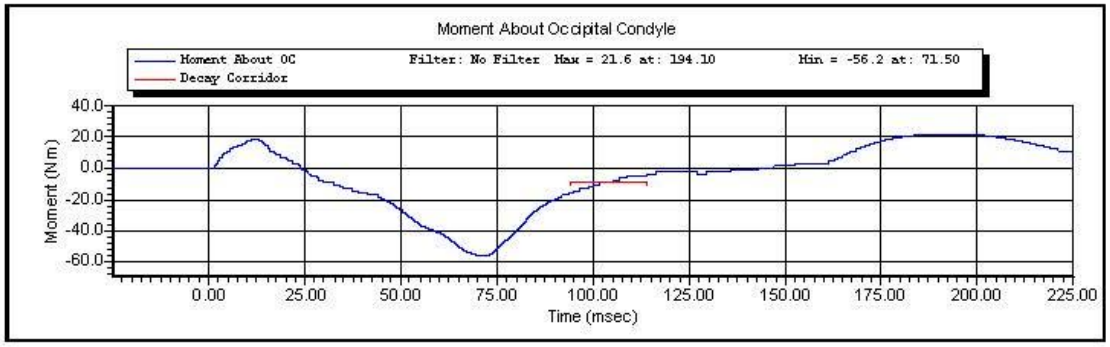

Test ID: Test Time: **8:33:31 AM** Test Date: **12/6/2011**

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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:		Test Date:	**12/6/2011**
Test Number:	**1**	Test Time:	**10:27:07 AM**

Component Part Number	Component Serial Number
Ribs 880105-RS	**670**
Chest Jacket - 880105-355-E	**DH0069**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.8**	deg C	P
Humidity	10.0	--	70.0	**36.0**	%RH	P
Velocity	6.59	--	6.83	**6.65**	m/s	P
Sternum Displacement	-58.0	--	-50.0	**-55.2**	mm	P
Force During Displacement Interval	-4400	--	-3900	**-4087**	N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	**-3838**	N	P
Hysteresis	69	--	85	**70**	%	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **10:27:07 AM** Test Date: **12/6/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7231CT**	**AH5M8**	**11/8/2011**
DentonATD	**78051-342**	**DS-273**	**10/10/2011**

Test ID: Test Time: **10:27:07 AM** Test Date: **12/6/2011**

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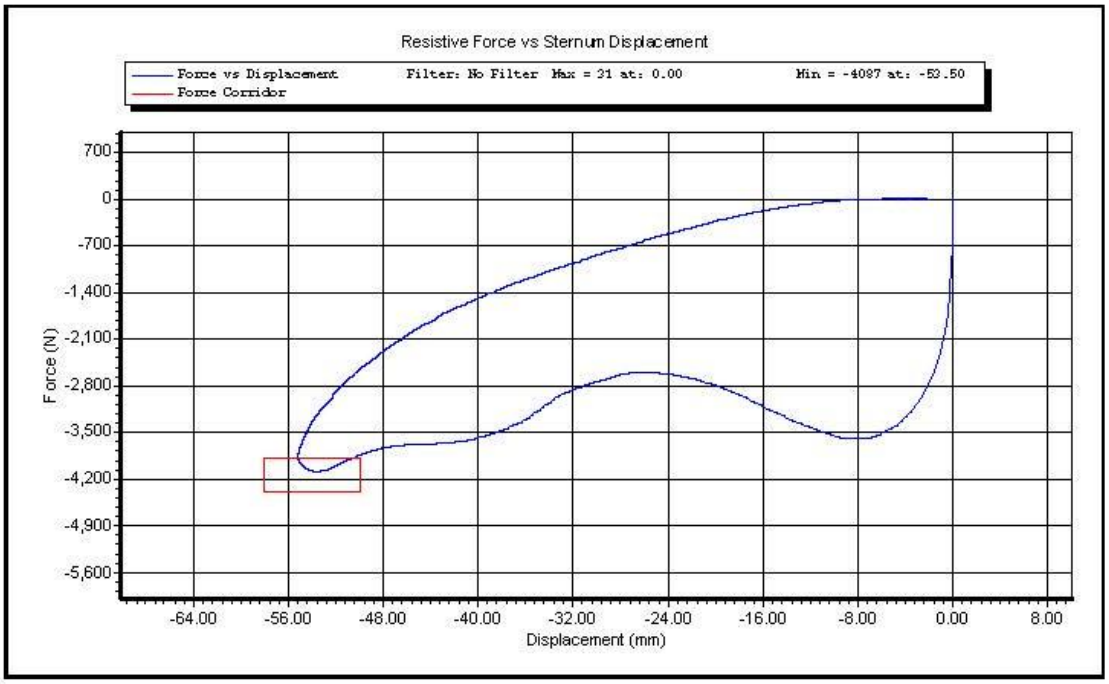
Test Name:	**Thorax Impact**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**12/6/2011**
Test Number:	**1**	Test Time:	**10:27:07 AM**



Test ID: Test Time: **10:27:07 AM** Test Date: **12/6/2011**

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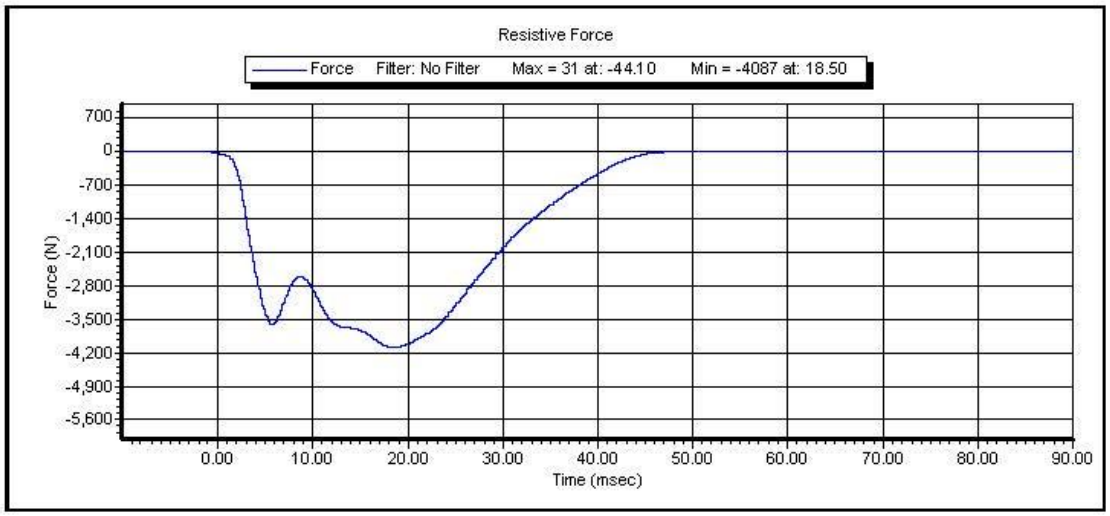
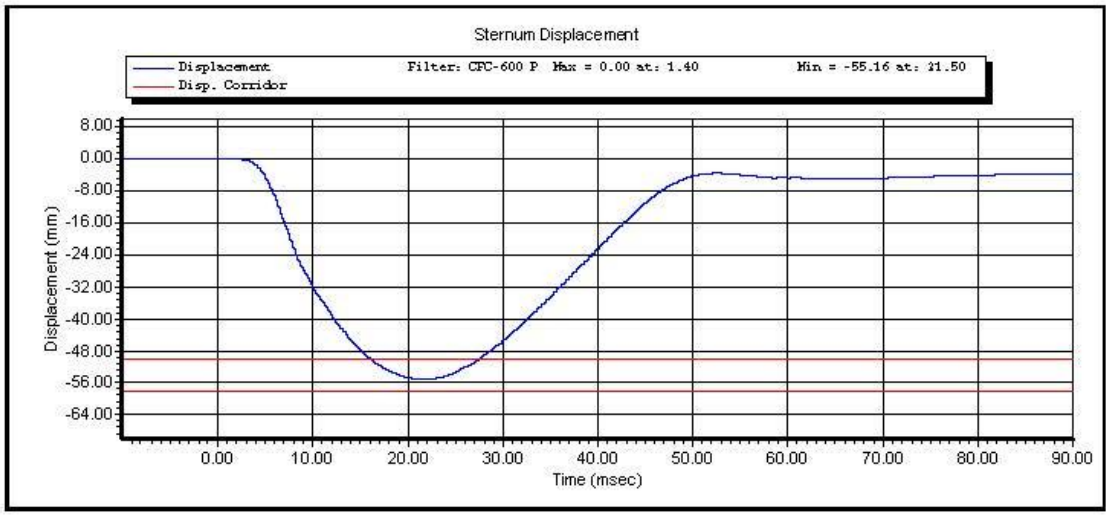
1 of 2





Test ID: Test Time: **10:27:07 AM** Test Date: **12/6/2011**

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Torso Flexion Test

Technician: SZ
Calibration Date: 12/6/2011

ATD Serial Number: NHTSA 5th Female 273

Test Results

Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.8° C	P
Lab Humidity	10-70%	35%	P
Max Force @ 45 deg	320 – 390N	372N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	11°	P
Final ref plan angle	Initial ref plane ± 8 deg	19°	P

P = Pass
F= Fail

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	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:	**12/7/2011**
Test Number:	**1**	Test Time:	**11:06:40 AM**

Component Part Number	Component Serial Number
Knee Skin - 880105-508	**1726**
Knee Insert - 880105-511	**1039**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10.0	--	70.0	**30.0**	%RH	P
Velocity	2.07	--	2.13	**2.10**	m/s	P
Resistive Force	-4060	--	-3450	**-3629**	N	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Left Knee** Test Time: **11:06:40 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7264-2000**	**P71267**	**11/2/2011**

Test ID: **Left Knee** Test Time: **11:06:40 AM** Test Date: **12/7/2011**

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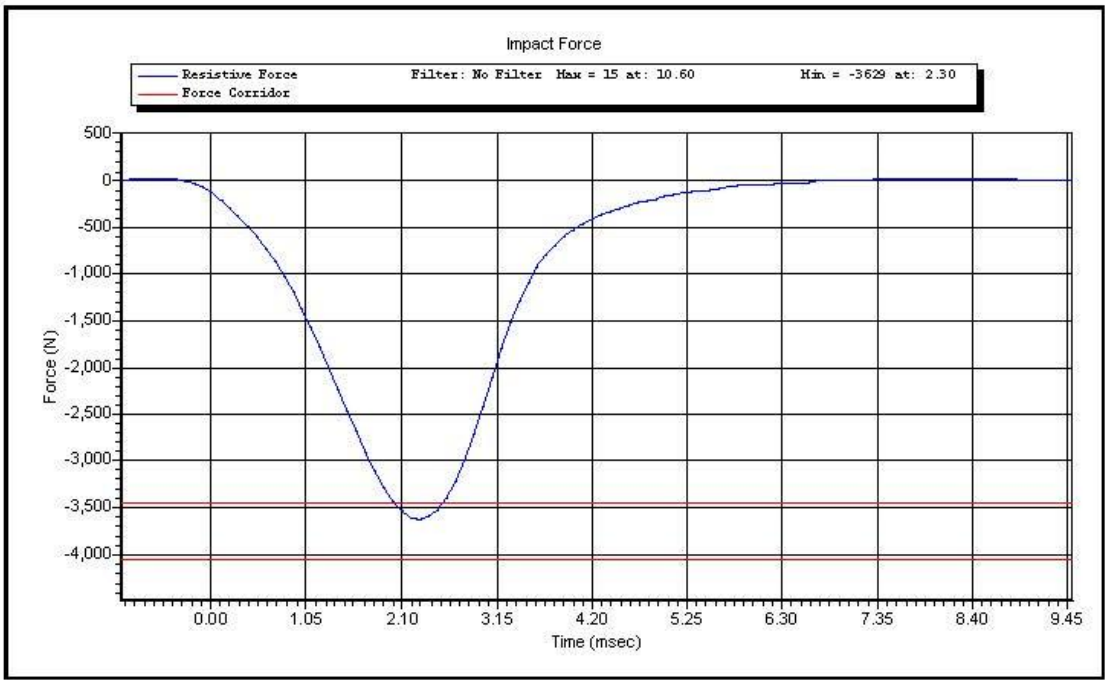
Test Name:	**Knee Impact PENDULUM**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:	**Left Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**11:06:40 AM**



Test ID: **Left Knee** Test Time: **11:06:40 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	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:	**12/7/2011**
Test Number:	**1**	Test Time:	**10:24:17 AM**

Component Part Number	Component Serial Number
Knee Skin - 880105-508	**1051**
Knee Insert - 880105-511	**1039**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**30.0**	%RH	P
Velocity	2.07	--	2.13	**2.07**	m/s	P
Resistive Force	-4060	--	-3450	**-3614**	N	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: **Right Knee** Test Time: **10:24:17 AM** Test Date: **12/7/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7264-2000**	**P71267**	**11/2/2011**

Test ID: **Right Knee** Test Time: **10:24:17 AM** Test Date: **12/7/2011**

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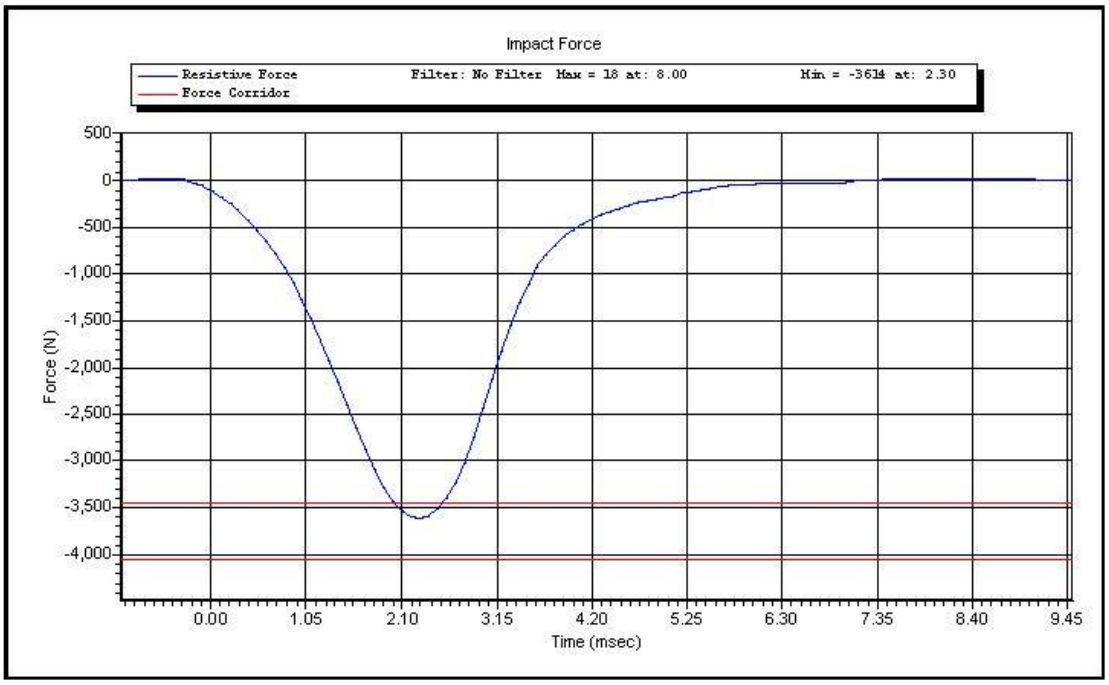
Test Name:	**Knee Impact PENDULUM**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:	**Right Knee**	Test Date:	**12/7/2011**
Test Number:	**1**	Test Time:	**10:24:17 AM**



Test ID: **Right Knee** Test Time: **10:24:17 AM** Test Date: **12/7/2011**

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1 of 1

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 064

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50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 – 35.0	35.0	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.4	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.5	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	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	13.3	Yes
J	Elbow Rest Height	7.5 – 8.3	7.9	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.5	Yes
L	Popliteal Height	16.9 – 17.9	17.2	Yes
M	Knee Pivot Height	19.1 – 19.7	19.1	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.2	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	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: 12/9/2011

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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:	**064**		
Test ID:		Test Date:	**12/10/2011**
Test Number:	**2**	Test Time:	**12:45:06 PM**

Component Part Number	Component Serial Number
Head Skin - 78051-228	**7997**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.8**	deg C	P
Humidity	10	--	70	**18**	%RH	P
Resultant Acceleration	225	--	275	**259**	g	P
Oscillation	0.0	--	10.0	**2.4**	%	P
Lateral Acceleration	-15.00	--	15.00	**-6.11**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D.Travale**

Test ID: Test Time: **12:45:06 PM** Test Date: **12/10/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: Test Time: **12:45:06 PM** Test Date: **12/10/2011**

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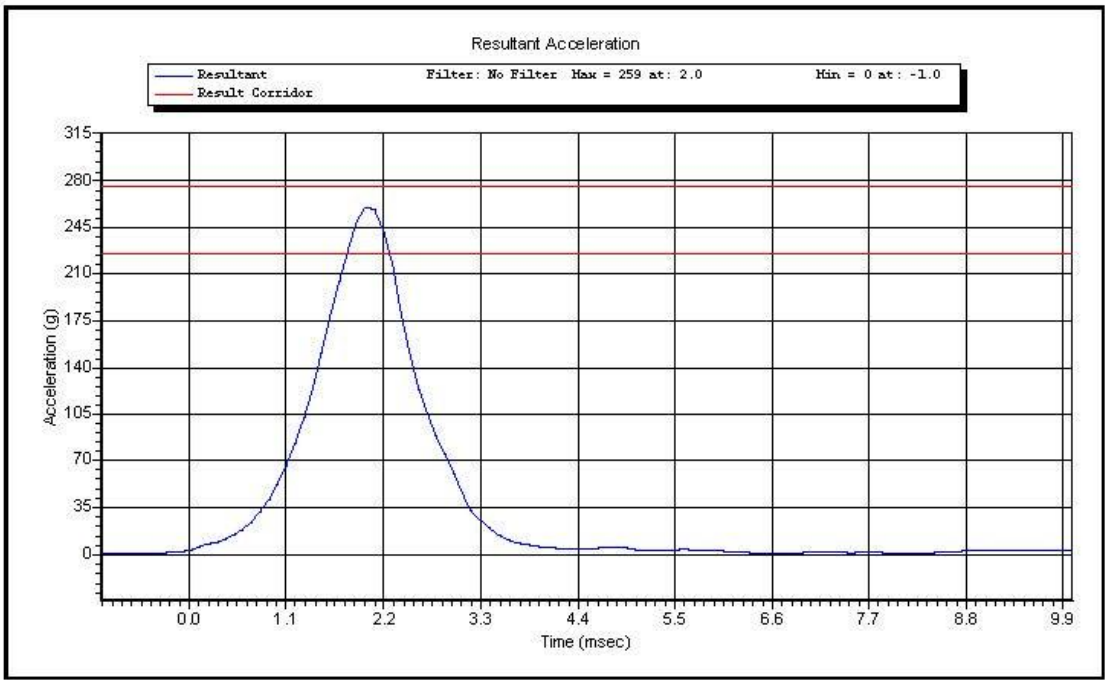
Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:		Test Date:	**12/10/2011**
Test Number:	**2**	Test Time:	**12:45:06 PM**



Test ID: Test Time: **12:45:06 PM** Test Date: **12/10/2011**

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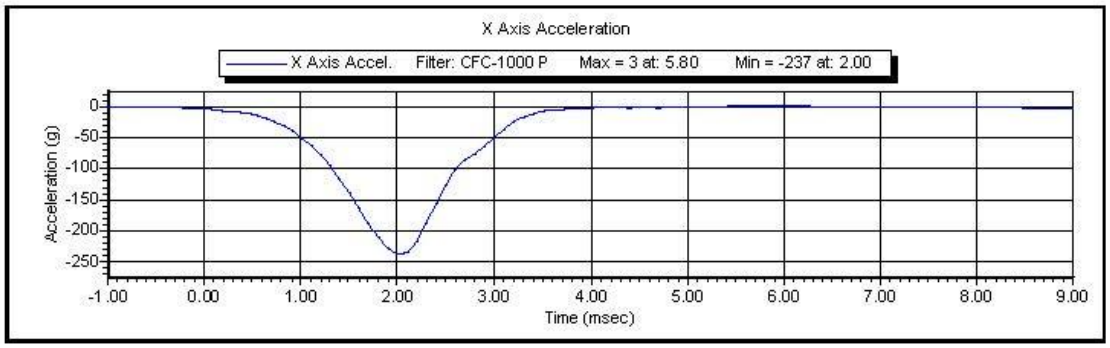

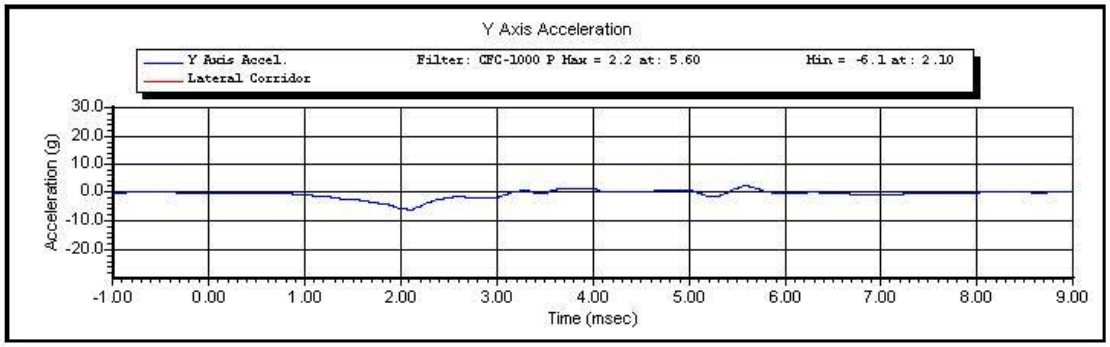

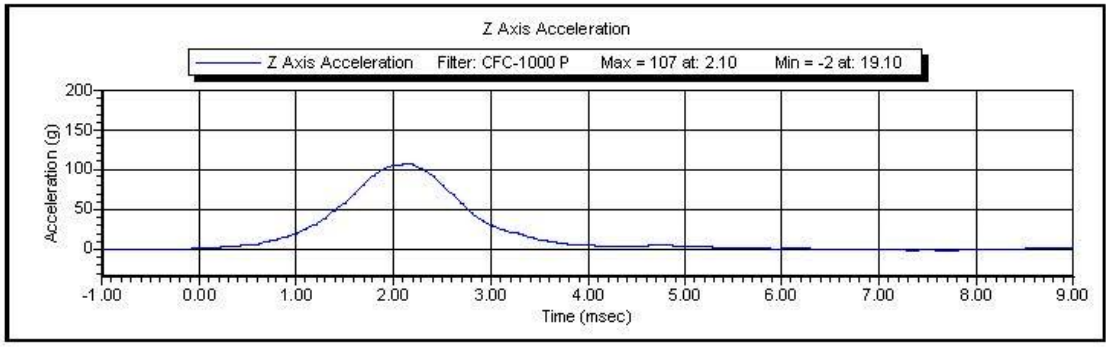

Test ID: Test Time: **12:45:06 PM** Test Date: **12/10/2011**

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2 of 2

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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:	**064**		
Test ID:		Test Date:	**12/10/2011**
Test Number:	**1**	Test Time:	**4:08:33 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**02-1692**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.8**	deg C	P
Humidity		10	--	70	**18**	%RH	P
Velocity		5.94	--	6.19	**6.11**	m/s	P
Pendulum Deceleration at	10 ms	17.2	--	21.2	**19.8**	g	P
Pendulum Deceleration at	20 ms	14.0	--	19.0	**14.9**	g	P
Pendulum Deceleration at	30 ms	11.0	--	16.0	**11.8**	g	P
Max Pendulum Deceleration after	30 ms	0.0	--	22.0	**13.5**	g	P
Decel Time to	5 g	38.0	--	46.0	**43.8**	ms	P
D Plane Rotation		81.0	--	106.0	**97.7**	degrees	P
Time at Max Rotation		72.0	--	82.0	**79.2**	ms	P
Rotation Decay to Zero		147.0	--	174.0	**158.8**	ms	P
Moment About Occipital Condyle		-80.0	--	-52.9	**-61.7**	Nm	P
Time at Max Moment		65.0	--	79.0	**74.4**	ms	P
Moment Decay to Zero		120.0	--	148.0	**146.3**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **4:08:33 PM** Test Date: **12/10/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID: Test Time: **4:08:33 PM** Test Date: **12/10/2011**

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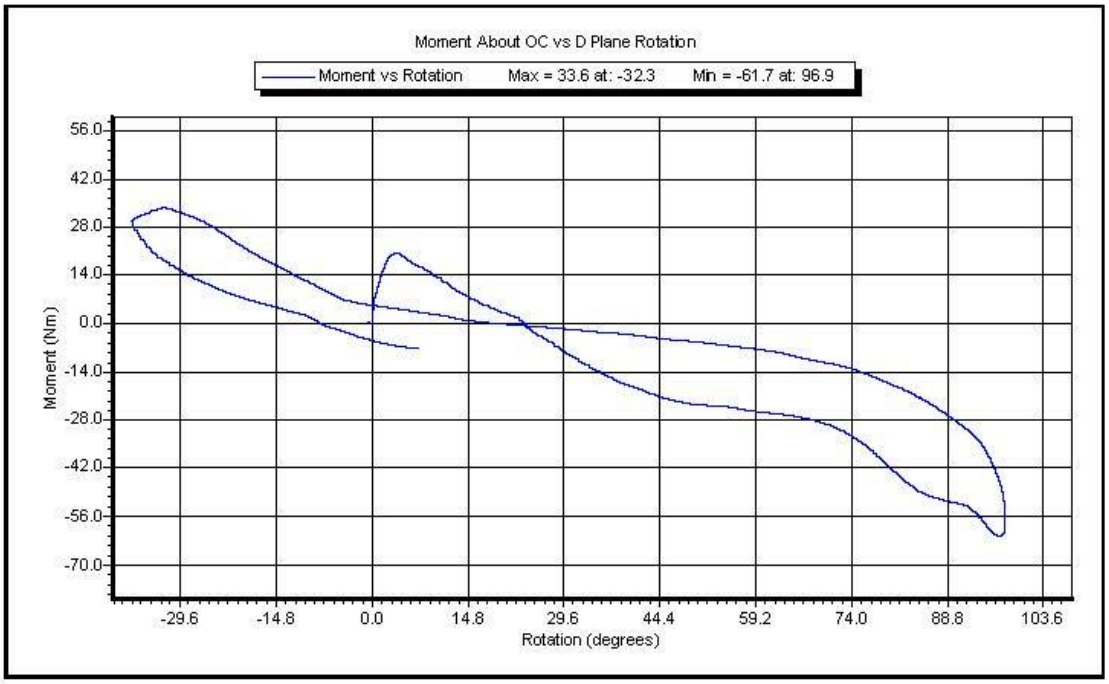
Name of Test:	**Neck Extension**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
ID of Test:		Date:	**12/10/2011**
Number of Test:	**1**	Time of Test:	**4:08:33 PM**



ID of Test: Time of Test: **4:08:33 PM** Date of Test: **12/10/2011**

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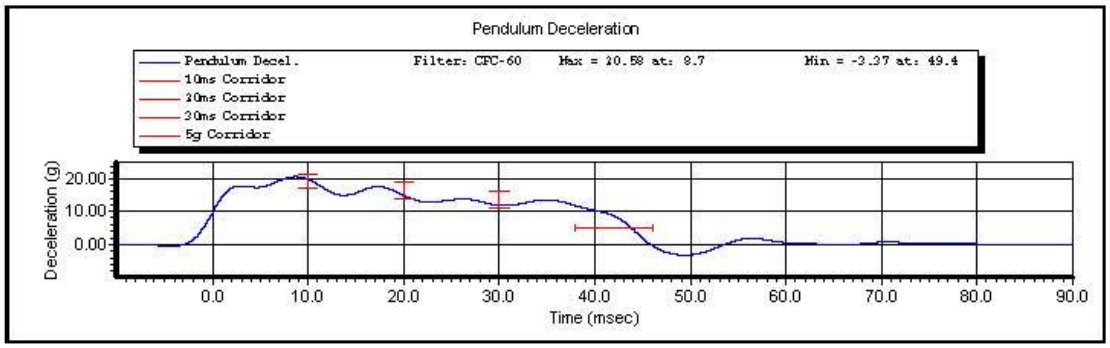

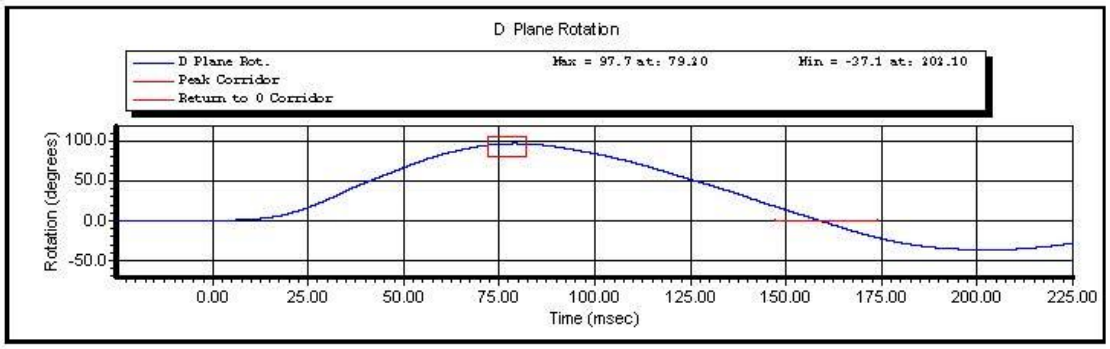

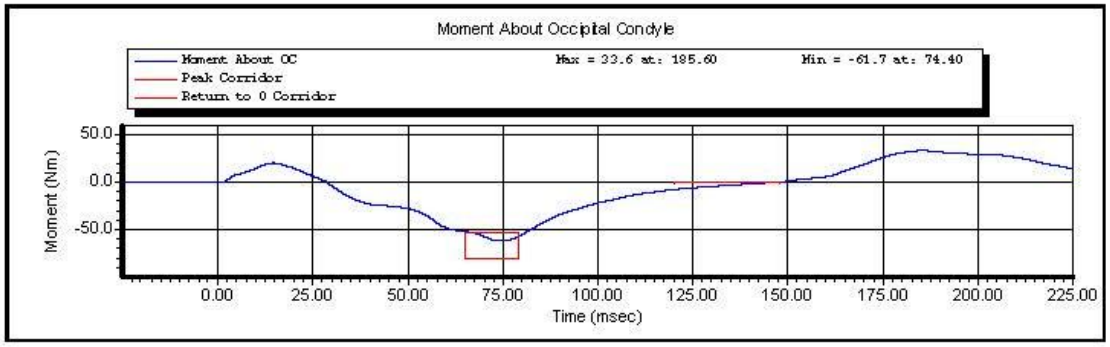

ID of Test: Time of Test: **4:08:33 PM** Date of Test: **12/10/2011**

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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:	**064**		
Test ID:		Test Date:	**12/10/2011**
Test Number:	**1**	Test Time:	**4:40:46 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**02-1692**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.8**	deg C	P
Humidity		10	--	70	**18**	%RH	P
Velocity		6.89	--	7.13	**7.10**	m/s	P
Pendulum Deceleration at	10 ms	22.5	--	27.5	**23.8**	g	P
Pendulum Deceleration at	20 ms	17.6	--	22.6	**19.2**	g	P
Pendulum Deceleration at	30 ms	12.5	--	18.5	**15.1**	g	P
Max Pendulum Deceleration After	30 ms	0.0	--	29.0	**16.0**	g	P
Deceleration time to	5 g	34.0	--	42.0	**39.2**	ms	P
D Plane Rotation		-78.0	--	-64.0	**-73.2**	degrees	P
Time at max rotation		57.0	--	64.0	**60.1**	ms	P
Rotation Decay to Zero		113.0	--	128.0	**116.6**	ms	P
Moment about OC		88.1	--	108.4	**91.8**	Nm	P
Time at Max Moment		47.0	--	58.0	**53.7**	ms	P
Moment Decay to Zero		97.0	--	107.0	**105.0**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **4:40:46 PM** Test Date: **12/10/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-2186 My	6/3/2011
Denton	1716A	LC-2186 Fx	6/3/2011

Test ID: Test Time: **4:40:46 PM** Test Date: **12/10/2011**

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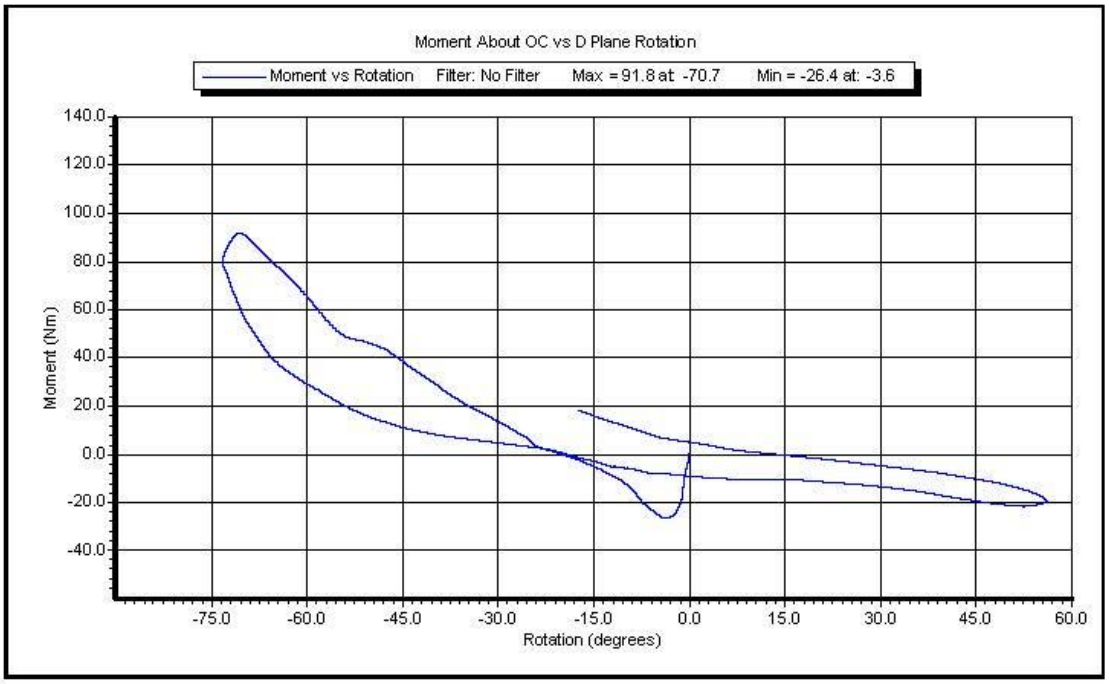
Name of Test:	**Neck Flexion**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
ID of Test:		Date:	**12/10/2011**
Number of Test:	**1**	Time of Test:	**4:40:46 PM**



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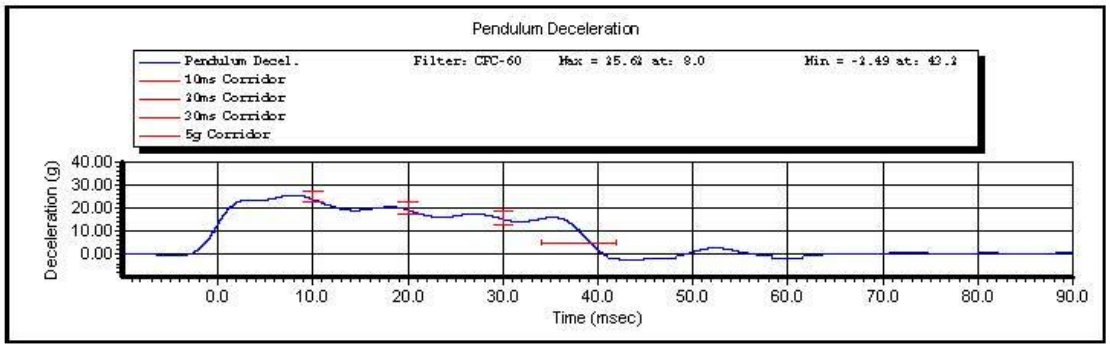

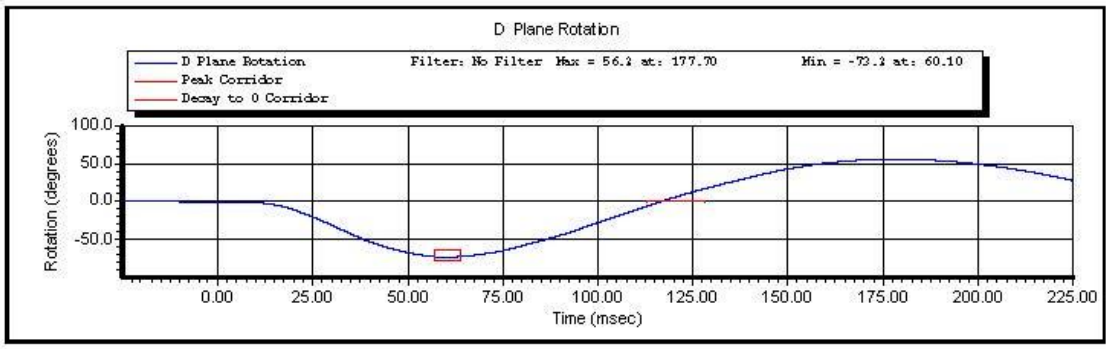

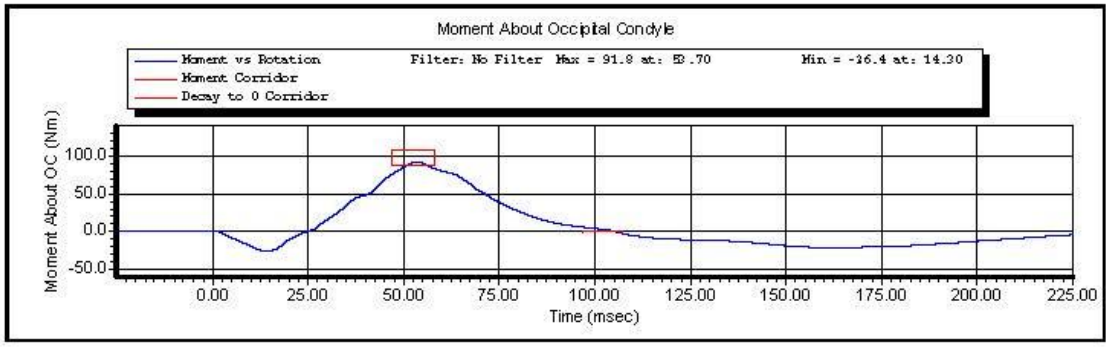

ID of Test: Time of Test: **4:40:46 PM** Date of Test: **12/10/2011**

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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:	**064**		
Test ID:		Test Date:	**12/9/2011**
Test Number:	**3**	Test Time:	**5:05:31 PM**

Component Part Number	Component Serial Number
Ribs 78051-RS	**3964**
Chest Jacket - 78051-169	**2589**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.7**	deg C	P
Humidity	10.0	--	70.0	**28.0**	%RH	P
Velocity	6.59	--	6.83	**6.80**	m/s	P
Resistive Force	-5.894	--	-5.160	**-5.831**	kN	P
Sternum Displacement	-72.6	--	-63.5	**-64.5**	mm	P
Hysteresis	69	--	85	**78**	%	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **5:05:31 PM** Test Date: **12/9/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7264-2000**	**P71267**	**11/2/2011**
DentonATD	**78051-342**	**DS-064**	**10/13/2011**

Test ID: Test Time: **5:05:31 PM** Test Date: **12/9/2011**

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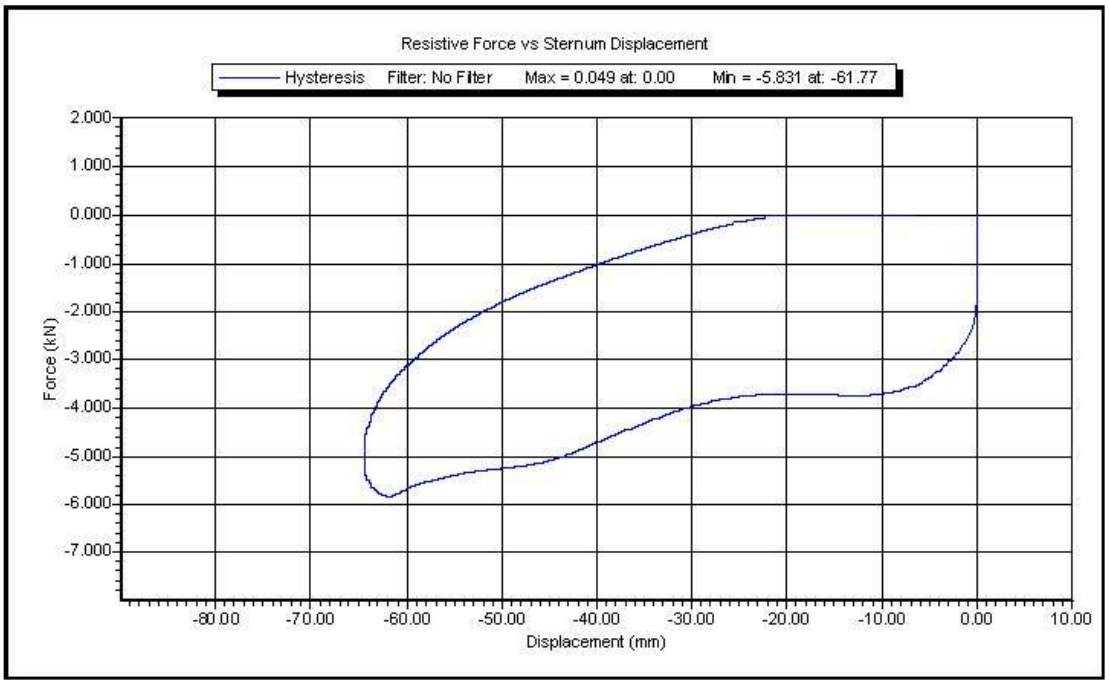
Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:		Test Date:	**12/9/2011**
Test Number:	**3**	Test Time:	**5:05:31 PM**



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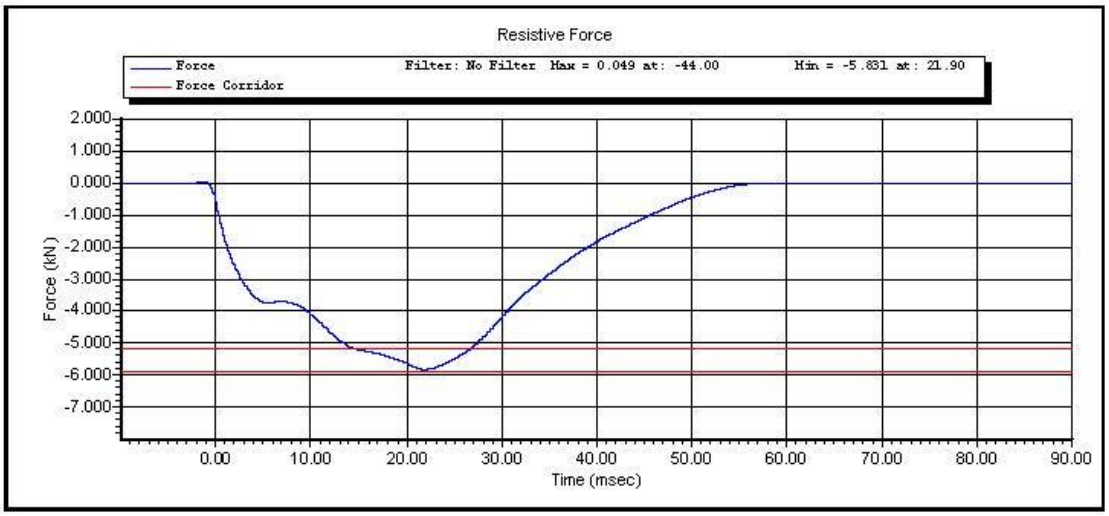

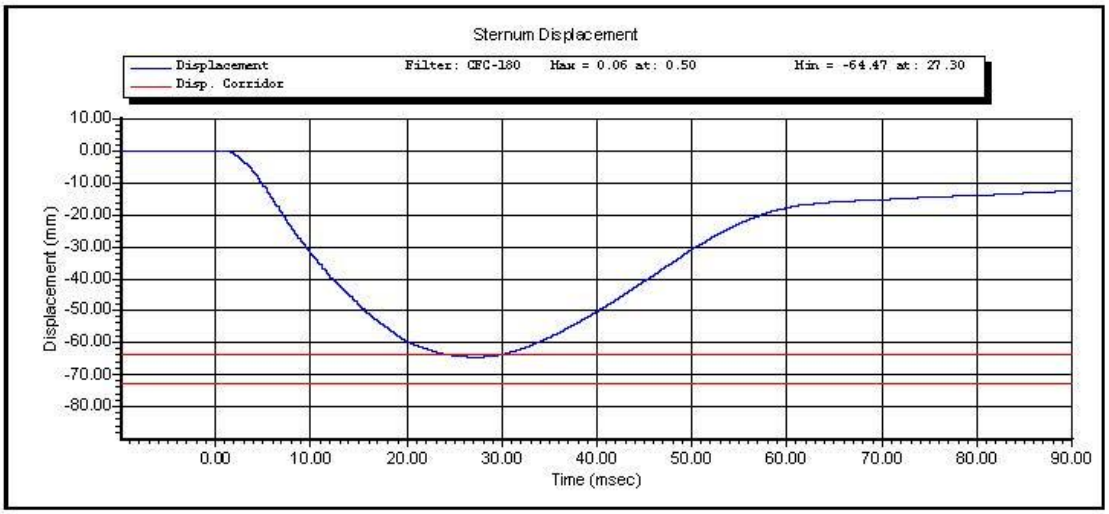

Test ID: Test Time: **5:05:31 PM** Test Date: **12/9/2011**

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CALSPAN

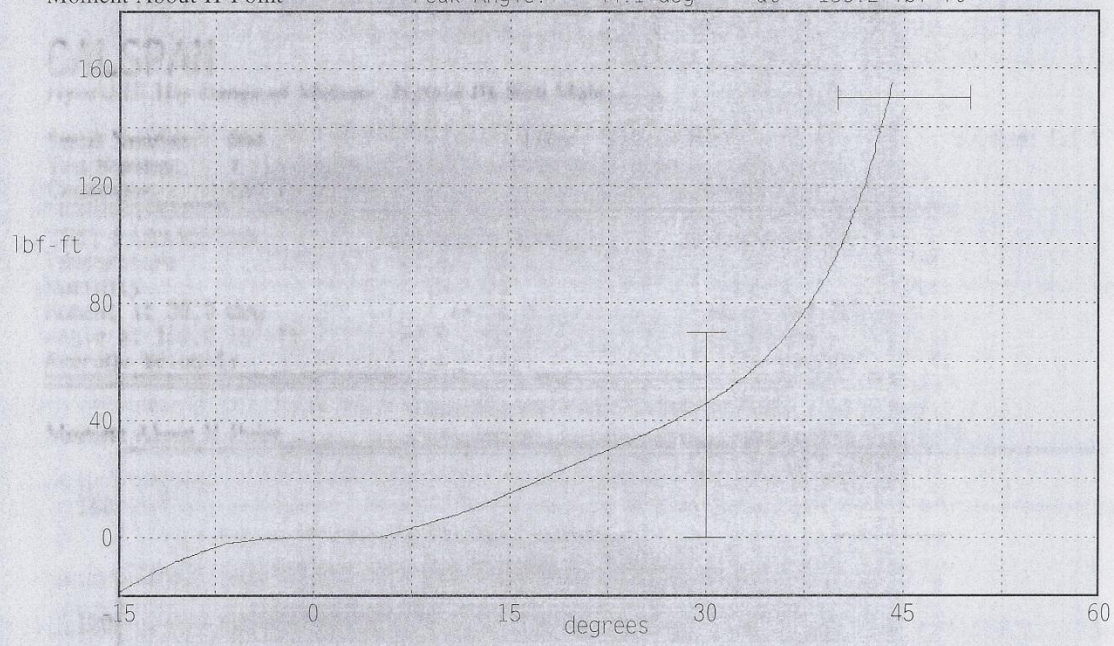
Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number: 064 Date: 12/10/2011 Version: 1.6.3
Test Number: 1 Time: 11:38
Comments: LEFT

TEST PARAMETER	SPECIFICATION	TEST RESULTS		
Temperature	66.0 - 78.0	71.5	°F	Pass
Humidity	10 - 70	18	%	Pass
Moment at 30.0 deg	<= 70.0	46.2	lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.9	deg	Pass
Average Velocity	5.0 - 10.0	7.5	deg/sec	Pass

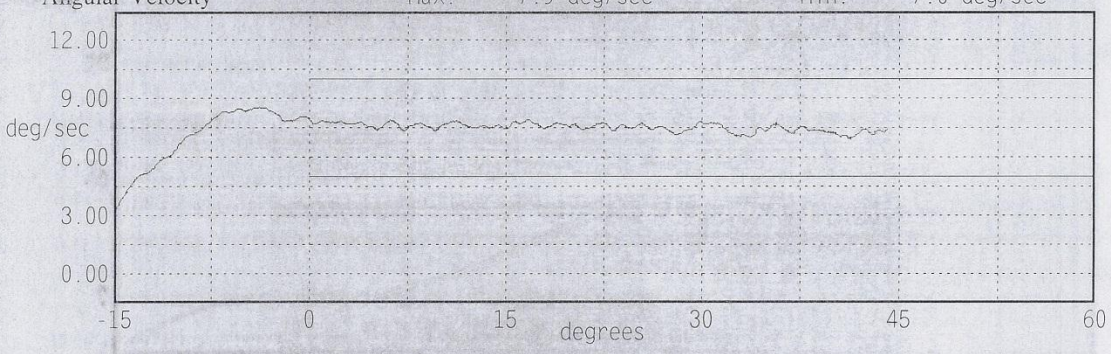
Moment About H-Point

Peak Moment: 155.2 lbf-ft at 44.1 deg
Peak Angle: 44.1 deg at 155.2 lbf-ft



Angular Velocity

Max: 7.9 deg/sec Min: 7.0 deg/sec



CALSPAN

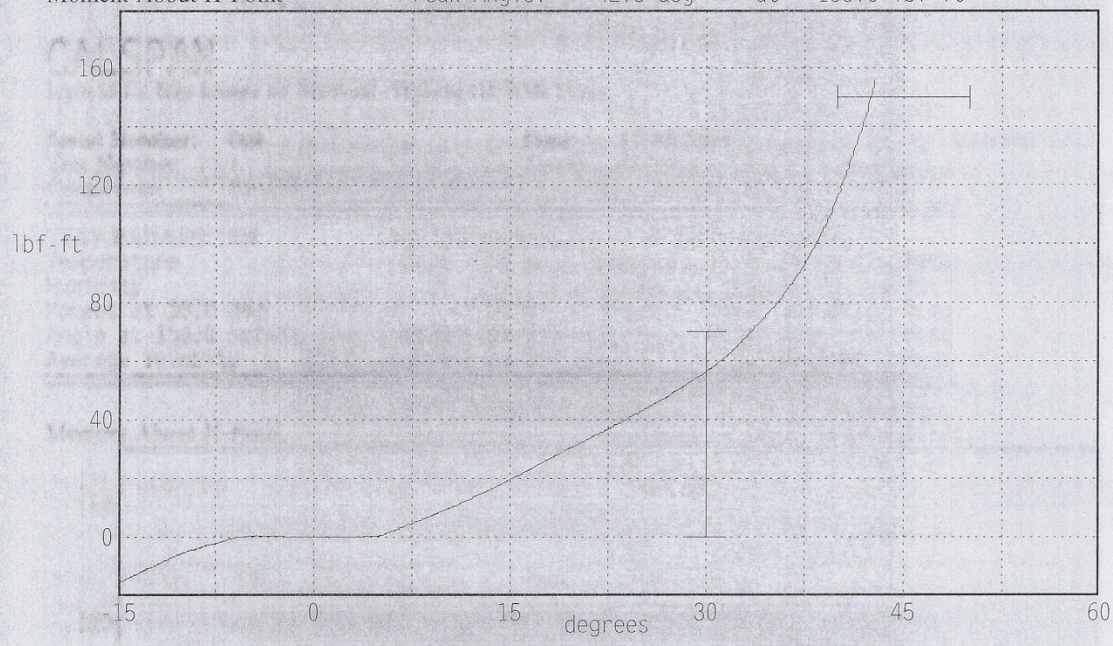
Hybrid III Hip Range of Motion: Hybrid III 50th Male

Serial Number: 064 Date: 12/10/2011 Version: 1.6.3
Test Number: 1 Time: 11:48
Comments: RIGHT

TEST PARAMETER	SPECIFICATION	TEST RESULTS		
Temperature	66.0 - 78.0	71.5	°F	Pass
Humidity	10 - 70	18	%	Pass
Moment at 30.0 deg	<= 70.0	56.4	lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	42.6	deg	Pass
Average Velocity	5.0 - 10.0	7.5	deg/sec	Pass

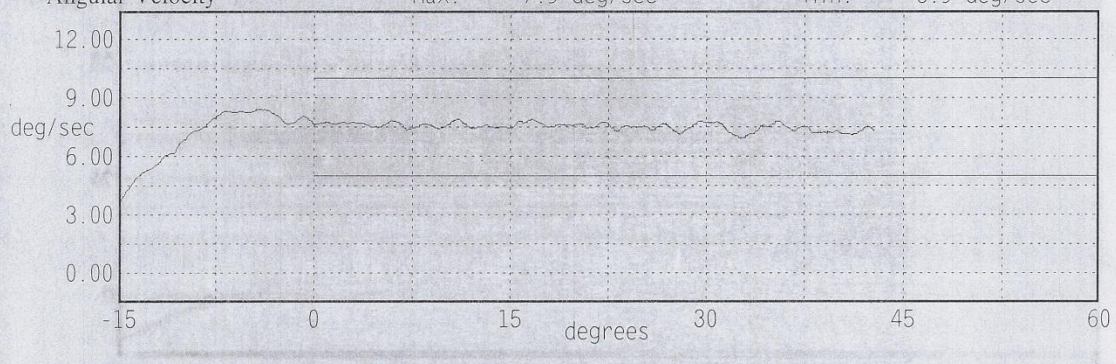
Moment About H-Point

Peak Moment: 155.6 lbf-ft at 42.8 deg
Peak Angle: 42.8 deg at 155.6 lbf-ft



Angular Velocity

Max: 7.9 deg/sec Min: 6.9 deg/sec



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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Left Knee**	Test Date:	**12/12/2011**
Test Number:	**2**	Test Time:	**10:52:38 AM**

Component Part Number	Component Serial Number
Knee Skin - 78051(L)	**2792**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10.0	--	70.0	**18.0**	%RH	P
Velocity	2.07	--	2.13	**2.09**	m/s	P
Resistive Force	-5.78	--	-4.72	**-5.33**	kN	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **Left Knee** Test Time: **10:52:38 AM** Test Date: **12/12/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee** Test Time: **10:52:38 AM** Test Date: **12/12/2011**

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Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Left Knee**	Test Date:	**12/12/2011**
Test Number:	**2**	Test Time:	**10:52:38 AM**

Test ID: **Left Knee** Test Time: **10:52:38 AM** Test Date: **12/12/2011**

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Right Knee**	Test Date:	**12/12/2011**
Test Number:	**1**	Test Time:	**9:42:10 AM**

Component Part Number	Component Serial Number
Knee Skin - 78056(R)	**2880**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.9**	deg C	P
Humidity	10.0	--	70.0	**18.0**	%RH	P
Velocity	2.07	--	2.13	**2.08**	m/s	P
Resistive Force	-5.78	--	-4.72	**-4.92**	kN	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **Right Knee** Test Time: **9:42:10 AM** Test Date: **12/12/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee** Test Time: **9:42:10 AM** Test Date: **12/12/2011**

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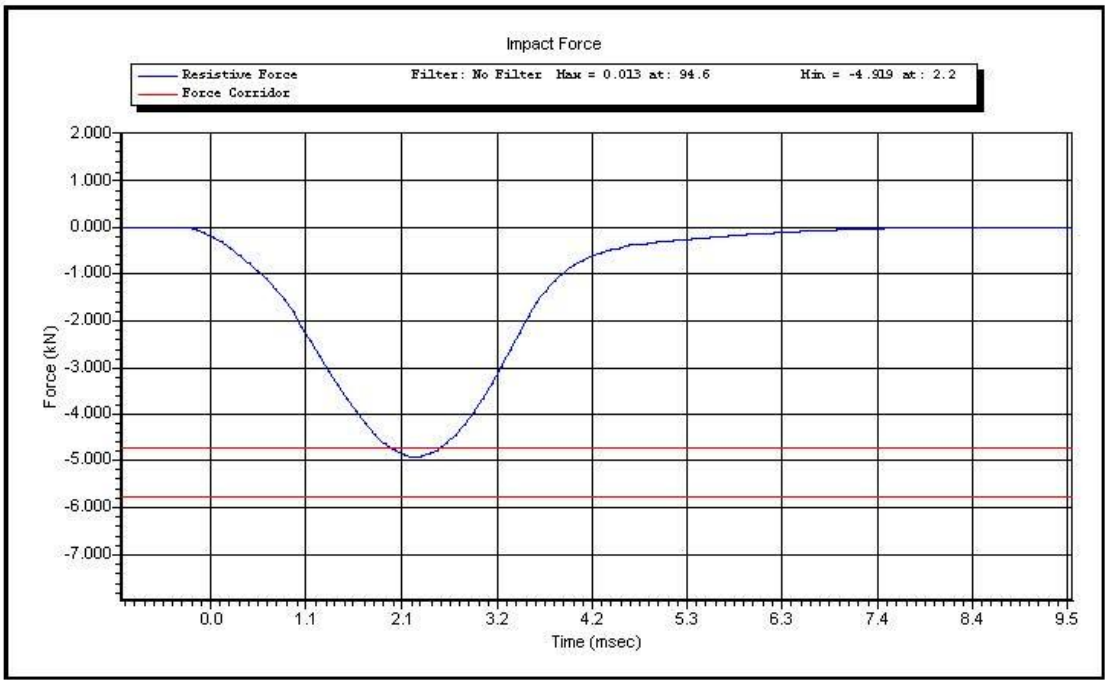
Test Name:	**Knee Impact PENDULUM**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
Test ID:	**Right Knee**	Test Date:	**12/12/2011**
Test Number:	**1**	Test Time:	**9:42:10 AM**



Test ID: **Right Knee** Test Time: **9:42:10 AM** Test Date: **12/12/2011**

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1 of 1

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

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External Measurements

5th Female SN 273

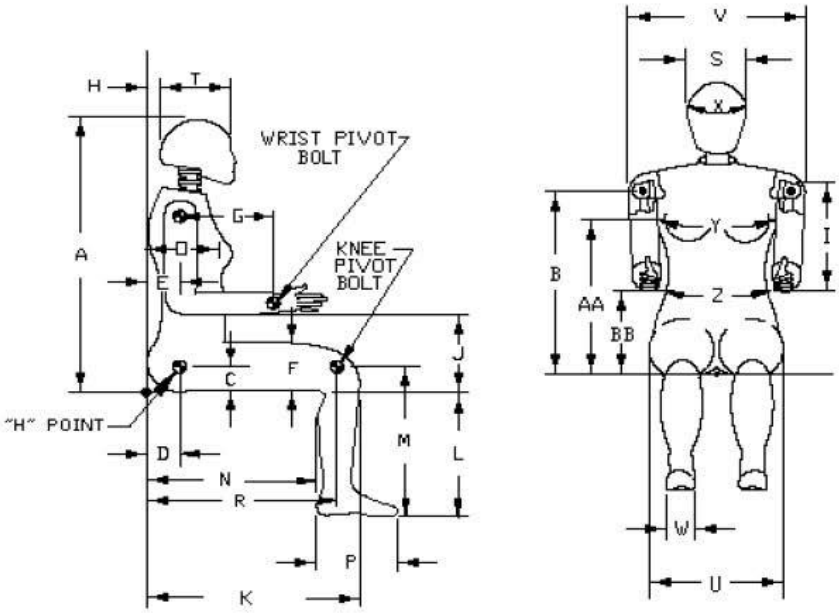
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	132	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	249	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	192	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	397	Yes
N	Buttock Popliteal Length	414 – 439.4	422	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	183	Yes
U	Hip Breadth	299.7 – 314.9	310	Yes
V	Shoulder Breadth	350.5 – 365.7	357	Yes
W	Foot Breadth	78.8 - 94	82	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	860	Yes
Z	Waist Circumference	759.5 – 789.9	770	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: 12/10/2011

Hybrid III 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:		Test Date:	**1/4/2012**
Test Number:	**1**	Test Time:	**2:51:05 PM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.7**	deg C	P
Humidity	10	--	70	**17**	%RH	P
Resultant Acceleration	250	--	300	**286**	g	P
Oscillation	0.0	--	10.0	**1.5**	%	P
Lateral Acceleration	-15.00	--	15.00	**1.31**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **2:51:05 PM** Test Date: **1/4/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: Test Time: **2:51:05 PM** Test Date: **1/4/2012**

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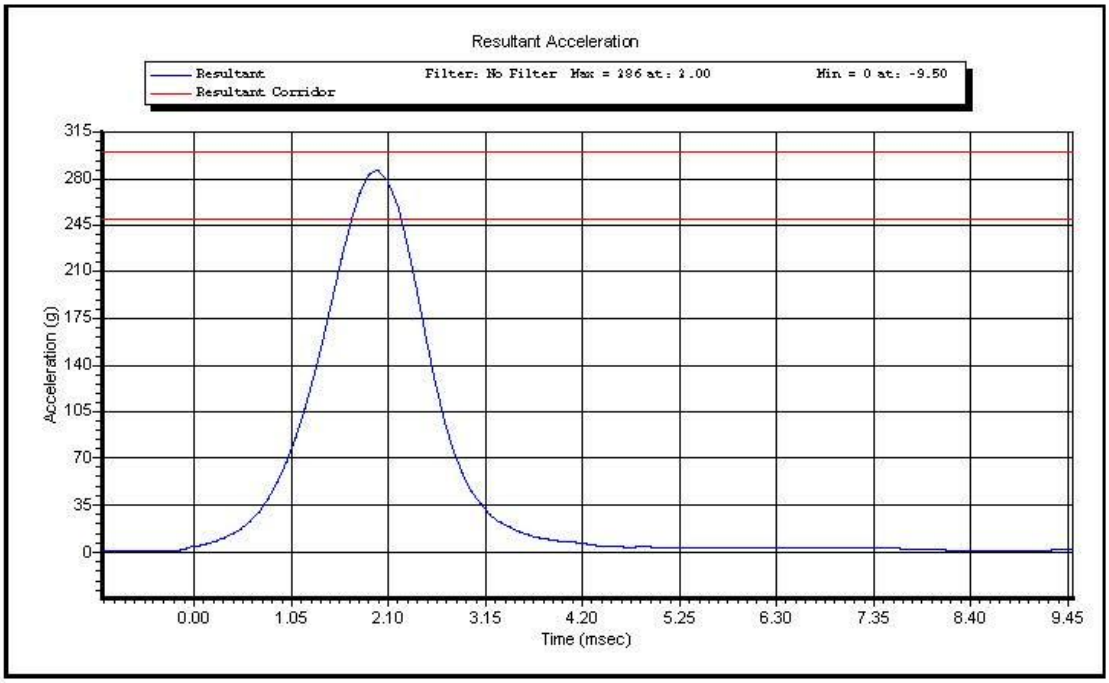
Test Name:	**Head Drop**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**1/4/2012**
Test Number:	**1**	Test Time:	**2:51:05 PM**



Test ID: Test Time: **2:51:05 PM** Test Date: **1/4/2012**

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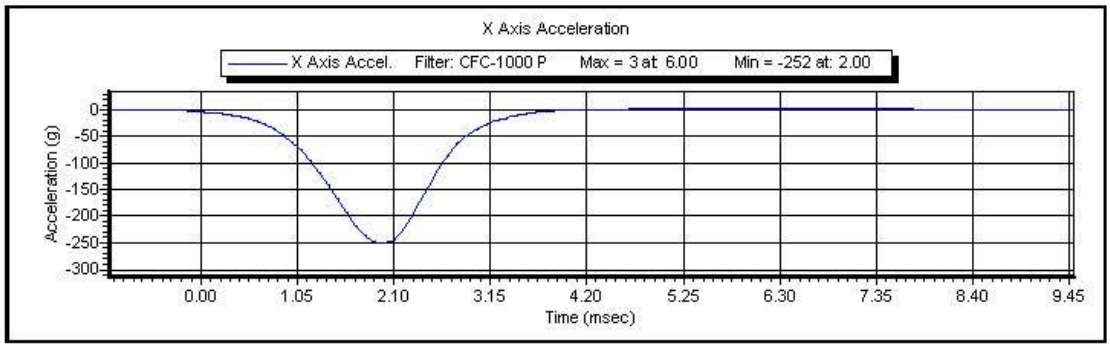

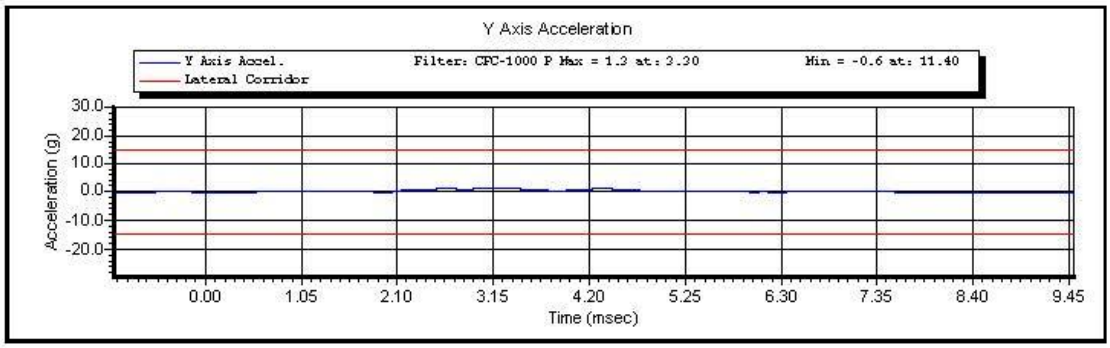

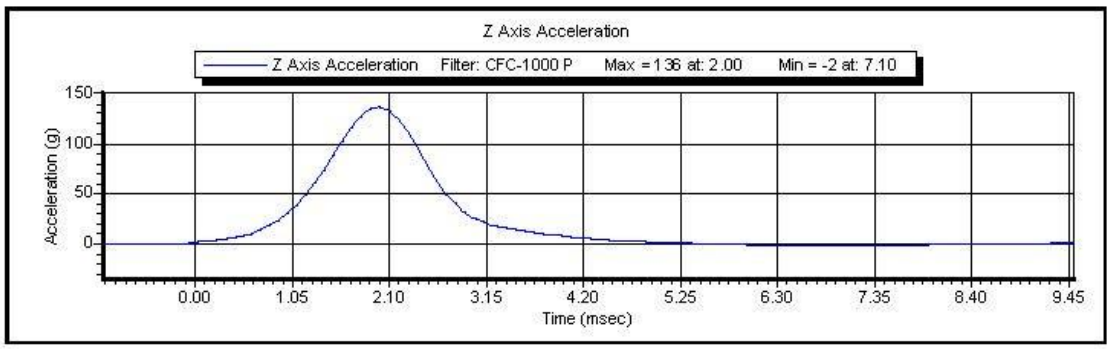

Test ID: Test Time: **2:51:05 PM** Test Date: **1/4/2012**

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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:		Test Date:	**1/9/2012**
Test Number:	**3**	Test Time:	**10:24:30 AM**

Component Part Number	Component Serial Number
Neck - 880105-255	**660**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.7**	deg C	P
Humidity		10	--	70	**19**	%RH	P
Velocity		5.95	--	6.19	**6.12**	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	**3.66**	m/s	P
Pendulum Impulse at	30 ms	4.60	--	5.60	**5.26**	m/s	P
D Plane Rotation		99.0	--	114.0	**101.8**	degrees	P
Moment During Rotation Interval		-65.0	--	-53.0	**-56.2**	Nm	P
Moment Decay to -10.0 Nm		94.0	--	114.0	**100.7**	ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **10:24:30 AM** Test Date: **1/9/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/3/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1629My	6/3/2011
Denton	1716A	LC-1629Fx	6/3/2011

Test ID: Test Time: **10:24:30 AM** Test Date: **1/9/2012**

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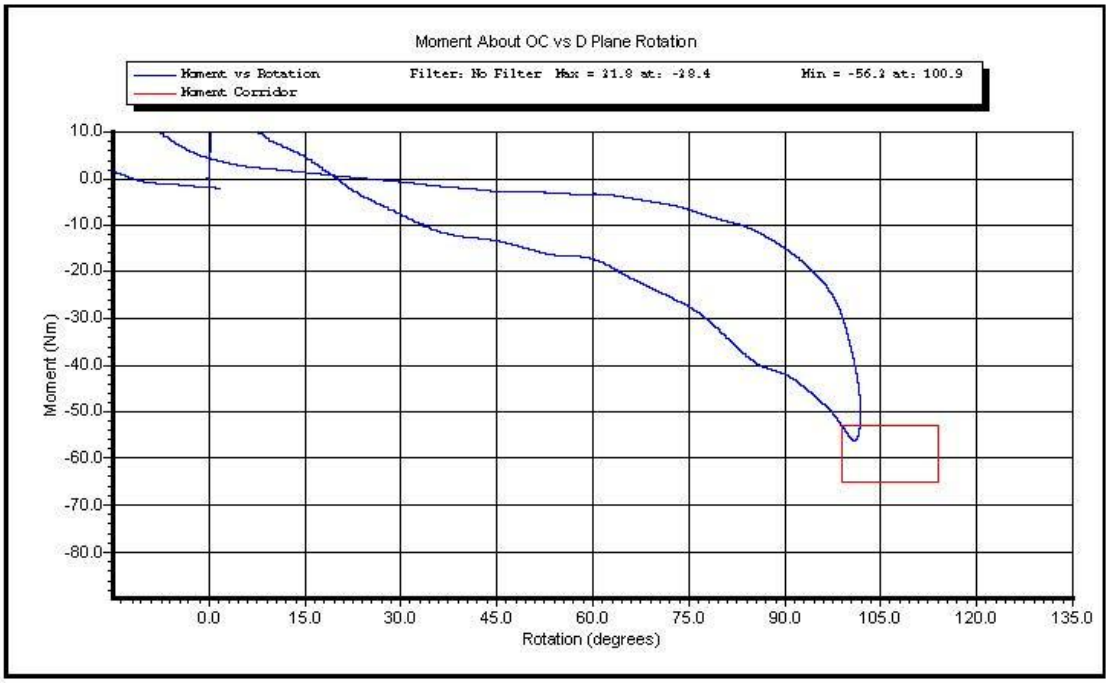
Test Name:	**Neck Extension**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**1/9/2012**
Test Number:	**3**	Test Time:	**10:24:30 AM**



Test ID: Test Time: **10:24:30 AM** Test Date: **1/9/2012**

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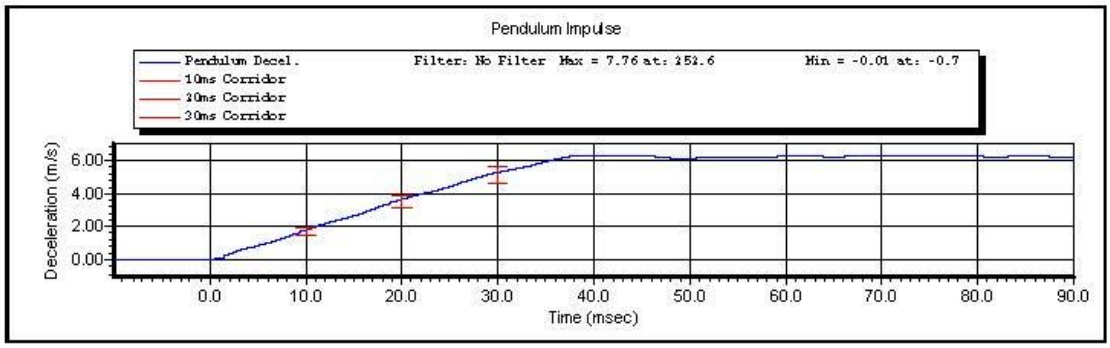

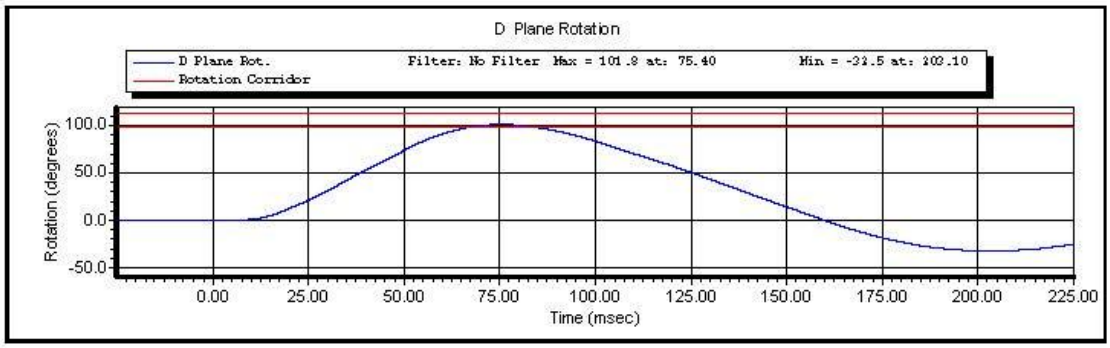

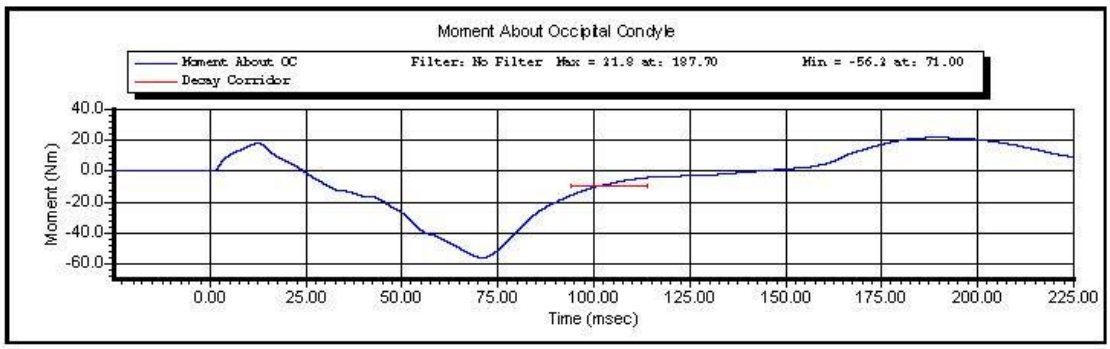

Test ID: Test Time: **10:24:30 AM** Test Date: **1/9/2012**

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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:		Test Date:	**1/6/2012**
Test Number:	**3**	Test Time:	**11:57:10 AM**

Component Part Number	Component Serial Number
Neck - 880105-255	**660**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**22.0**	deg C	P
Humidity		10	--	70	**26**	%RH	P
Velocity		6.89	--	7.13	**7.11**	m/s	P
Pendulum Impulse at	10 ms	2.10	--	2.50	**2.37**	m/s	P
Pendulum Impulse at	20 ms	4.00	--	5.00	**4.54**	m/s	P
Pendulum Impulse at	30 ms	5.80	--	7.00	**6.40**	m/s	P
D Plane Rotation		-91.0	--	-77.0	**-81.2**	degrees	P
Moment During Rotation Interval		69.0	--	83.0	**72.2**	Nm	P
Moment Decay to 10.0 Nm		80.0	--	100.0	**86.5**	ms	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test ID: Test Time: **11:57:10 AM** Test Date: **1/6/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7231CT**	**C16510**	**10/3/2011**
DentonATD	**78051-342**	**PENDULUM POT**	**2/7/2011**
DentonATD	**78051-342**	**CONDYLE POT**	**2/7/2011**
Denton	**1716A**	**LC-1629My**	**6/3/2011**
Denton	**1716A**	**LC-1629Fx**	**6/3/2011**

Test ID: Test Time: **11:57:10 AM** Test Date: **1/6/2012**

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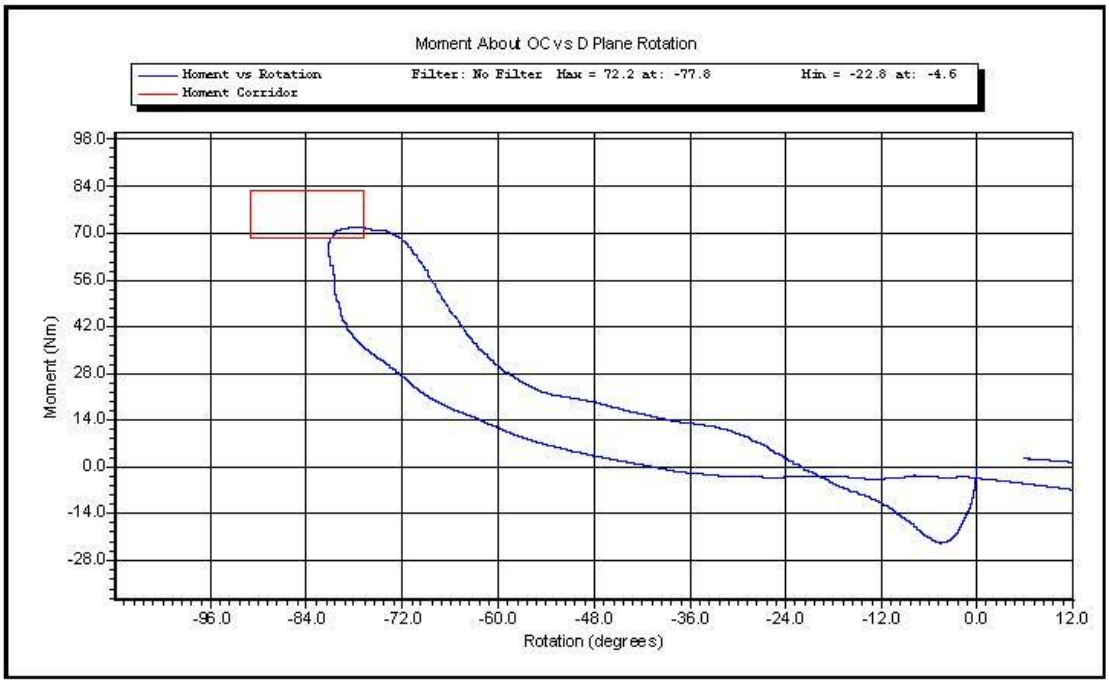
Test Name:	**Neck Flexion**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**1/6/2012**
Test Number:	**3**	Test Time:	**11:57:10 AM**



Test ID: Test Time: **11:57:10 AM** Test Date: **1/6/2012**

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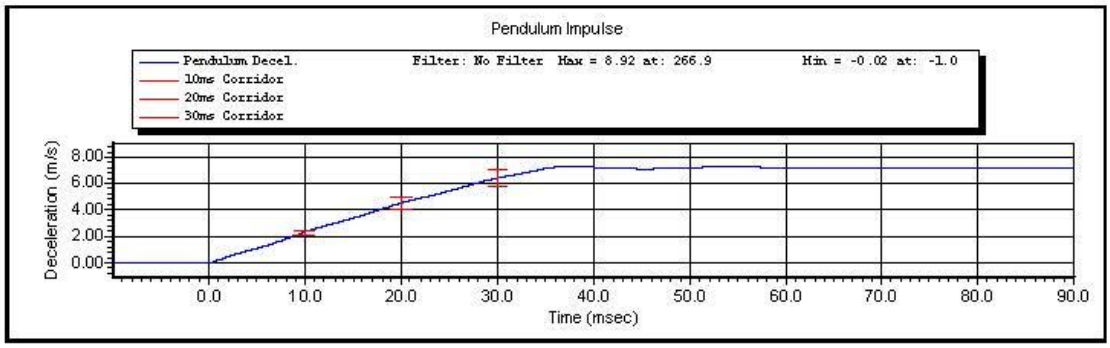

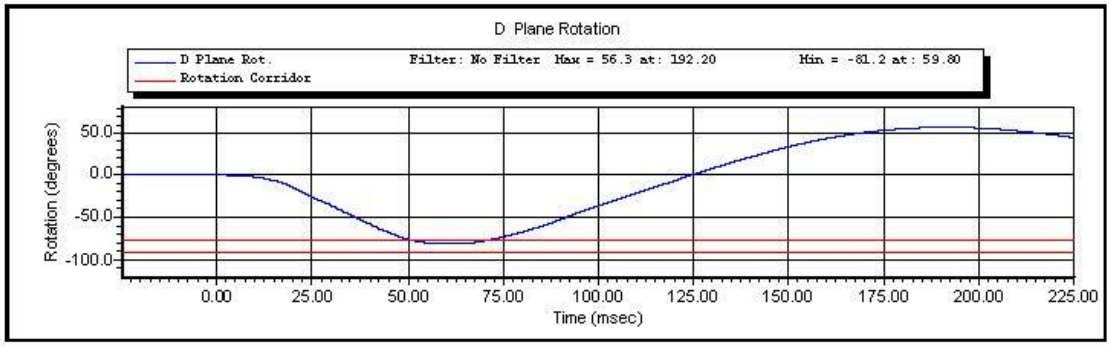

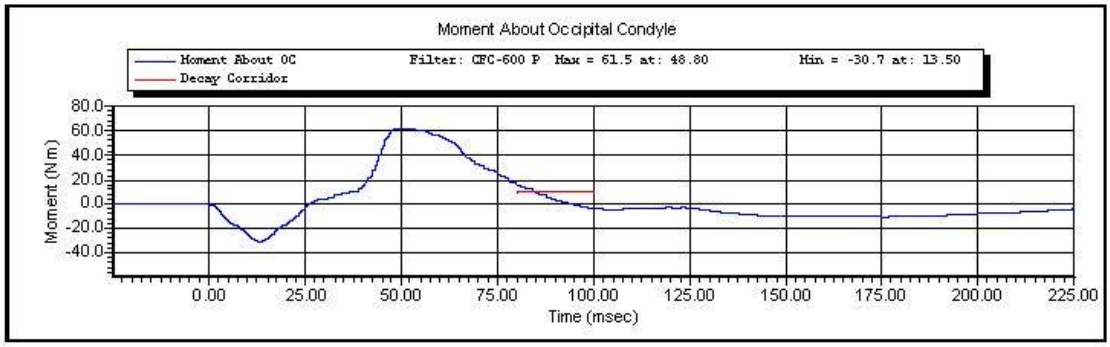

Test ID: Test Time: **11:57:10 AM** Test Date: **1/6/2012**

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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:		Test Date:	**12/21/2011**
Test Number:	**1**	Test Time:	**11:10:31 AM**

Component Part Number	Component Serial Number
Ribs 880105-RS	**670**
Chest Jacket - 880105-355-E	**DH0069**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**22.0**	deg C	P
Humidity	10.0	--	70.0	**37.0**	%RH	P
Velocity	6.59	--	6.83	**6.64**	m/s	P
Sternum Displacement	-58.0	--	-50.0	**-53.5**	mm	P
Force During Displacement Interval	-4400	--	-3900	**-4284**	N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	**-4213**	N	P
Hysteresis	69	--	85	**70**	%	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: Test Time: **11:10:31 AM** Test Date: **12/21/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2011**
Endevco	**7231CT**	**AGHF5**	**12/14/2011**
DentonATD	**78051-342**	**DS-273**	**10/10/2011**
Endevco	**7264-2000**	**P58884**	**10/31/2011**

Test ID: Test Time: **11:10:31 AM** Test Date: **12/21/2011**

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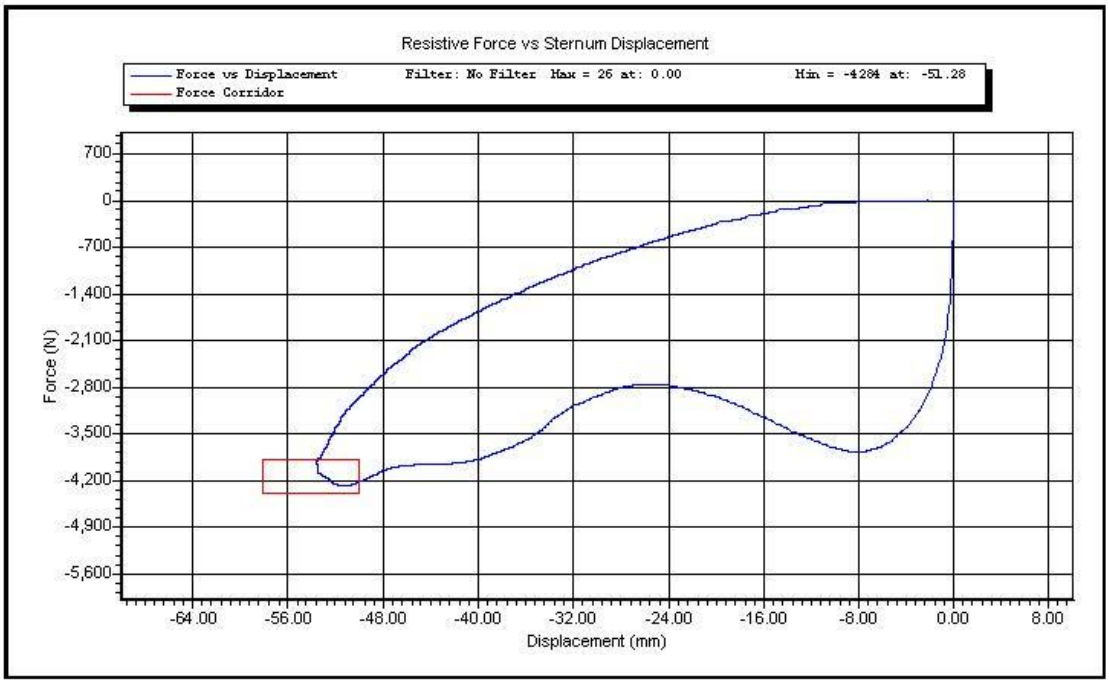
Test Name:	**Thorax Impact**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**12/21/2011**
Test Number:	**1**	Test Time:	**11:10:31 AM**



Test ID: Test Time: **11:10:31 AM** Test Date: **12/21/2011**

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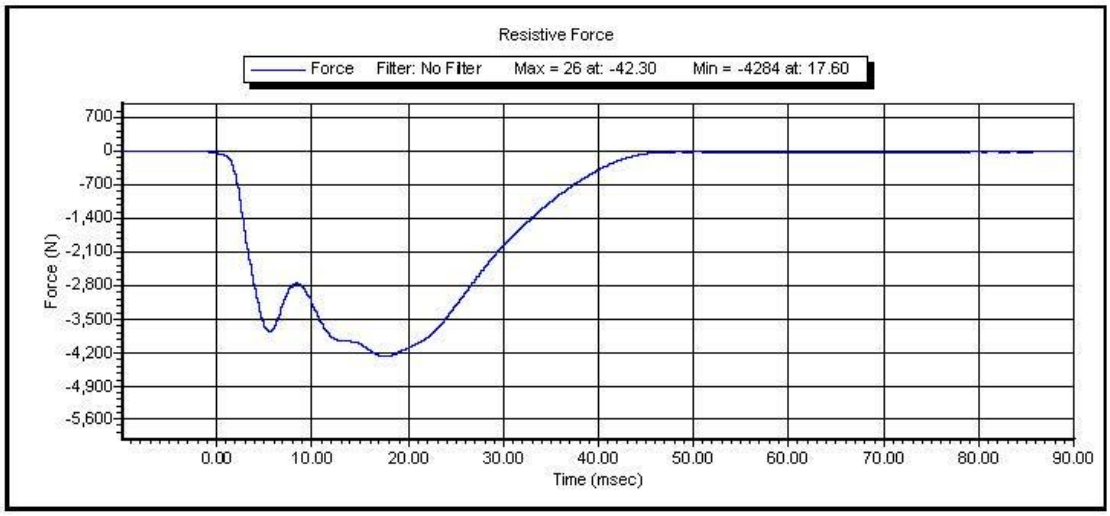

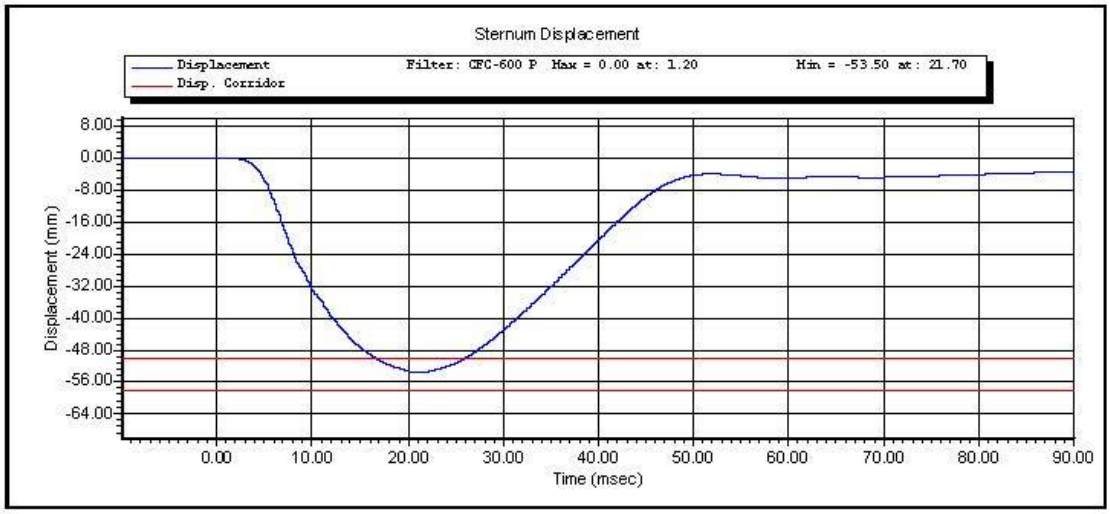

Test ID: Test Time: **11:10:31 AM** Test Date: **12/21/2011**

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Torso Flexion Test

Technician: SZ
Calibration Date: 1/12/2012

ATD Serial Number: NHTSA 5th Female 273

Test Results

Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.8° C	Pass
Lab Humidity	10-70%	26%	Pass
Max Force @ 45 deg	320 – 390N	368N	Pass
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	Pass
Initial reference angle	≤20 deg	12°	Pass
Final ref plan angle	Initial ref plane ± 8 deg	19°	Pass

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	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:	**12/12/2011**
Test Number:	**2**	Test Time:	**2:55:14 PM**

Component Part Number	Component Serial Number
Knee Skin - 880105-508	**1726**
Knee Insert - 880105-511	**1039**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10.0	--	70.0	**19.0**	%RH	P
Velocity	2.07	--	2.13	**2.09**	m/s	P
Resistive Force	-4060	--	-3450	**-3624**	N	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **Left Knee** Test Time: **2:55:14 PM** Test Date: **12/12/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee** Test Time: **2:55:14 PM** Test Date: **12/12/2011**

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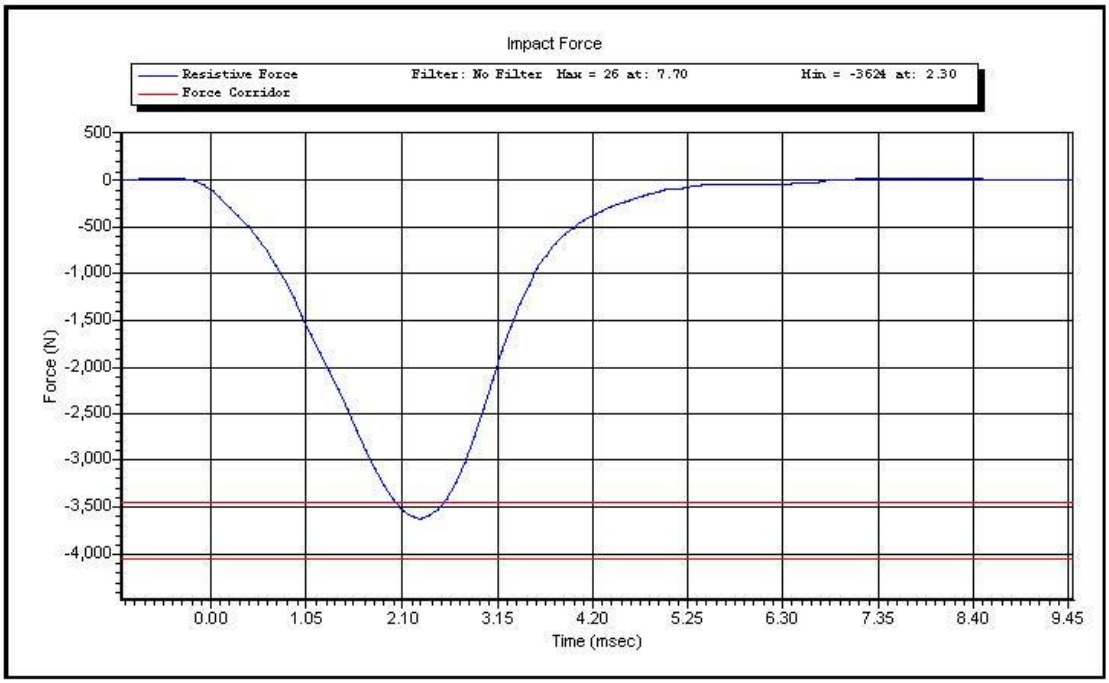
Test Name:	**Knee Impact PENDULUM**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:	**Left Knee**	Test Date:	**12/12/2011**
Test Number:	**2**	Test Time:	**2:55:14 PM**



Test ID: **Left Knee** Test Time: **2:55:14 PM** Test Date: **12/12/2011**

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1 of 1

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VERIFICATION REPORT

Test Name:	**Knee Impact PENDULUM**	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:	**12/12/2011**
Test Number:	**1**	Test Time:	**1:53:23 PM**

Component Part Number	Component Serial Number
Knee Skin - 880105-508	**1051**
Knee Insert - 880105-511	**1038**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10.0	--	70.0	**19.0**	%RH	P
Velocity	2.07	--	2.13	**2.11**	m/s	P
Resistive Force	-4060	--	-3450	**-3689**	N	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test ID: **Right Knee** Test Time: **1:53:23 PM** Test Date: **12/12/2011**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee** Test Time: **1:53:23 PM** Test Date: **12/12/2011**

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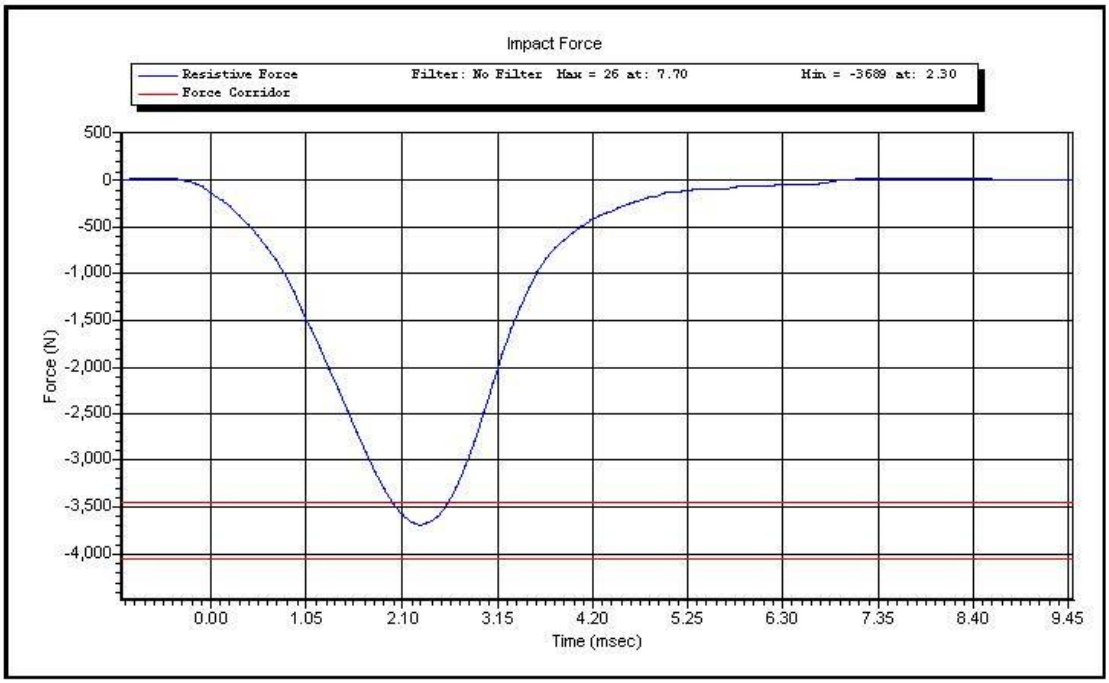

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