REPORT NUMBER: NCAP-CAL-13-003

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

Chrysler Group LLC
2013 Dodge Dart
Four Door Sedan

NHTSA No: MD0303

PREPARED BY:
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October 30, 2012

FINAL REPORT

PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

_____

COTR, New Car Assessment Program
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Date: _____

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16. Abstract

A 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2013 Dodge Dart Four Door Sedan 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 Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on September 26, 2012.

The impact velocity of the vehicle was 56.60 km/h, and the ambient temperature at the barrier face at the time of impact was 19°C. The target vehicle's maximum post-test static crush was 446 mm to the right side of the vehicle's centerline. The test vehicle's occupant performance data is as follows:

Measurement Description	Units	Driver ATD (Serial No. 061)		Passenger ATD (Serial No. 273)	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})		700	241.05	700	239.33
Maximum Chest Compression	mm	63	-18.30	52	-13.19
Nij		1	0.30	1	0.42
Neck Tension	N	4,170	1,485.49	2,620	559.56
Neck Compression	N	4,000	-475.05	2,520	-717.70
Left Femur Force	N	10,008	-2,847.60	6,805	-2,014.42
Right Femur Force	N	10,008	-2220.15	6,805	-1511.11

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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h 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. DTNH22-12-D-00260. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test procedure, dated May 2012.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2013 Dodge Dart Four Door Sedan at a velocity of 56.60 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on September 26, 2012. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATD), 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. 061) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 136 channels of data were recorded on an on-board data acquisition system. Please refer to Appendix B for the dummy response data traces.

There was 100.0 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was a total of zero grams of stoddard solvent leakage after the event and including all phases of the static rollover. The maximum static crush of the test vehicle was 446 mm located to the right of the vehicle's centerline. During and after the impact event, the driver's side door remained closed and operational and the passenger's side door remained closed and operational.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee airbag.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee airbag.

The occupant data is summarized below.

ATD Position	HIC_{15}	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50^{th})	241.05	0.30	1,485.49	-475.05	44.34	-18.30	-2,847.60	-2,220.15
Passenger (5^{th})	239.33	0.42	559.56	-717.70	39.99	-13.19	-2,014.42	-1,511.11

GENERAL COMMENTS:

1. P1 (Driver) serial number - 061
2. P2 (Passenger) serial number - 273

Data Anomalies:

- V1P1 Left Lower Tibia Fz is questionable after 36 ms
- V1P2 Chest Redundant y is questionable data
- V1P2 Right Upper Tibia Mx is questionable after 16 ms.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 – General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

Data Sheet No. 6 – High-Speed Camera Locations and Data

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

Data Sheet No. 9 – Load Cell Locations on Fixed Barrier

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

Data Sheet No. 15 – Summary of FMVSS 212, 219 (Partial), and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

Data Sheet No. 17 – Dummy/Vehicle Temperature Stabilization Chart

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD0303	Anti-Lock Brakes	Yes
Make	Dodge	Power Steering	Yes
Model	Dart	Driver Front Airbag	Yes
Body Style	Four Door Sedan	Driver Curtain Airbag	Yes
VIN	1C3CDFBA7DD708372	Driver Head/Torso Airbag	No
Color	Light gray/silver	Driver Torso Airbag	No
Delivery Date	9/6/2012	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (mi)	35.0	Driver Pelvis Airbag	No
Odometer Reading (km)	56.3	Driver Knee Airbag	Yes
Dealer	Transitown Dodge Chrysler Jeep	Pass. Front Airbag	Yes
Transmission	6-Speed Automatic	Pass. Curtain Airbag	Yes
Final Drive	Front Wheel Drive	Pass. Head/Torso Airbag	No
Type/No. Cyl	I4	Pass. Torso Airbag	No
Engine Disp. (L)	2.0	Pass. Torso/Pelvis Airbag	Yes
Engine Placement	Transverse	Pass. Pelvis Airbag	No
Roof Rack	No	Pass. Knee Airbag	Yes
Sunroof/T-Top	No	Pretensioners	Yes
Tinted Glass	No	Load Limiters	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Tilt Steering	Yes
Front Disc	Yes	Other	--
Rear Disc	Yes	Other	--

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler Group LLC	GVWR (kg)	1,944
Date of Manufacture	July 12	GAWR Front (kg)	1,076
		GAWR Rear (kg)	870

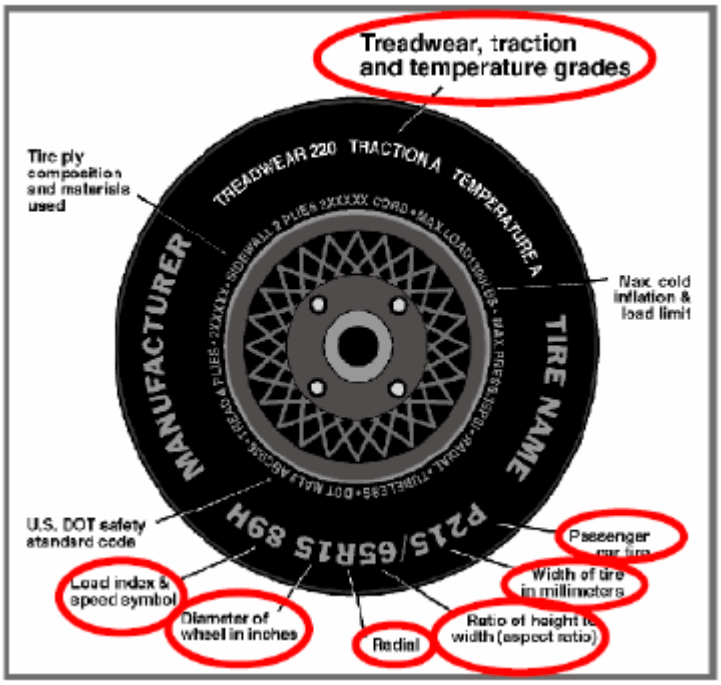
VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Type of Seats	Bucket	Bench			
Number of Occupants	2	3		5	
Capacity Wt. (VCW) (kg)				374.0	(A)
DSC X 68.04 kg				340.2	(B)
Cargo Wt. (RCLW) (kg)				33.8	(A-B)

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

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	235	235
Recommended Tire Size	P225/45R17	P225/45R17
Tire Size on Vehicle	P225/45R17	P225/45R17
Tire Manufacturer	Continental	Continental
Tire Model	ContiproContact	ContiproContact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index / Speed Symbol	91H	91H
Tire Material	Rubber	Rubber
DOT Safety Code Right	P57R3YW1712	P57R3YW1712
DOT Safety Code Left	P57R3YW1812	P57R3YW2112

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

Test Vehicle: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	486.0	272.0		499.0	347.0	
Right	kg	439.5	302.5		484.0	336.5	
Ratio	%	61.7	38.3		59.0	41.0	
Totals	kg	925.5	574.5	1,500.0	983.0	683.5	1,666.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1,500.0	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	33.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1,674.4	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	697	695	705	706	1,035
As Tested	mm	701	703	683	684	1,109
Post-Test	mm	696	693	689	683	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,703
Total Vehicle Length at Left Side	mm	4,594
Total Vehicle Length at Centerline	mm	4,676
Total Vehicle Length at Right Side	mm	4,594
Weight of Ballast in Cargo Area	kg	10.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	55.6

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

None

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

Test Vehicle: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4,676
2	Total Width	1,839
3	Bumper Top Height	-564
4	Bumper Bottom Height	-441
5	Longitudinal Member Top Height	-578
6	Distance Between Longitudinal Members	1,028
7	Longitudinal Member Width	69
8	Engine Top Height	-842
9	Engine Bottom Height	-144
10	Engine and Gearbox Width	586
11	Front Bumper-Engine Distance	505
12	Front Shock Absorber Fixing Height	-881
13	Bonnet Leading Edge Height	-738
14	Front Shock Absorber Fixing Width	1,146
15	Front Bumper – Front Axle Distance	980
16	Front Axle – A Pillar Distance	454
17	A-Pillar – B-Pillar Distance	1,120
18	B-Pillar – Rear Axle Distance	1,130
19	B-Pillar – C-Pillar Distance	966
20	Roof Sill Bottom Height	-1,317
21	Roof Sill Top Height	-1,421
22	Floor Sill Bottom Height	-271
23	Floor Sill Top Height	-375

*All measurements are in millimeters

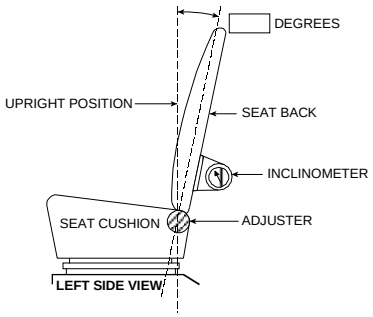
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

NOMINAL DESIGN RIDING POSITION

The driver's seat back was set to the manufacturer's designated angle. The passenger's seat back was positioned in a similar manner as the driver's seat back. Seat back angles are measured at the headrest post bezel using a digital inclinometer.

Seating Position	Degrees
Driver Seat Back Angle	-0.5
Passenger Seat Back Angle	1.4



FRONT SEAT ASSEMBLY

SEAT FORE / AFT POSITIONS

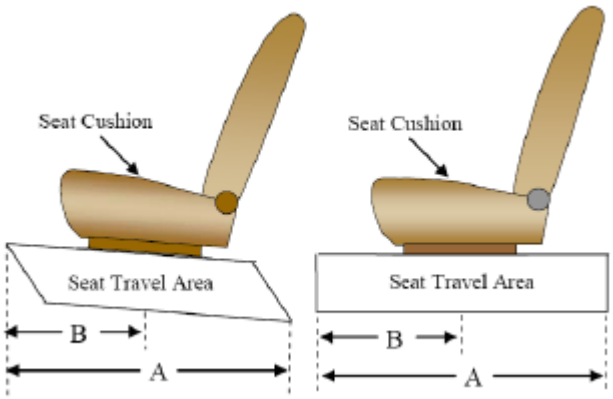
The driver's seat was positioned at the mid-point of fore/aft travel. The passenger's seat was positioned at the most forward position of fore/aft travel at mid seat cushion angle. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	22	9
Passenger Seat	22	0

SEAT BELT UPPER ANCHORAGE

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50th percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5th percentile adult female ATD. For this test zero is defined as the uppermost position.

Seating Position	Total # of Positions	Placed in Position #
Driver Seat	4	0
Passenger Seat	4	0



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

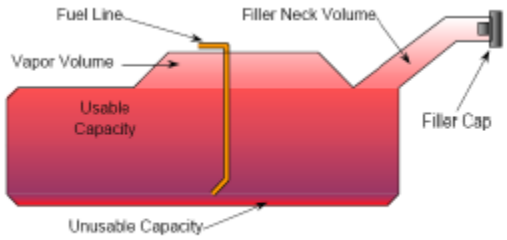
Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	59.8
Usable Capacity of "Optional Tank"	50.0
92%-94% of Usable Capacity	55.0 - 56.2
Actual Amount of Solvent Used	55.6
1/3 of Usable Capacity	19.9

FUEL PUMP

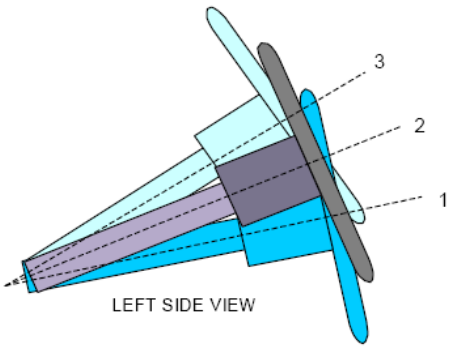
The vehicle is equipped with an electric fuel pump. The fuel filler neck is on the right side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



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. For angular measurements, a digital inclinometer was used to measure a plate which was placed across the steering wheel rim. A tape measure was used to measure the telescoping steering wheel travel.



STEERING COLUMN ASSEMBLY

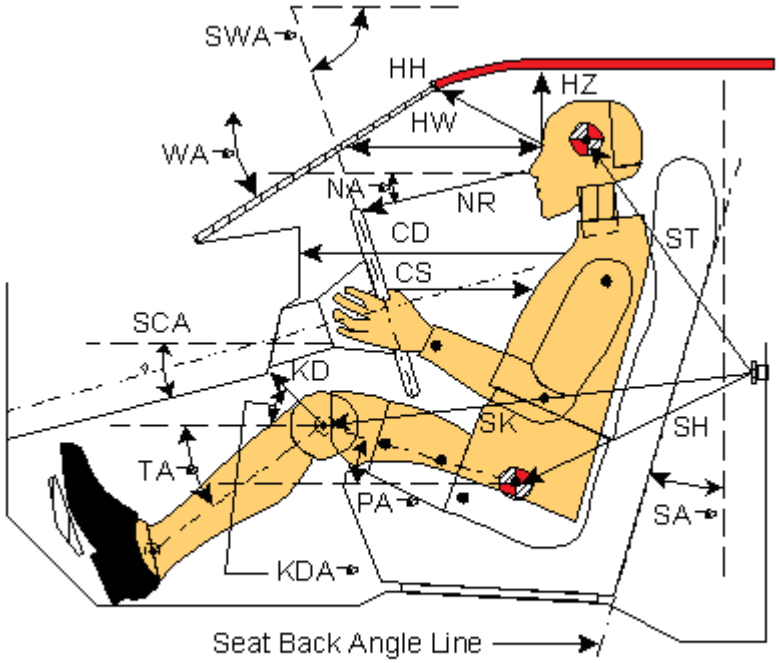
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	22.2	0
Geometric center position No. 2	24.3	20
Uppermost position No. 3	26.4	40
Telescoping Steering Wheel Travel		40
Test Position	24.3	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0303
Test Date: 9/26/2012



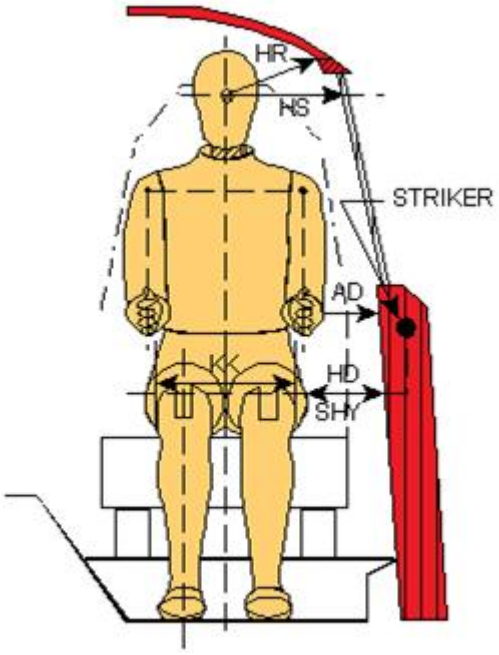
Left Side View

Code	Measurement Description	Driver (S/N: 061)		Passenger (S/N: 273)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		23.6		
SWA°	Steering Wheel Angle		24.5		
SCA°	Steering Column Angle		65.5		
SA°	Seat Back Angle (on headrest post)		-0.5		1.4
HZ	Head to Roof (Z)	169	90.0	203	90.0
HH	Head to Header	326	27.7	302	50.2
HW	Head to Windshield	642	0.0	673	0.0
NR	Nose to Rim	398	-9.5	450	-22.4
CD	Chest to Dash	549		397	
CS	Chest to Steering Hub	326	-1.0		
RA	Rim to Abdomen	209	3.0		
KDL	Left Knee to Dash	174	38.8	120	42.2
KDR	Right Knee to Dash	169	38.0	128	45.0
PA°	Pelvic Angle		23.7		20.7
TA°	Tibia Angle		-24.6		-35.1
SK	Striker to Knee	591	-8.6	667	-7.4
ST	Striker to Head	504	82.8	472	60.8
SH	Striker to H-Point	254	-47.8	353	-31.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0303
Test Date: 9/26/2012

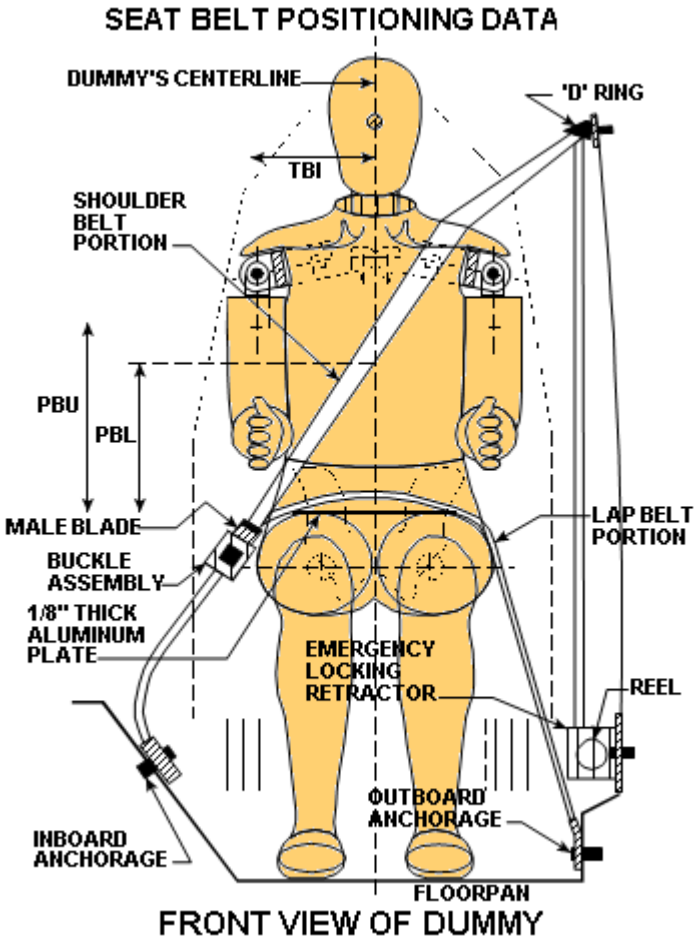


Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	115	91
HD	H-Point to Door	154	178
HR	Head to Side Header	218	260
HS	Head to Side Window	412	400
KK	Knee to Knee	270	168
SHY	Striker to H-Point (Y Direction)	250	280
AA	Ankle to Ankle	260	170

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	360	285
PBL — Top surface of reference to belt lower edge	mm	280	195

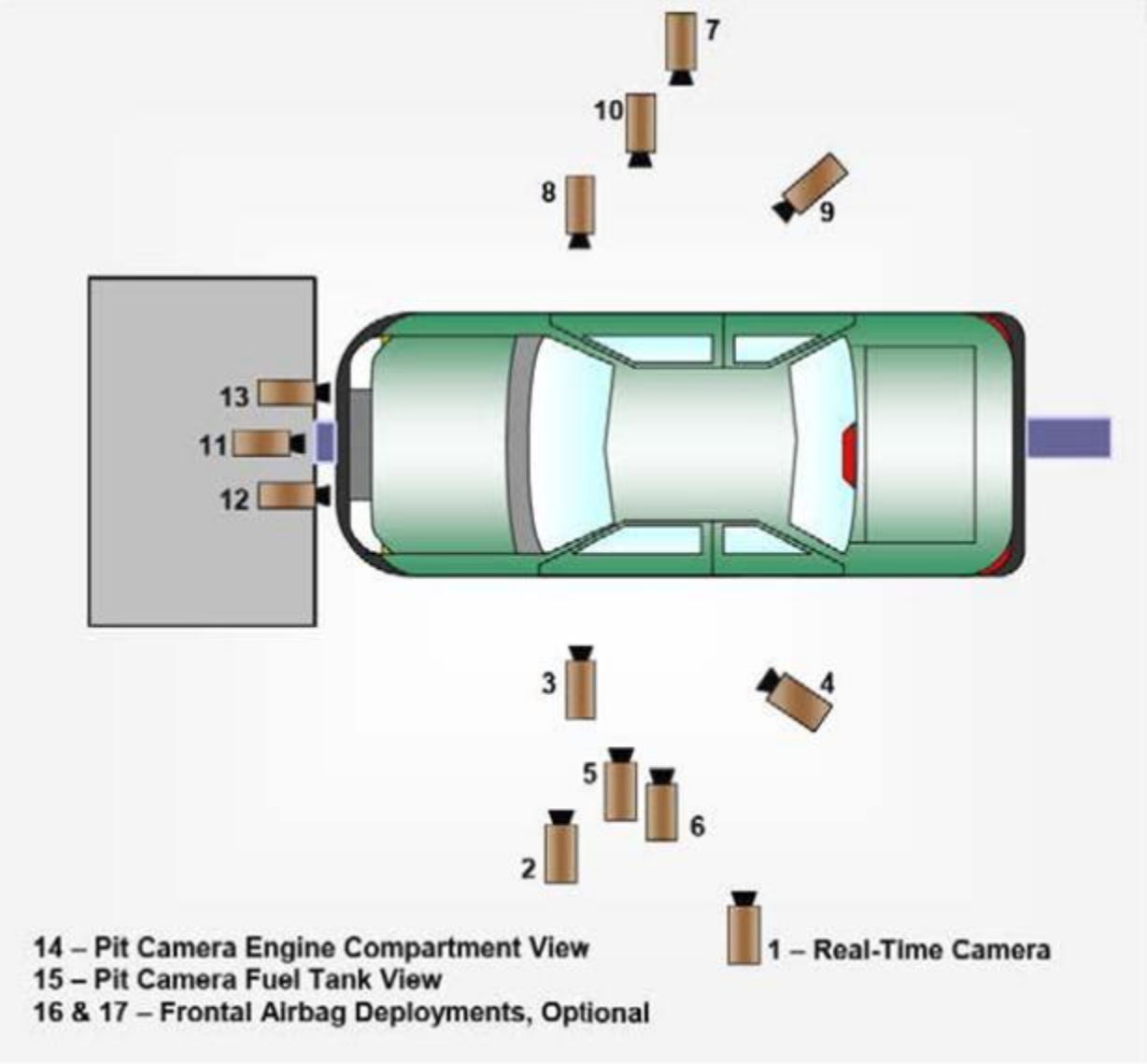
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	783	840
Lap Belt Length as measured on ATD	mm	565	620
Remainder of belt on reel	mm	1,252	1,140
Total belt length for continuous webbing systems	mm	2,600	2,600

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

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

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

Test Vehicle: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

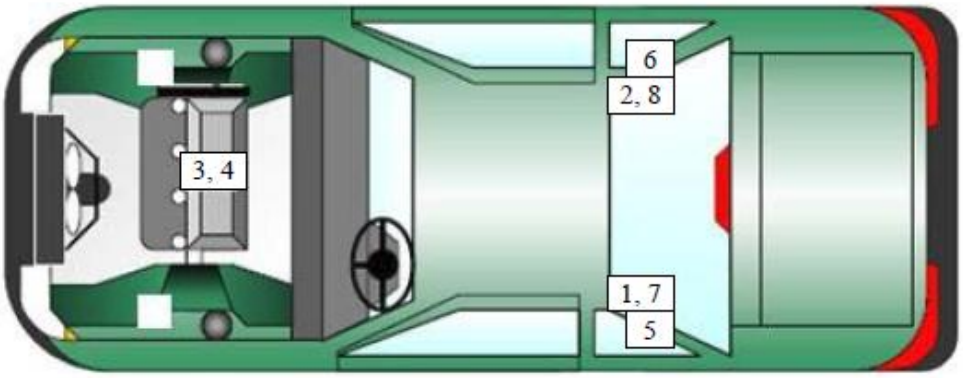
CAMERA LOCATIONS

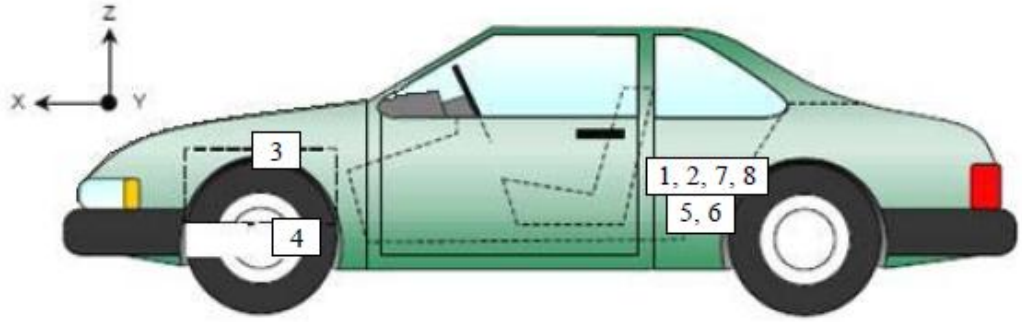
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		24
2	Driver Close-Up	1593	-8189	944	50	1000
3	Left Front Half	1195	-9415	900	50	1000
4	Left Angle	3096	-3376	2336	28	1000
5	Steering Column - Top	2079	-7731	1811	24 - 70	1000
6	Steering Column - Bottom	2079	-7731	1210	28 - 70	1000
7	Right Overall	2045	7111	936	24	1000
8	Passenger Close-Up	1808	7334	1171	50	1000
9	Right Front Half	1339	9181	901	50	1000
10	Right Angle	3018	3131	2311	24	1000
11	Windshield	480	0	3219	24	1000
12	Driver Windshield	260	-602	2012	12.5	1000
13	Passenger Windshield	260	583	1971	12.5	1000
14	Pit Front	948	0	1740	6.5	1000
15	Pit Rear	2454	0	1740	6.5	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 LOCATIONS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MD0303
Test Date: 9/26/2012





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X	1,925	-607	-259
2	Right Rear Accelerometer – X	1,917	590	-260
3	Engine Top X	3,850	366	-827
4	Engine Bottom X	4,271	188	-154
5	Left Rear Accelerometer – Z Direction	1,925	-607	-259
6	Right Rear Accelerometer – Z Direction	1,917	590	-260
7	Left Rear Accelerometer – X Direction Redundant	1,925	-607	-259
8	Right Rear Accelerometer – X Direction Redundant	1,917	590	-260

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

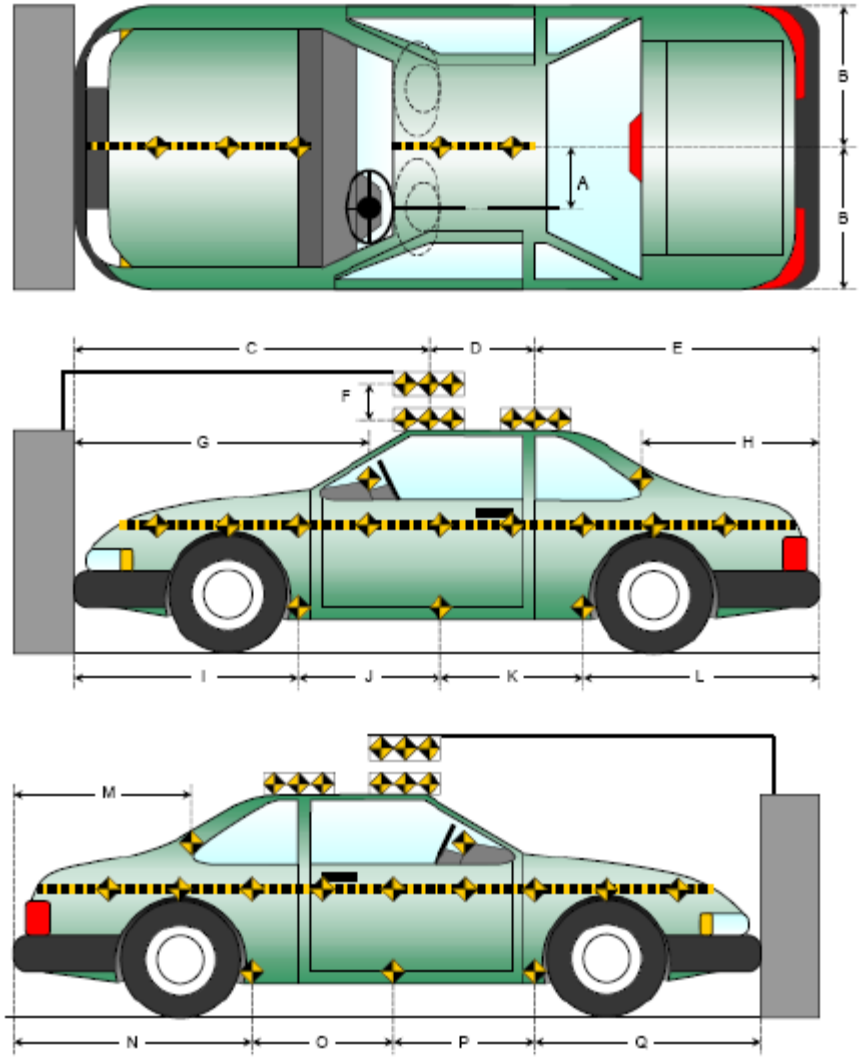
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MD0303
Test Date: 9/26/2012

Item	Value
A	356
B	919
C	2,297
D	1,216
E	1,163
F	145
G	1,794
H	975
I	1,405
J	920
K	931
L	1,421
M	973
N	1,423
O	923
P	926
Q	1,404

All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

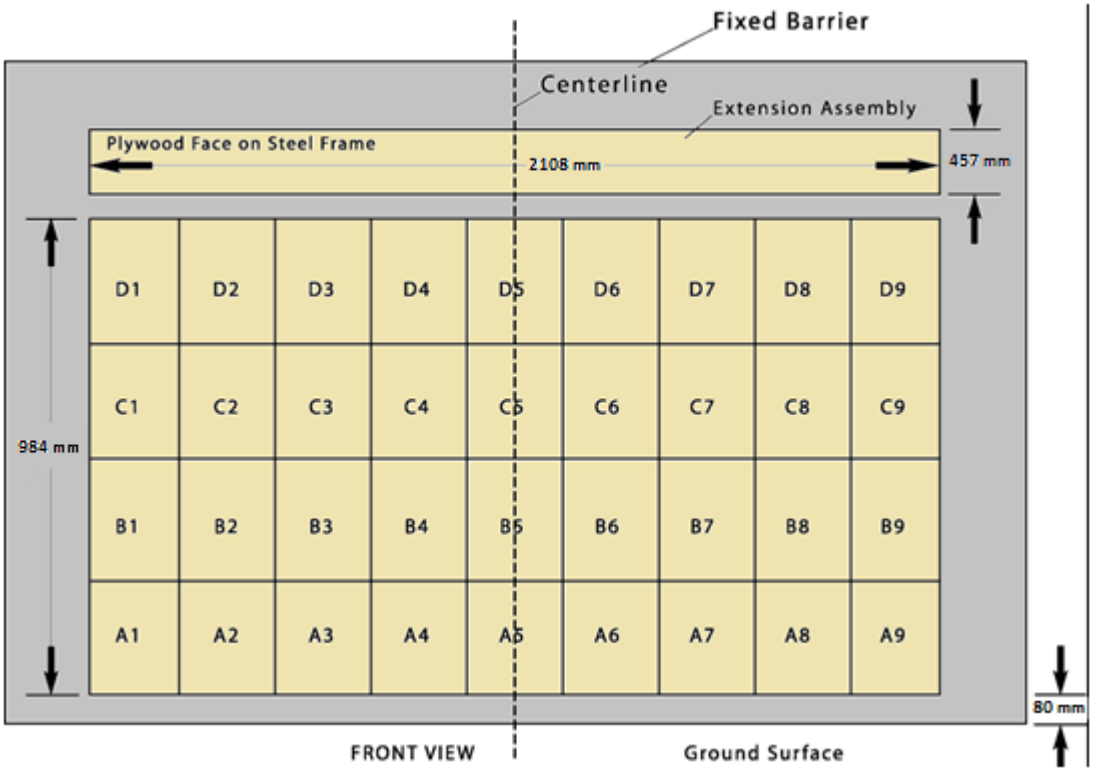


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test
Test Date: 9/26/2012

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	136

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: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50TH male / 061	P5720 5th female / 273
Head Contact	Front Airbag	Front Airbag
Upper Torso Contact	Front Airbag	Front Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Knee Airbag
Right Knee Contact	Knee Airbag	Knee Airbag

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)	0	0
Seat Back Failure	No	No
Glazing Damage	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracks along the bottom
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

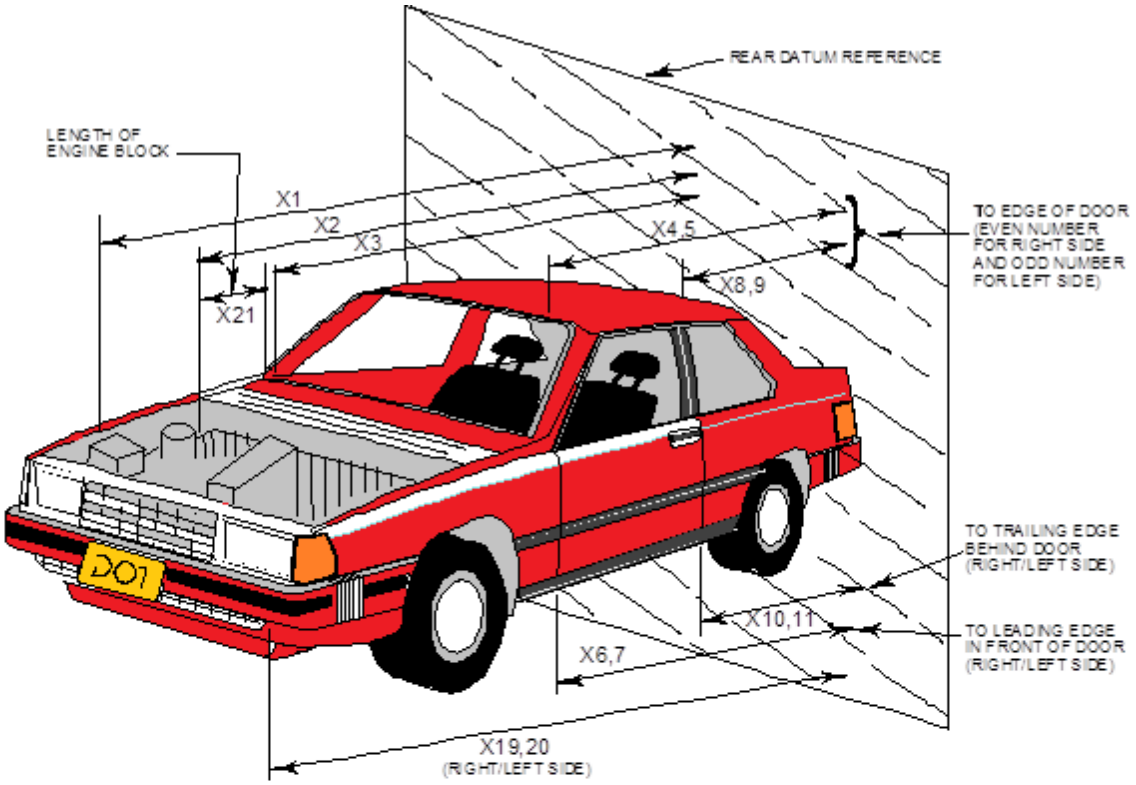
Measured Parameter	Units	Value
Left Side	mm	752
Center	mm	715
Right Side	mm	792
Average	mm	753

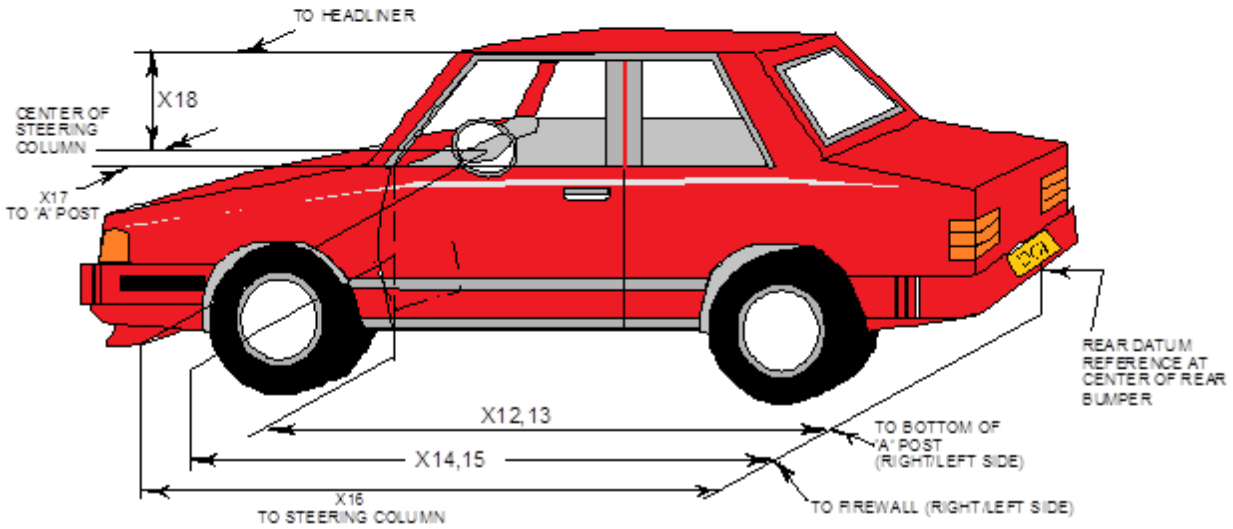
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 - Curtain	Yes	No	Yes	No
Side Airbag 2 - Torso/Pelvis	Yes	No	Yes	No
Knee Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012





DATA SHEET NO. 12 … (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Dodge Dart Four Door Sedan NHTSA No.: MD0303
Test Program: NCAP Frontal Barrier Impact Test Test Date: 9/26/2012

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4,676	4,241	-435
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4,171	4,062	-109
3	RSOV to Firewall	3,668	3,662	-6
4	RSOV to Upper Leading Edge of Right Door	3,212	3,210	-2
5	RSOV to Upper Leading Edge of Left Door	3,211	3,206	-5
6	RSOV to Lower Leading Edge of Right Door	3,187	3,189	2
7	RSOV to Lower Leading Edge of Left Door	3,186	3,184	-2
8	RSOV to Upper Trailing Edge of Right Door	2,103	2,104	1
9	RSOV to Upper Trailing Edge of Left Door	2,102	2,099	-3
10	RSOV to Lower Trailing Edge of Right Door	2,156	2,157	1
11	RSOV to Lower Trailing Edge of Left Door	2,155	2,155	0
12	RSOV to Bottom of “A” Post of Right Side	3,238	3,241	3
13	RSOV to Bottom of “A” Post of Left Side	3,244	3,242	-2
14	RSOV to Firewall, Right Side	3,760	3,745	-15
15	RSOV to Firewall, Left Side	3,761	3,747	-14
16	RSOV to Steering Column	2,723	2,772	49
17	Center of Steering Column to “A” Post	313	324	11
18	Center of Steering Column to Headliner	394	416	22
19	RSOV to Right Side of Front Bumper	4,594	4,141	-453
20	RSOV to Left Side of Front Bumper	4,594	4,225	-369
21	Length of Engine Block	432	432	0
RD	RSOV to Right Side of Dash Panel	2,916	2,918	2
CD	RSOV to Center of Dash Panel	2,959	2,964	5
LD	RSOV to Left Side of Dash Panel	2,917	2,920	3

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

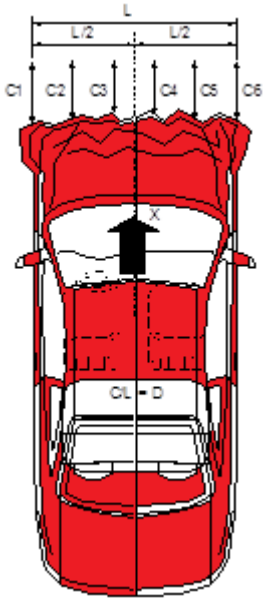
Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

VEHICLE INFORMATION

VIN:	1C3CDFBA7DD708372	Wheelbase (mm):	2,703
Vehicle Size Category:	Four Door Sedan	Test Weight (kg):	1,666.5

ACCELEROMETER DATA

Accelerometer Locations:	Please See Data Sheet No. 7
Cal. Procedure / Interval:	Calspan Procedure / 6 month
Integration Algorithm:	Trapezoidal
Linearity:	> 99%
Impact Velocity (km/h):	56.60
Velocity Change (km/h):	56.60
Time of Separation (ms):	110



CRUSH PROFILE

Collision Deformation Classification:	12FDEW2
Midpoint of Damage:	Vehicle Centerline
Damage Region Length (mm):	811
Impact Mode:	Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4464	4257	-207
C2	Crush Zone 2 at Left Side	mm	4608	4219	-389
C3	Crush Zone 3 at Left Side	mm	4667	4246	-421
C4	Crush Zone 4 at Right Side	mm	4667	4227	-440
C5	Crush Zone 5 at Right Side	mm	4609	4163	-446
C6	Crush Zone 6 at Right Side	mm	4472	4148	-324
L	C1 to C6	mm	1334	1418	84

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

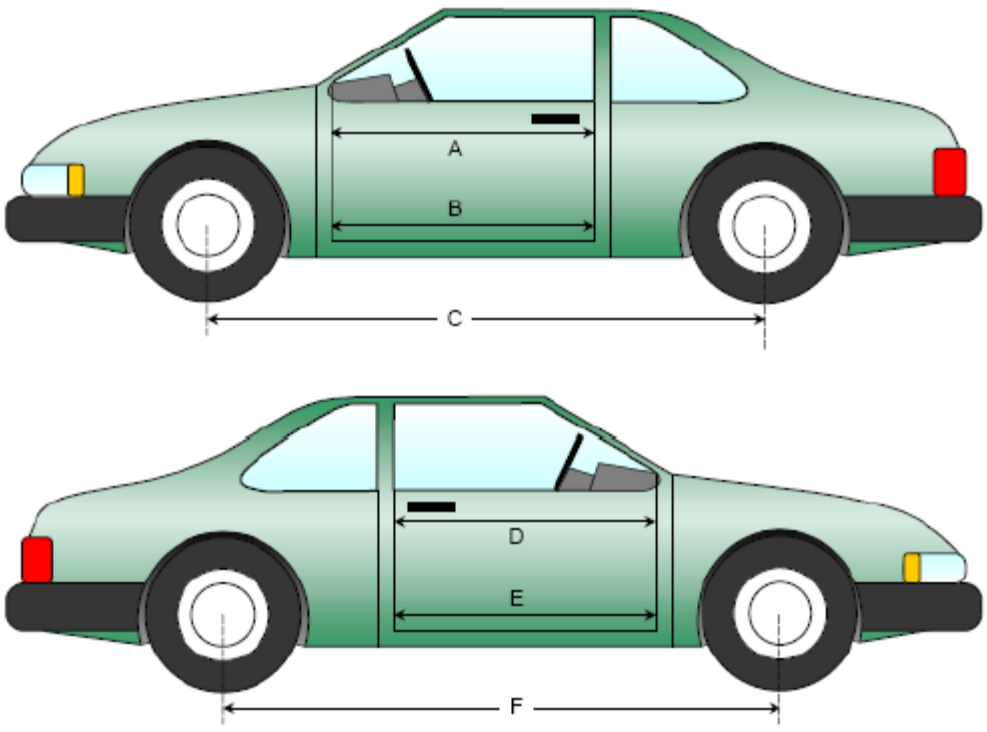
Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	991	990	-1
B	Left Side Lower	mm	842	841	-1
D	Right Side Upper	mm	989	989	0
E	Right Side Lower	mm	852	851	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2,703	2,694	-9
F	Right Side Wheelbase	mm	2,703	2,703	0



Left & Right Side Views

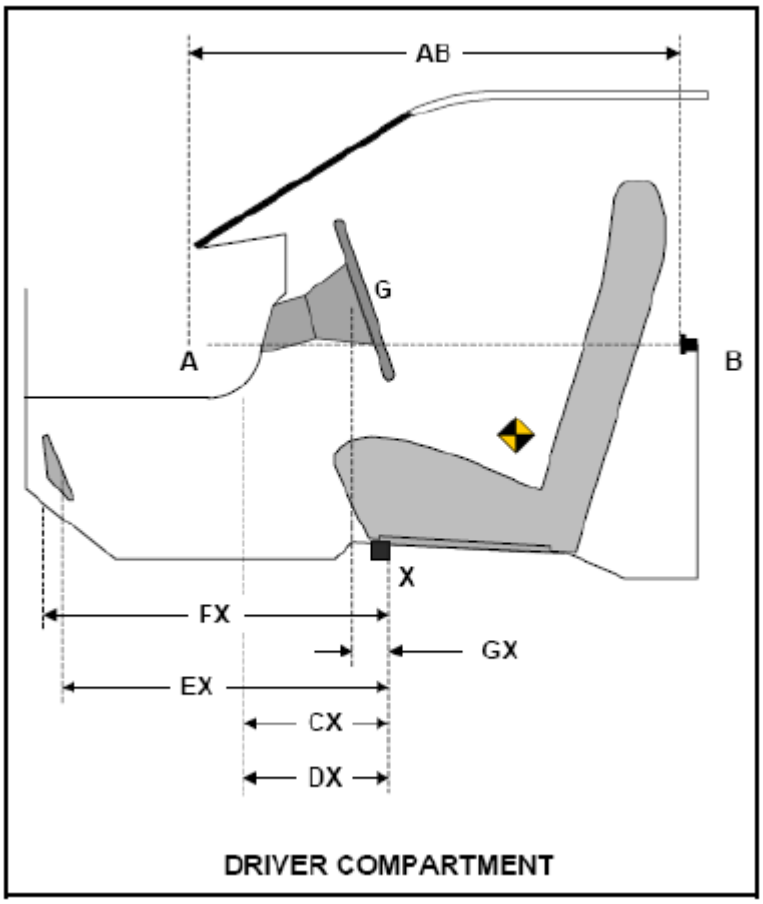
DATA SHEET NO.14 … (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MD0303
Test Date: 9/26/2012

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	828	829	1
CX	Left Knee Bolster to X	mm	313	317	-4
DX	Right Knee Bolster to X	mm	297	307	-10
EX	Brake Pedal to X	mm	595	581	-14
FX	Foot Rest to X	mm	603	603	0
GX	Center of Steering Column Wheel Hub to X	mm	102	152	50

X = Front of Seat Track (Stationary)



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

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

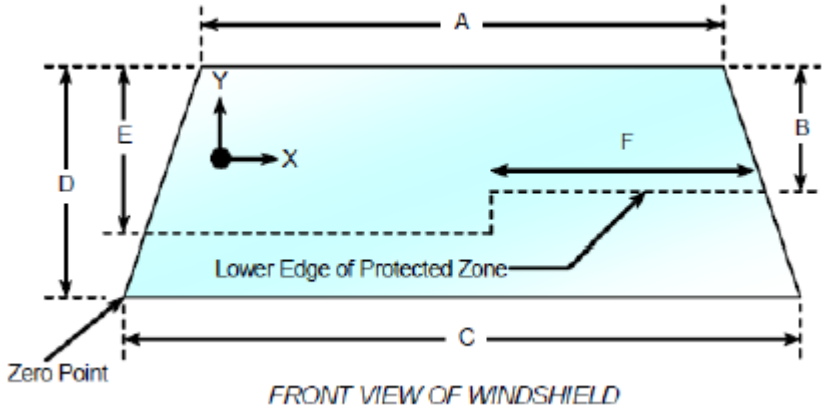
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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: 19° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2,254.0	2,254.0	100%
Right Side	2,254.0	2,254.0	100%
Total	4,508.0	4,508.0	100%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1,240
B	mm	475
C	mm	1,540
D	mm	864
E	mm	548
F	mm	284

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.*
   - ***No Penetration***

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.*
   - ***No Penetration***

X	Y

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

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 19° C Test Time: 5:38 PM

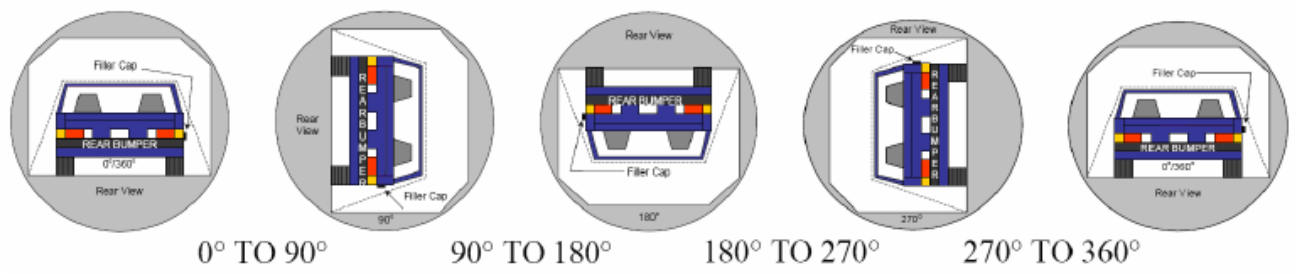
STODDARD SOLVENT SPILLAGE MEASUREMENTS

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

D. Spillage: Total Spillage was 0 oz. No Spillage Occurred

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2013 Dodge Dart Four Door Sedan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MD0303
Test Date: 9/26/2012



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: Total Spillage was 0 oz. No Spillage Occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	74	300	374
90° to 180°	65	300	365
180° to 270°	62	300	362
270° to 360°	69	300	369

FMVSS 301 SPILLAGE TABLE

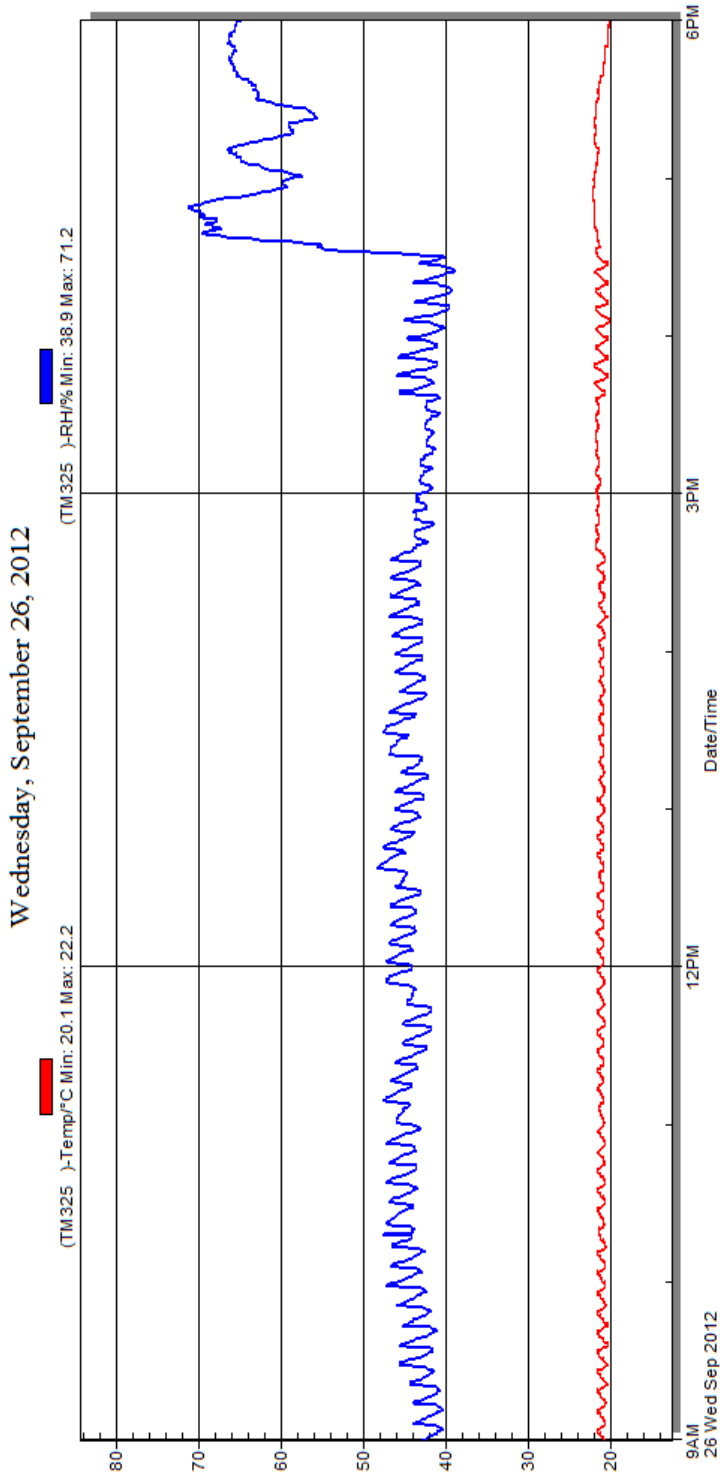
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle:	2013 Dodge Dart Four Door Sedan	NHTSA No.:	MD0303
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	9/26/2012



Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle

APPENDIX A

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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.*

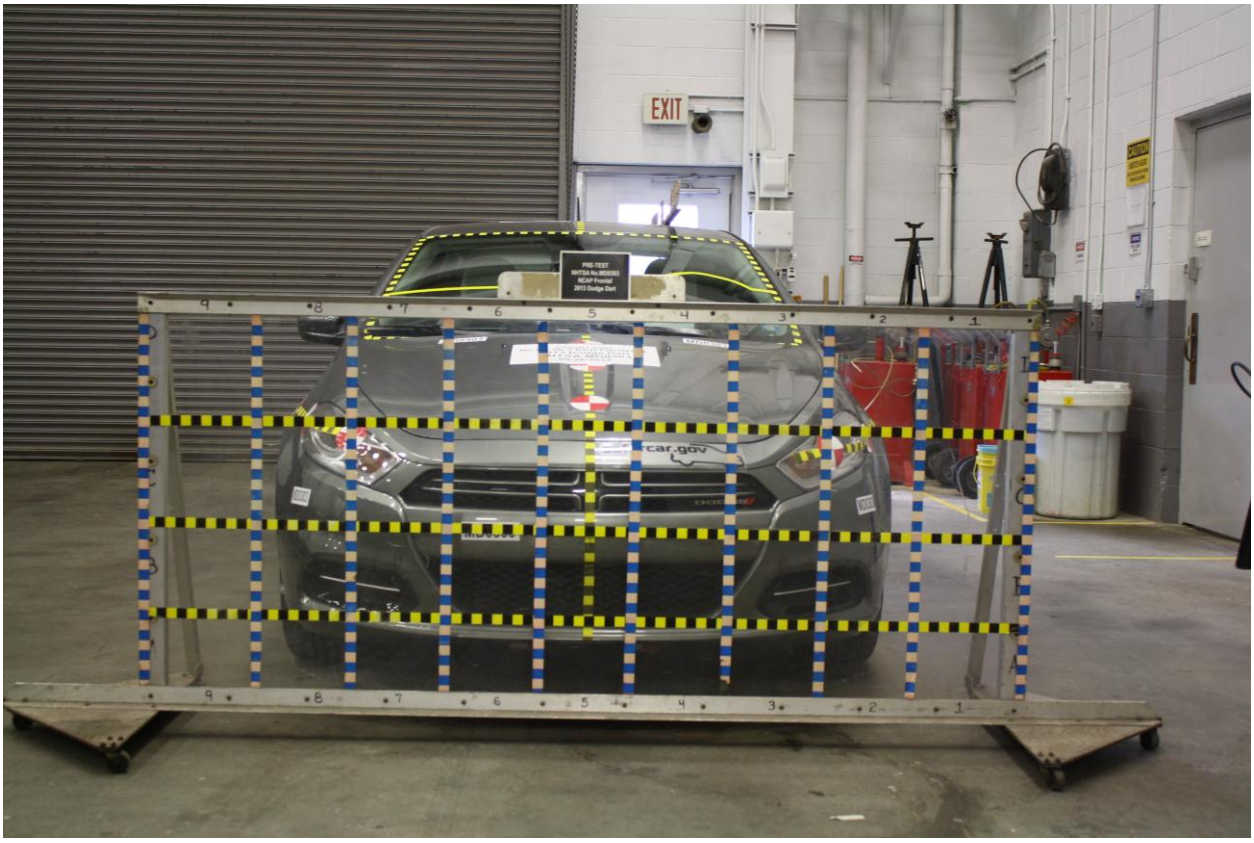


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall



Figure A-3: Manufacturer's Label

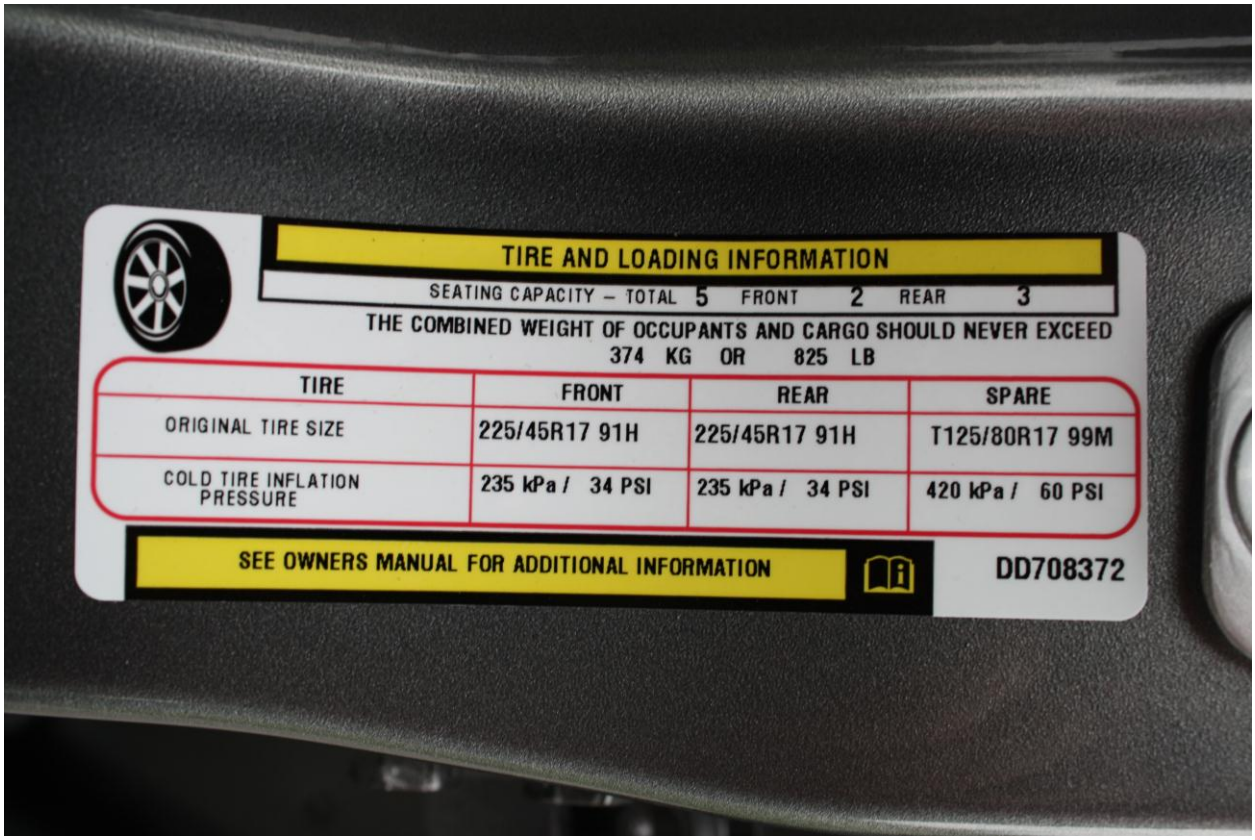


Figure A-4: Tire Placard



Figure A-5: 2013 Dodge Dart Frontal As Delivered



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

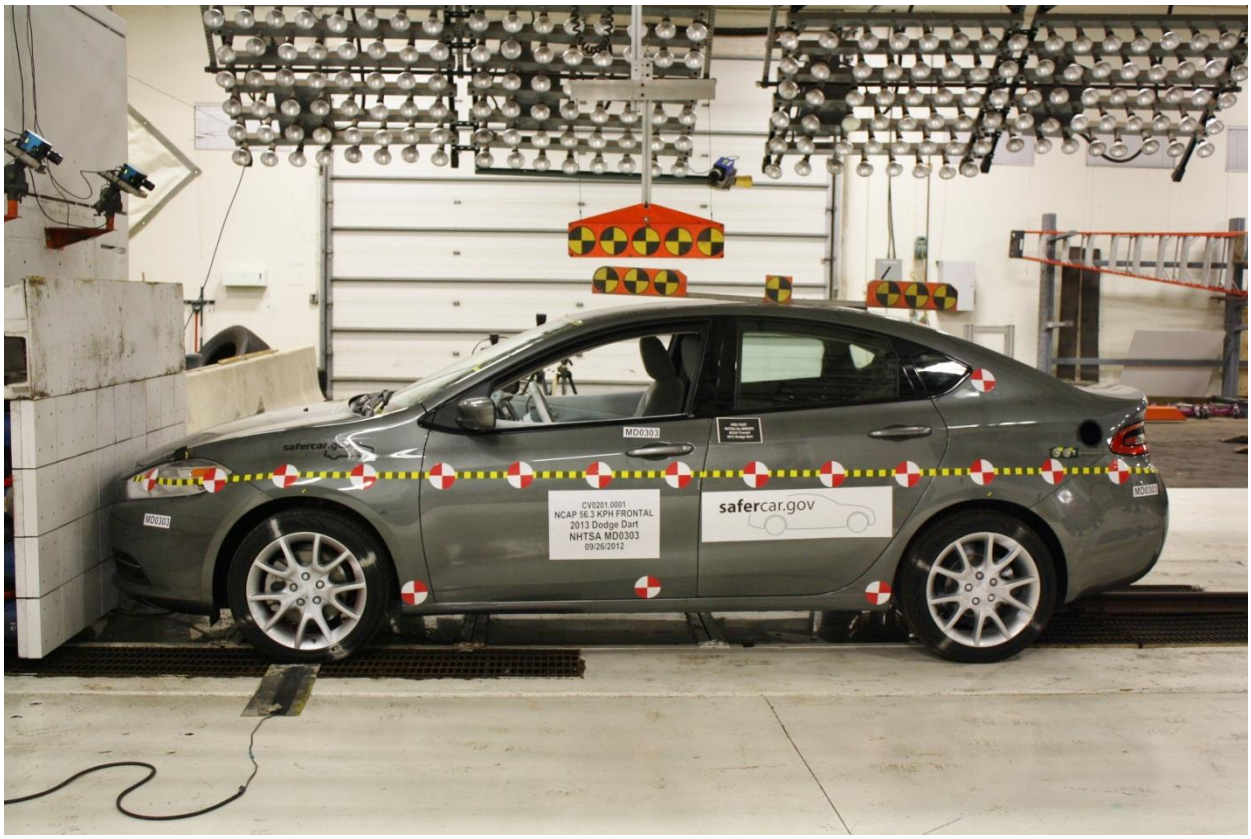


Figure A-9: Pre-Test Left View of Test Vehicle



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 Rear 3-4 View

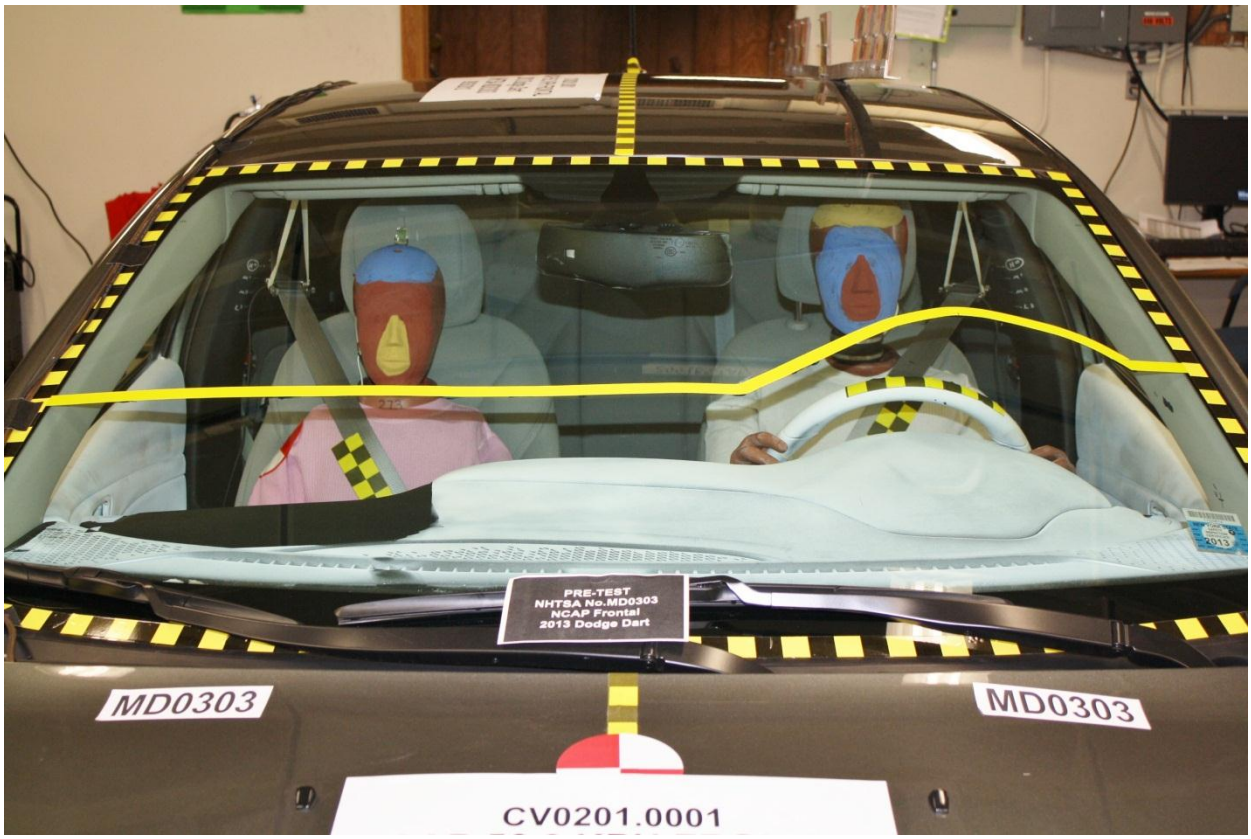


Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View

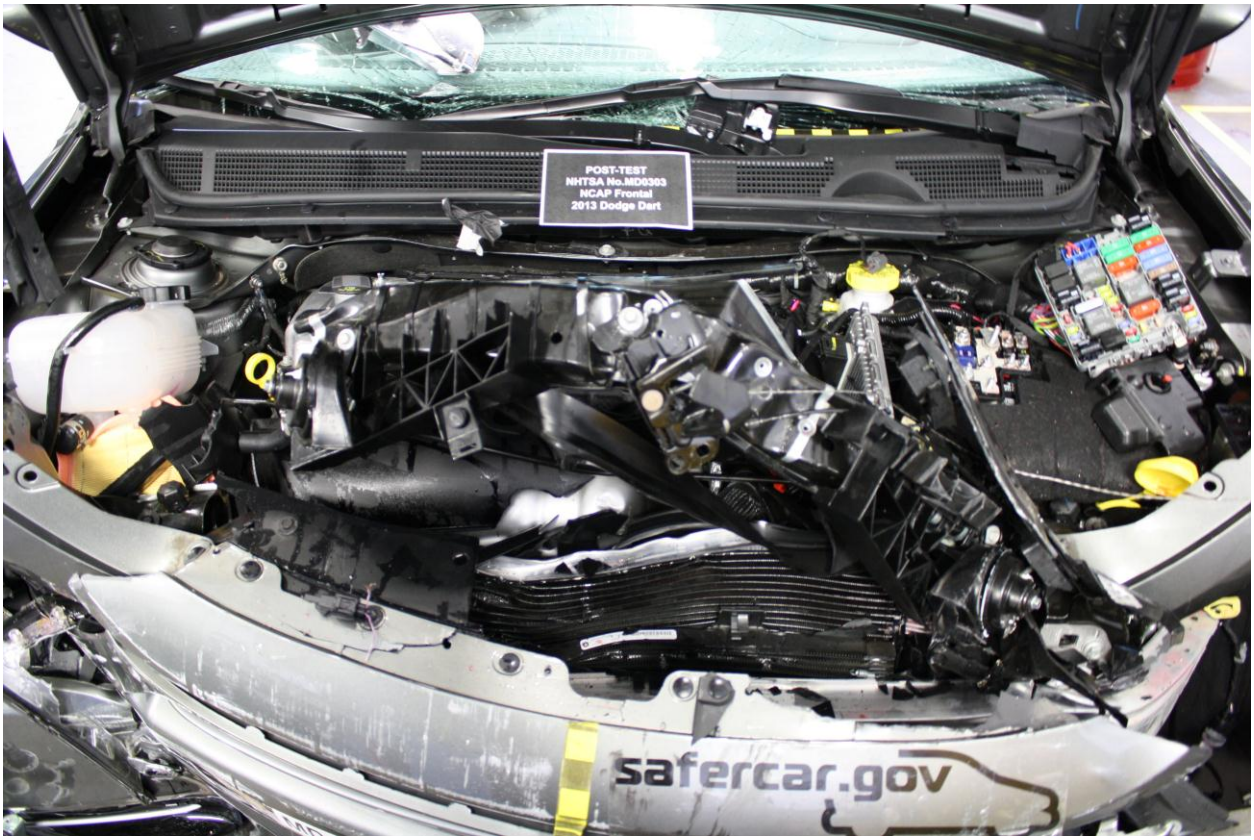


Figure A-20: Post-Test Engine Compartment View



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



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



Figure A-23: Pre-Test Front Underbody View

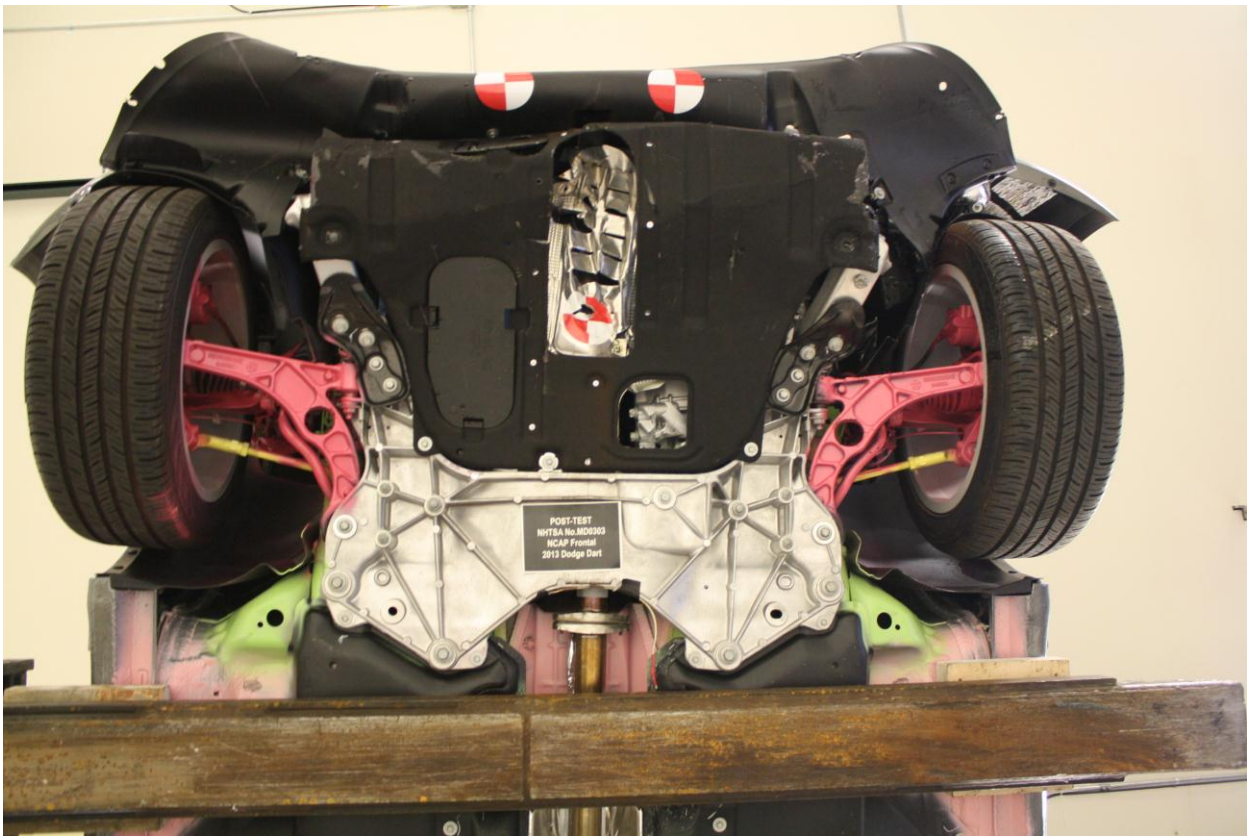


Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing

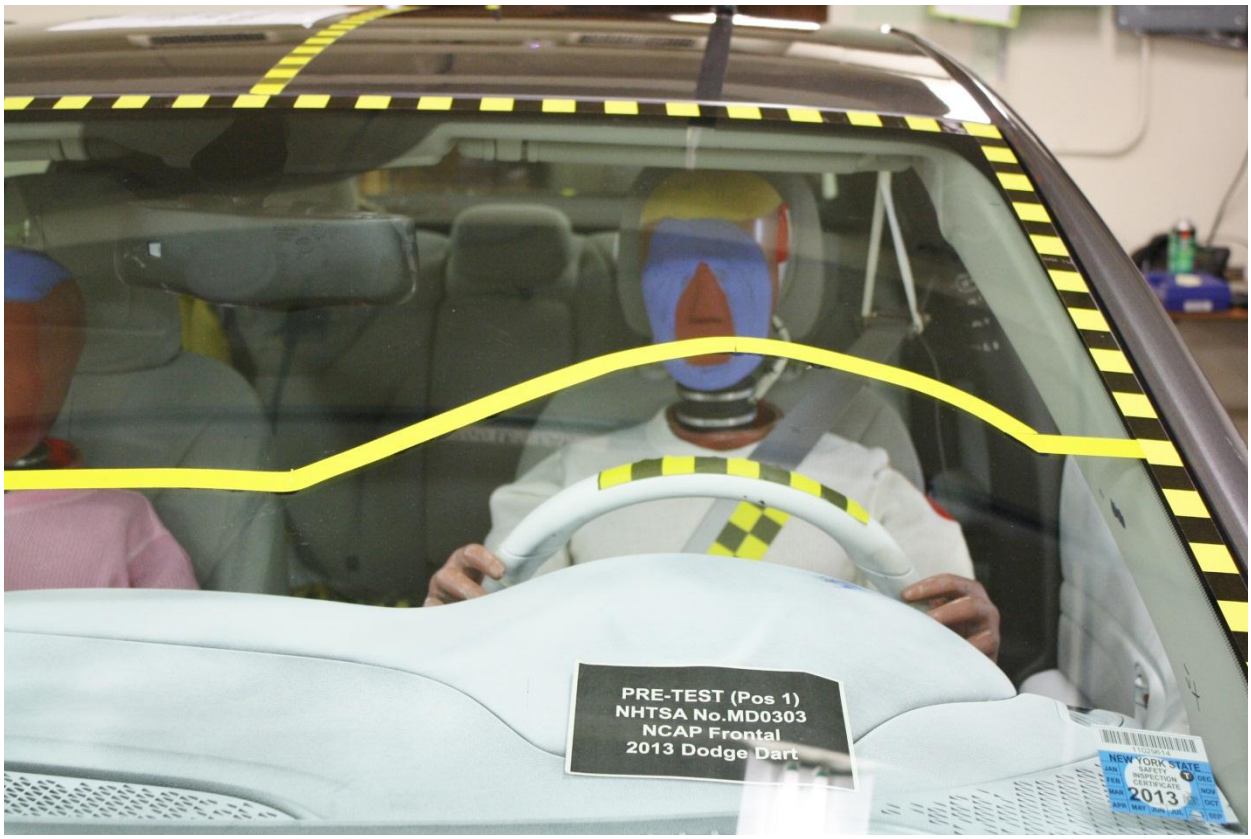


Figure A-29: Pre-Test Driver Dummy Front View

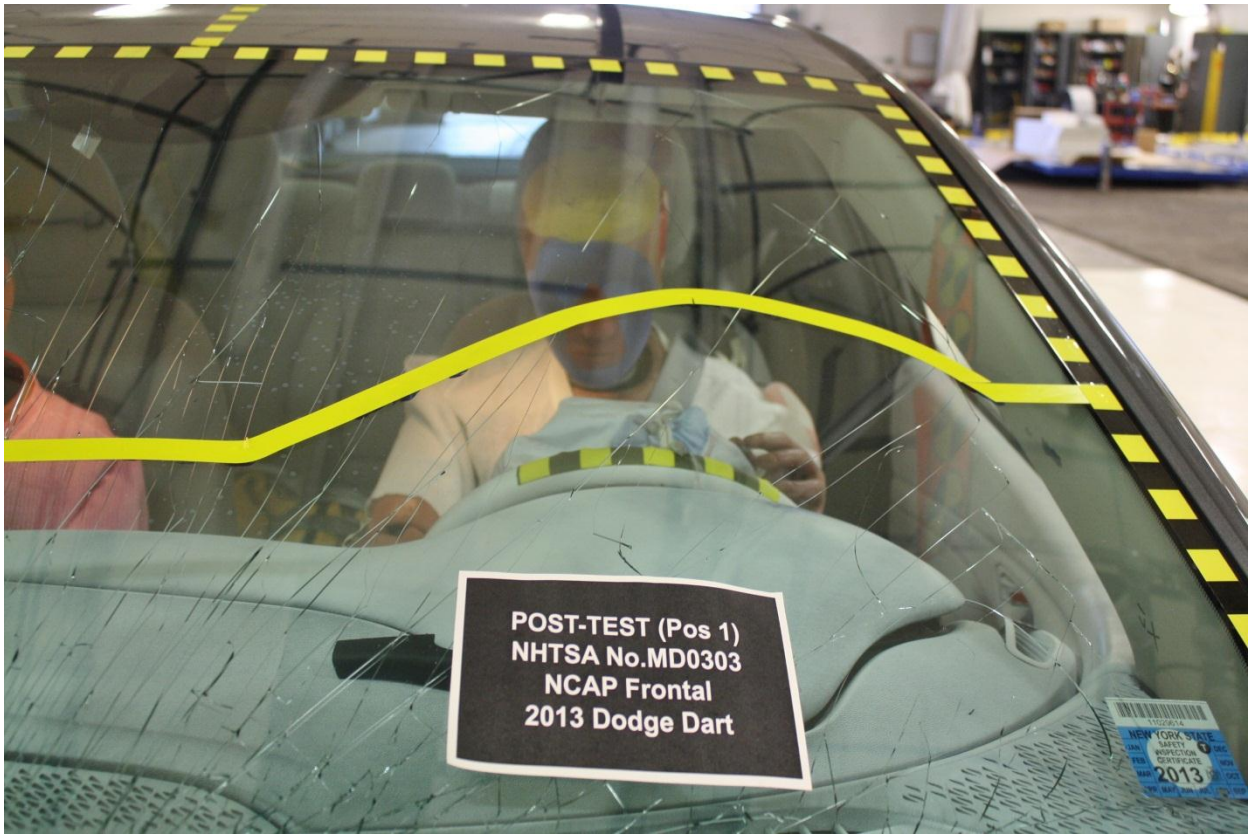


Figure A-30: Post-Test Driver Dummy Front View



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



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



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



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



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

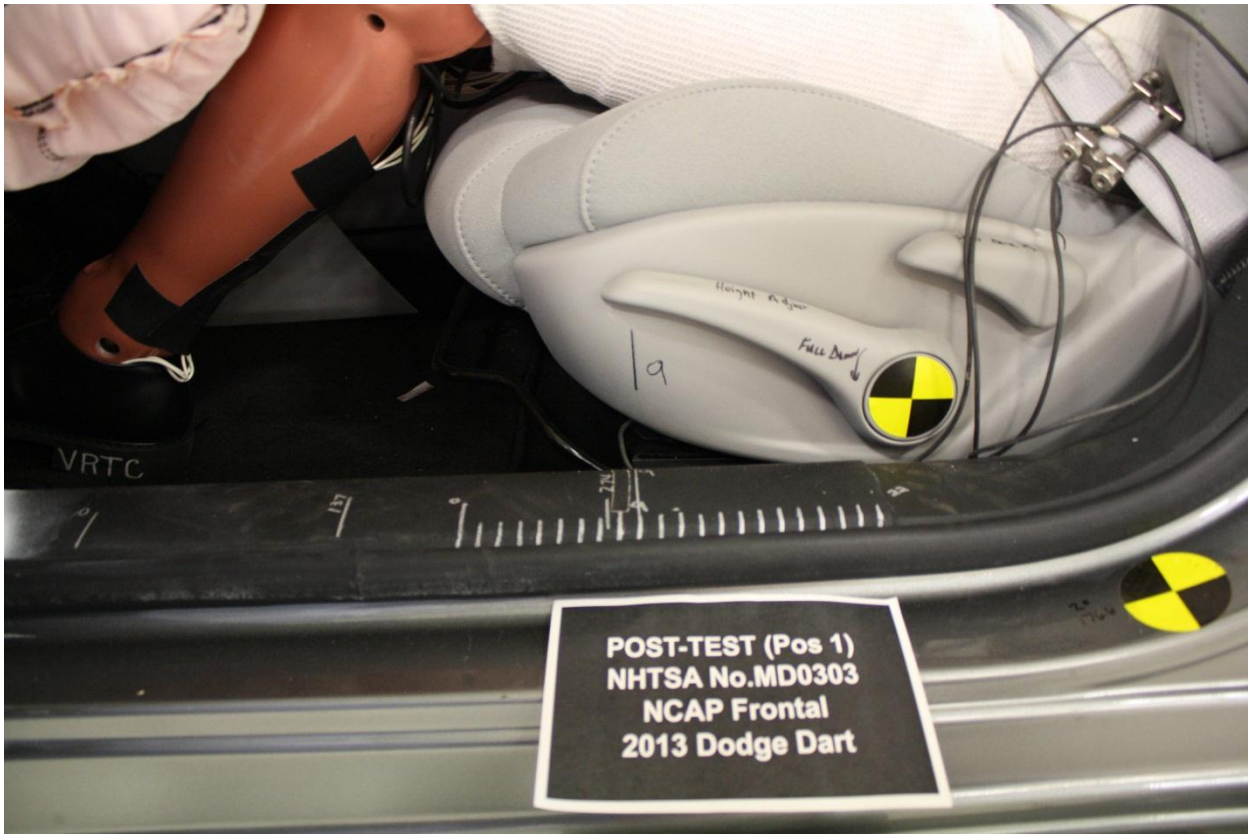


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



Figure A-37: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-38: Post-Test View of Belt Anchorage for Driver Dummy

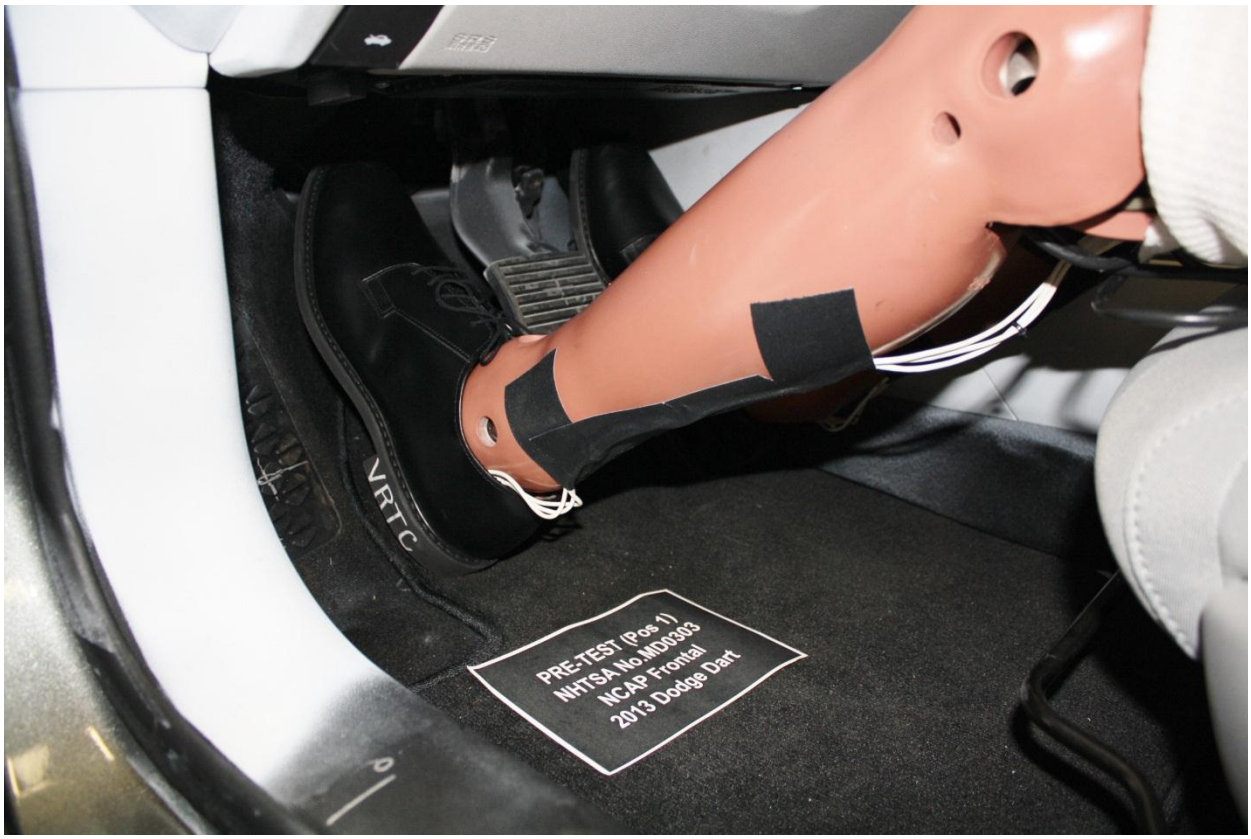


Figure A-39: Pre-Test Driver Dummy Feet

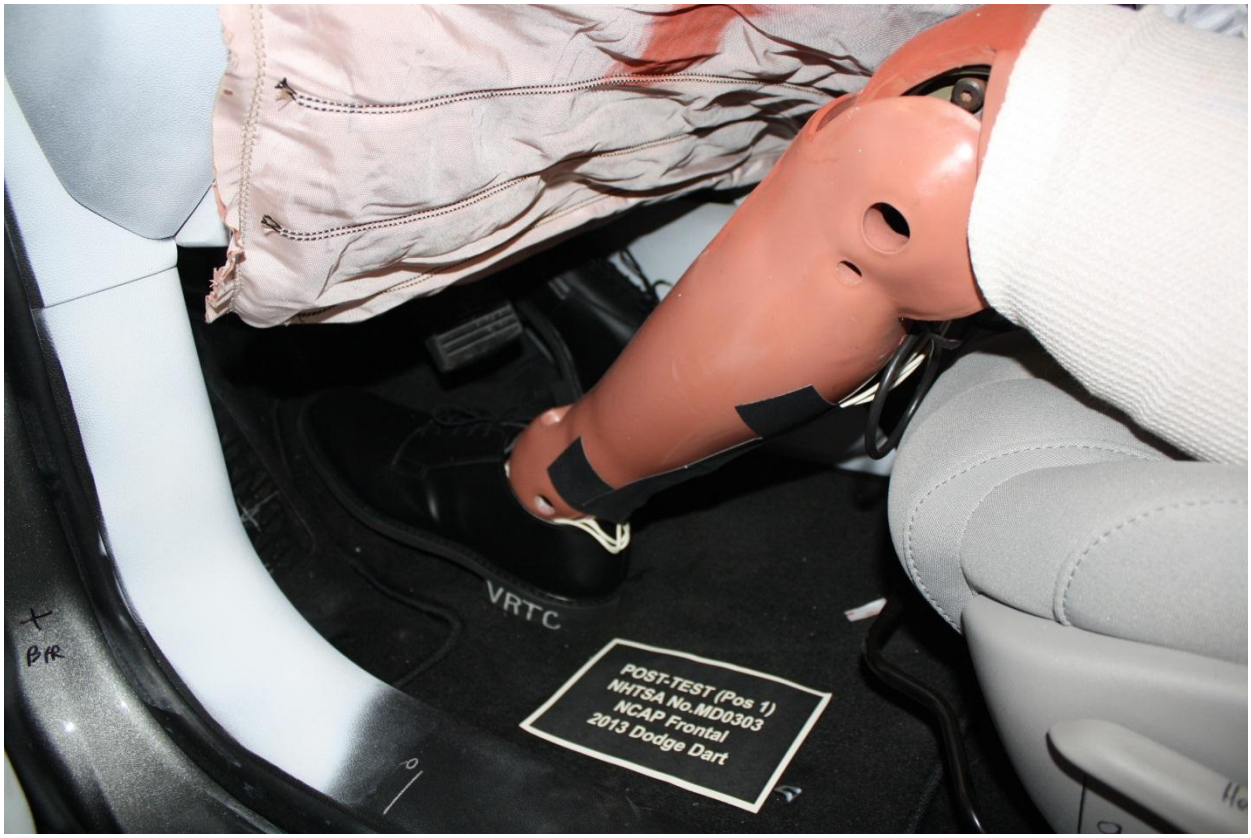


Figure A-40: Post-Test Driver Dummy Feet



Figure A-41: Pre-Test Driver's Side Knee Bolster



Figure A-42: Post-Test Driver's Side Knee Bolster



Figure A-43: Pre-Test Driver's Side Floorpan



Figure A-44: Post-Test Driver's Side Floorpan



Figure A-45: Post-Test Driver Dummy Face



Figure A-46: Post-Test Driver Dummy Contact With Airbag



Figure A-47: Post-Test Driver Dummy Contact With Headrest



Figure A-48: Pre-Test View of the Steering Wheel



Figure A-49: Post-Test View of the Steering Wheel



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



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



Figure A-52: Pre-Test Passenger Dummy Window View



Figure A-53: Post-Test Passenger Dummy Window View

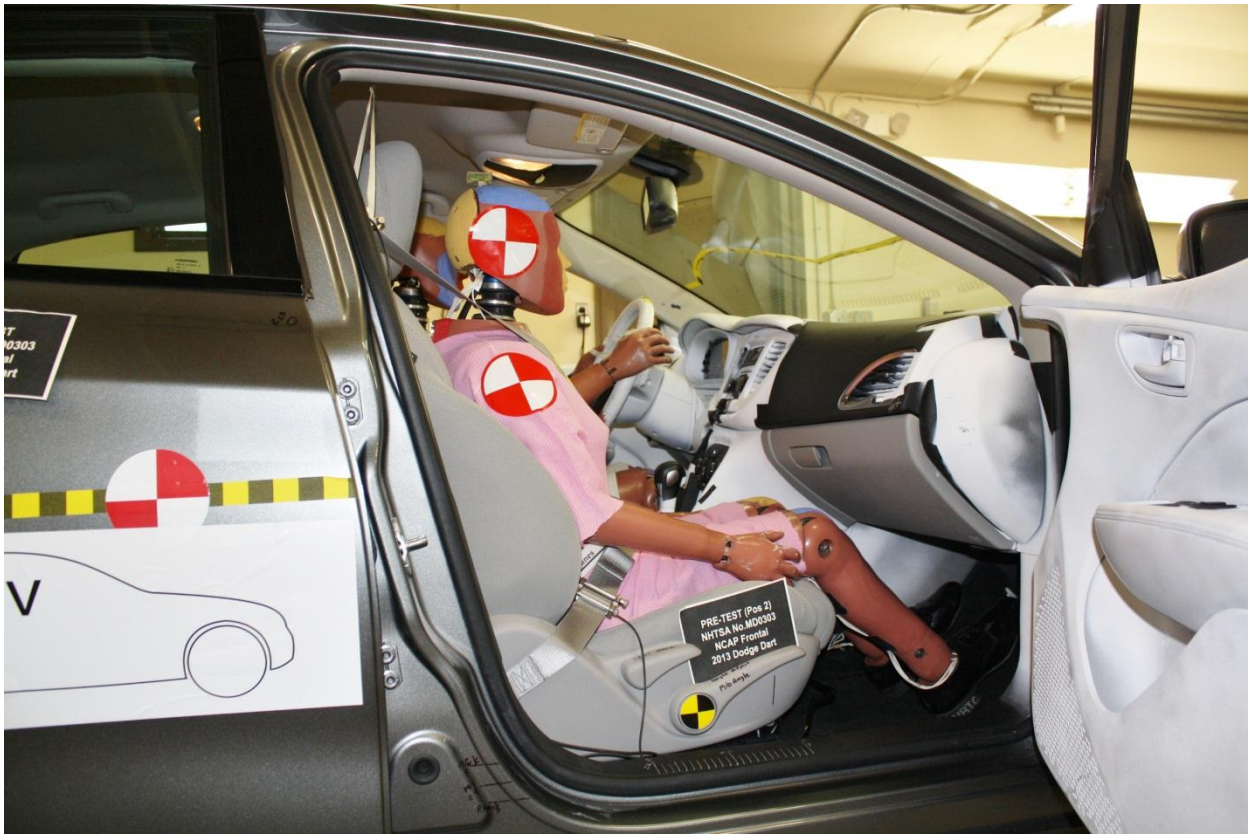


Figure A-54: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-55: Post-Test Passenger Dummy and Vehicle Interior View



Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings



Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-58: Pre-Test View of Belt Anchorage for Passenger Dummy



Figure A-59: Post-Test View of Belt Anchorage for Passenger Dummy

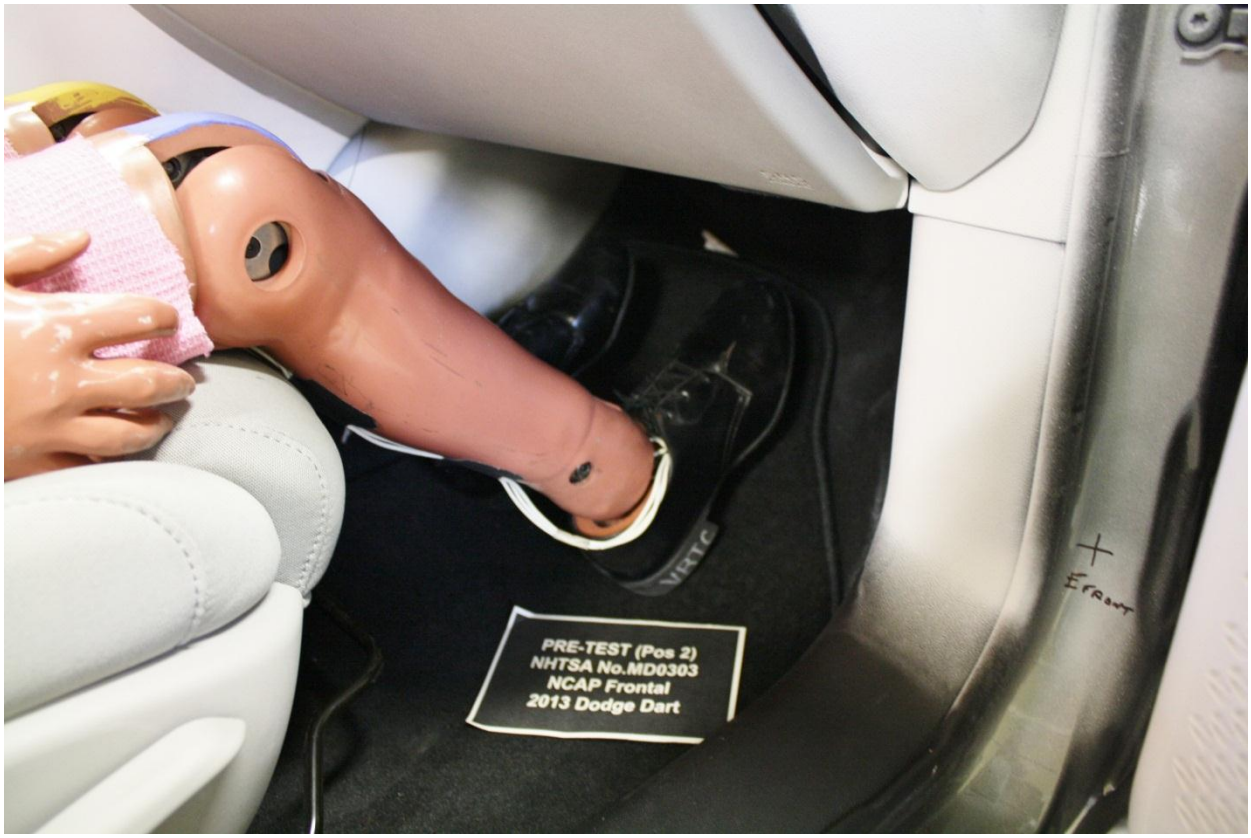


Figure A-60: Pre-Test Passenger Dummy Feet



Figure A-61: Post-Test Passenger Dummy Feet



Figure A-62: Pre-Test Passenger's Side Knee Bolster



Figure A-63: Post-Test Passenger's Side Knee Bolster



Figure A-64: Pre-Test Passenger's Side Floorpan



Figure A-65: Post-Test Passenger's Side Floorpan



Figure A-66: Post-Test Passenger Dummy Contact With Airbag



Figure A-66a: Post-Test Passenger Dummy Contact With Headrest

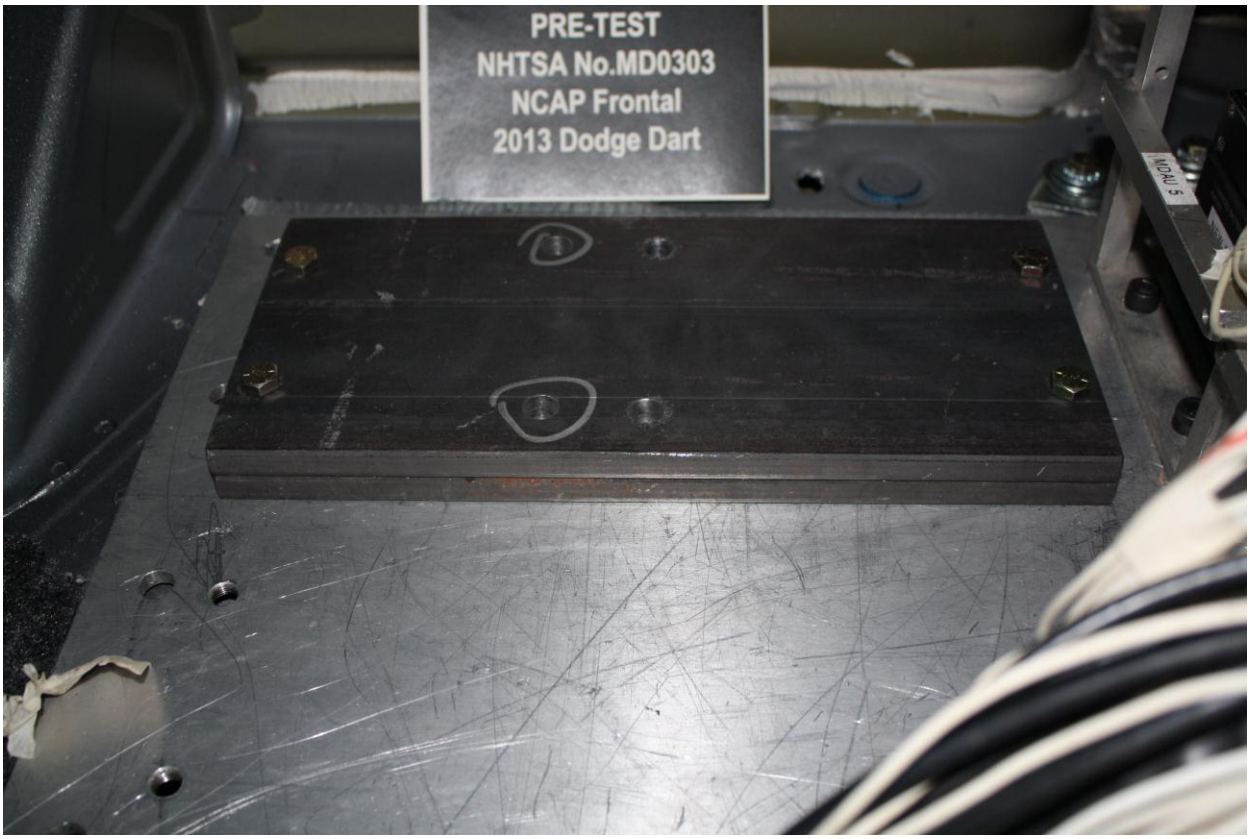


Figure A-67: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-68: Post-Test Stoddard Solvent Spillage Location View, If Required



Figure A-69: Post-Test Speed Trap Read-Out



Figure A-70: Vehicle at 0º on Static Rollover Device



Figure A-71: Vehicle at 90º on Static Rollover Device



Figure A-72: Vehicle at 180º on Static Rollover Device



Figure A-73: Vehicle at 270º on Static Rollover Device



Figure A-74: Vehicle at 360º on Static Rollover Device



Figure A-75: 2013 Dodge Dart Frontal Impact Event

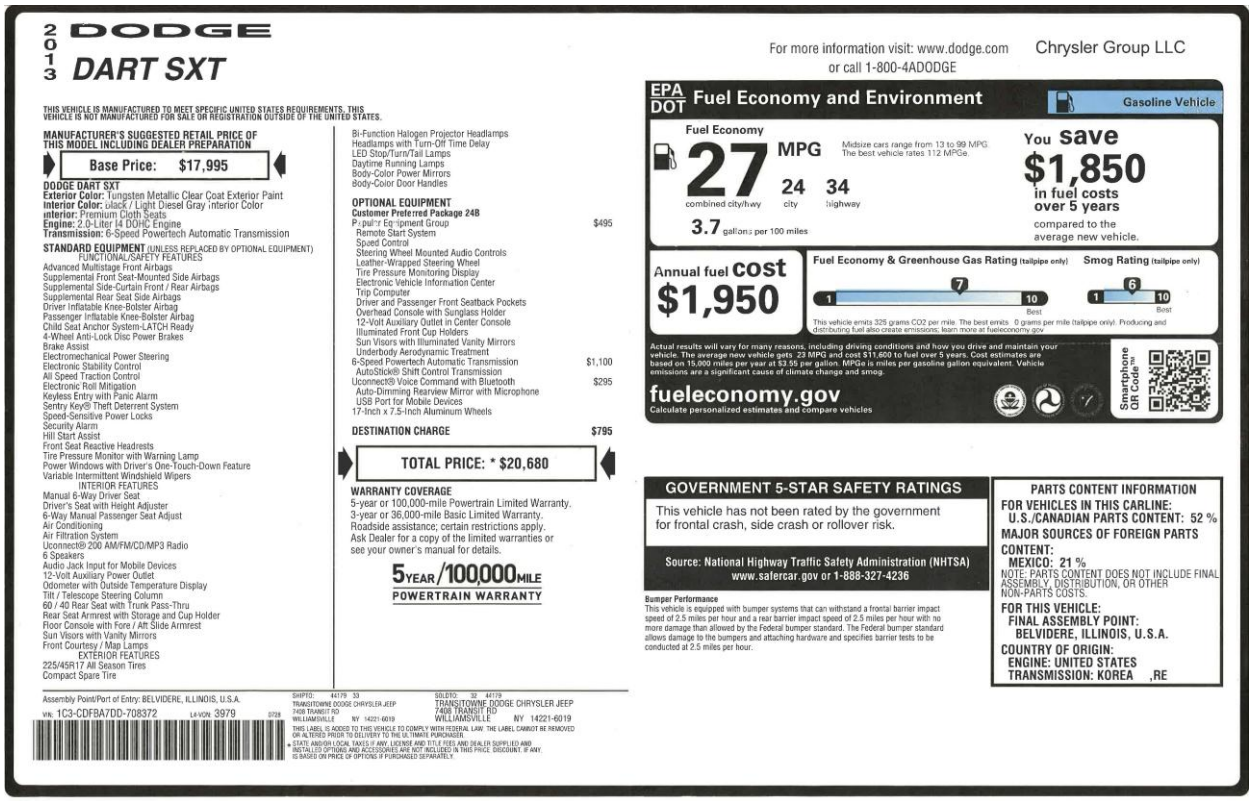


Figure A-76: Monroney Label Photograph

APPENDIX B

DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

Fig.	Description	Page
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

Additional Driver Dummy Instrumentation Data

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

Additional Passenger Dummy Instrumentation Data

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 Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force

Vehicle Instrumentation Data

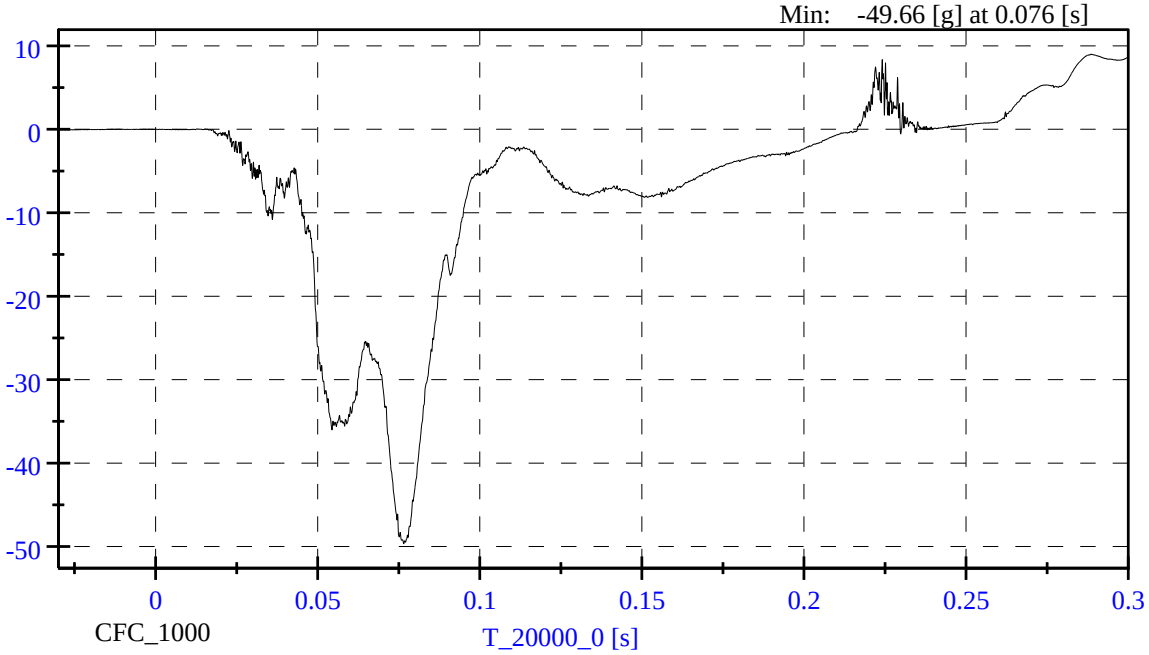
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X

Load Cell Barrier Instrumentation Data

Load Cell Barrier A1-A9
Load Cell Barrier B1-A9
Load Cell Barrier C1-A9
Load Cell Barrier D1-A9

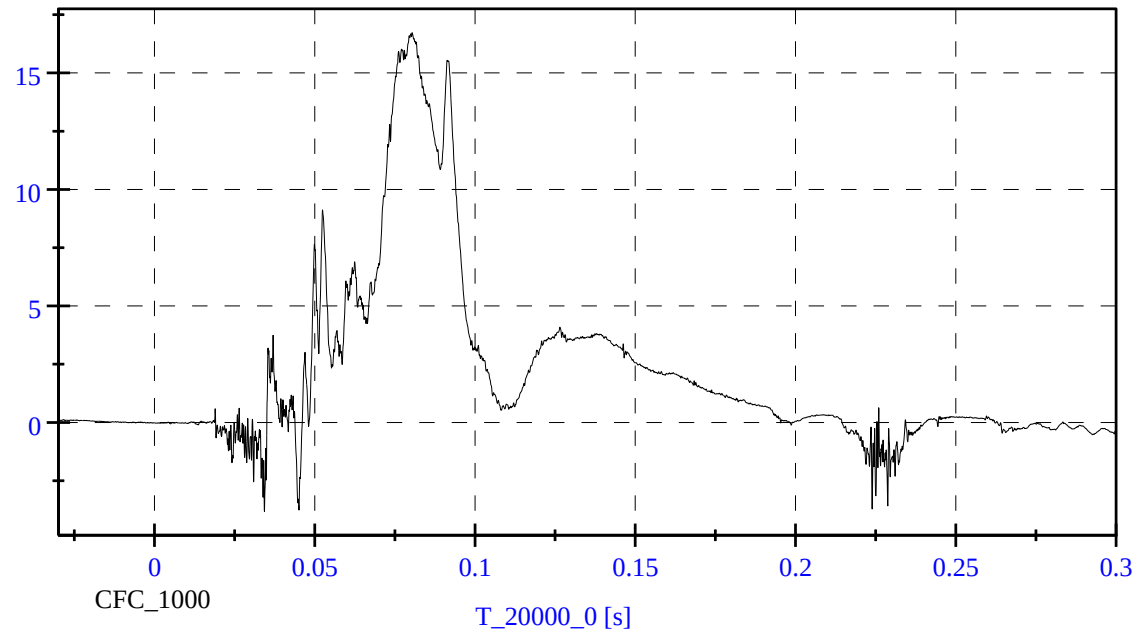
V1P1 Head CG x [g , CFC_1000]

Max: 9.00 [g] at 0.289 [s]
Min: -49.66 [g] at 0.076 [s]



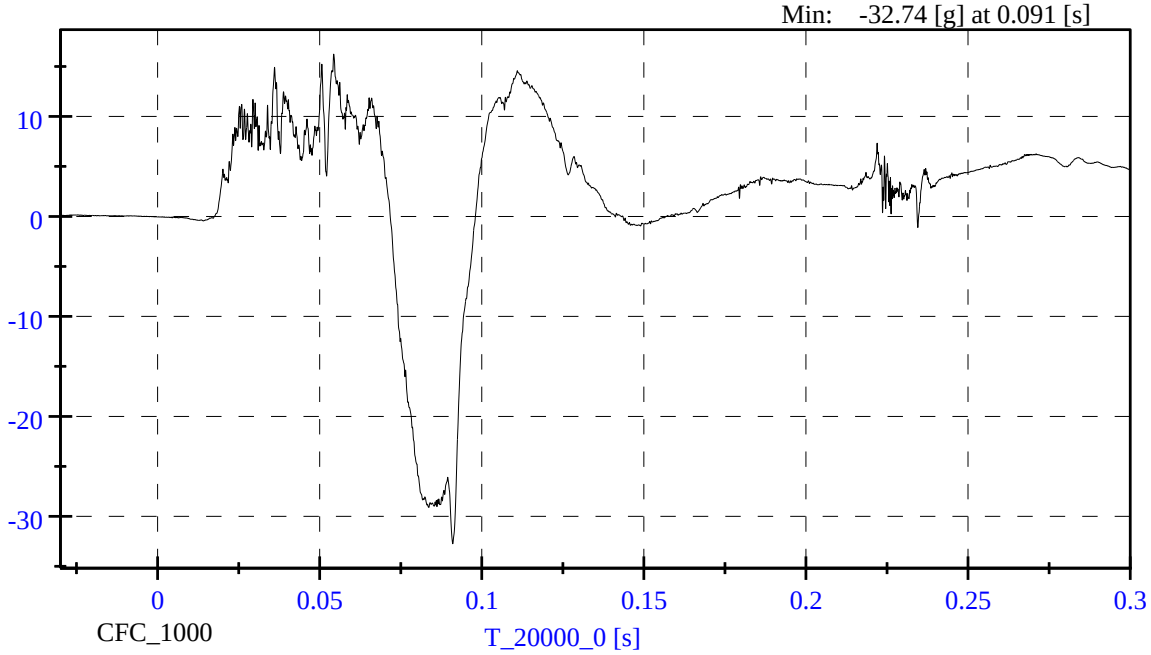
V1P1 Head CG y [g , CFC_1000]

Max: 16.73 [g] at 0.080 [s]
Min: -3.82 [g] at 0.034 [s]



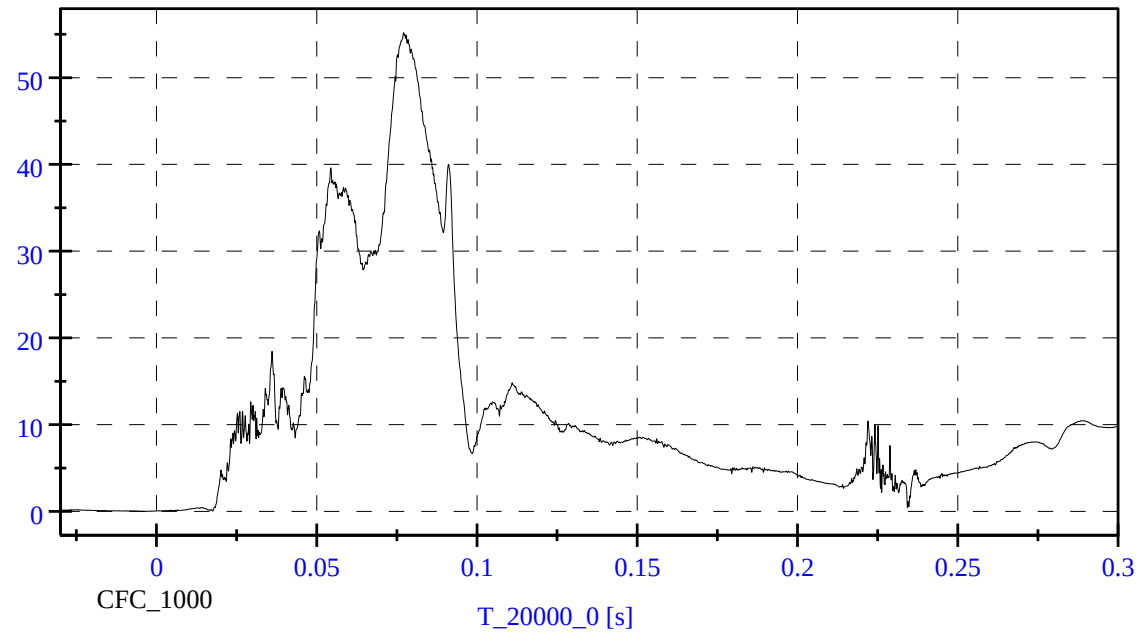
V1P1 Head CG z [g , CFC_1000]

Max: 16.23 [g] at 0.054 [s]
Min: -32.74 [g] at 0.091 [s]



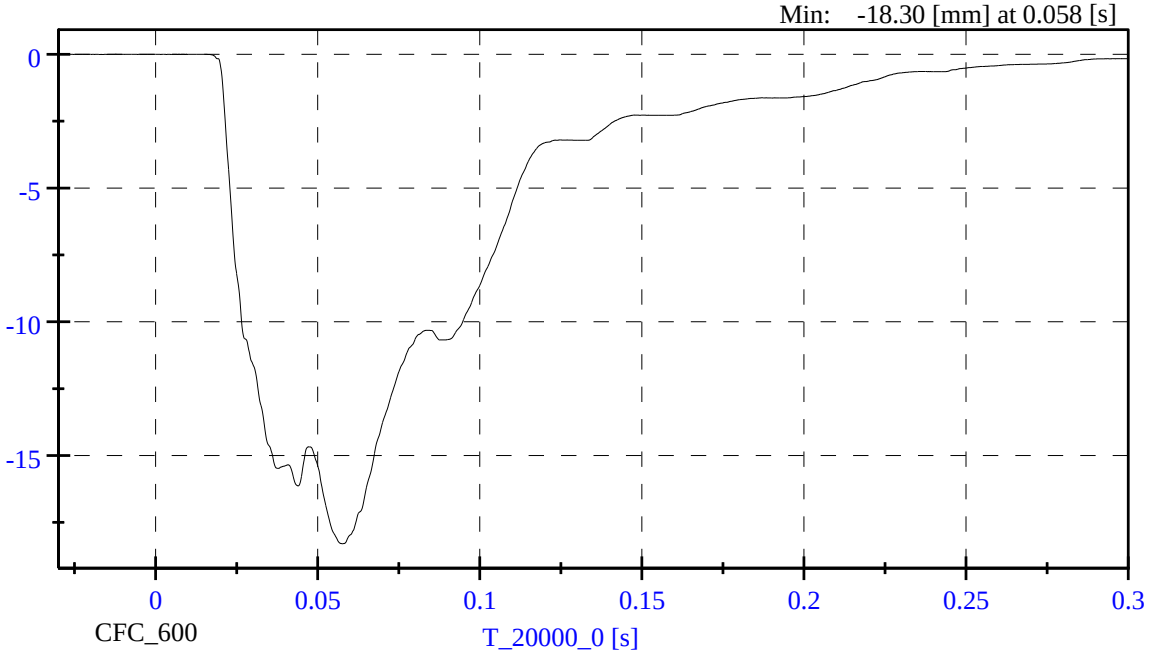
V1P1 Headform Resultant [g, CFC_1000]

Max: 55.19 [g] at 0.077 [s]
Min: 0.00 [g] at -0.004 [s]



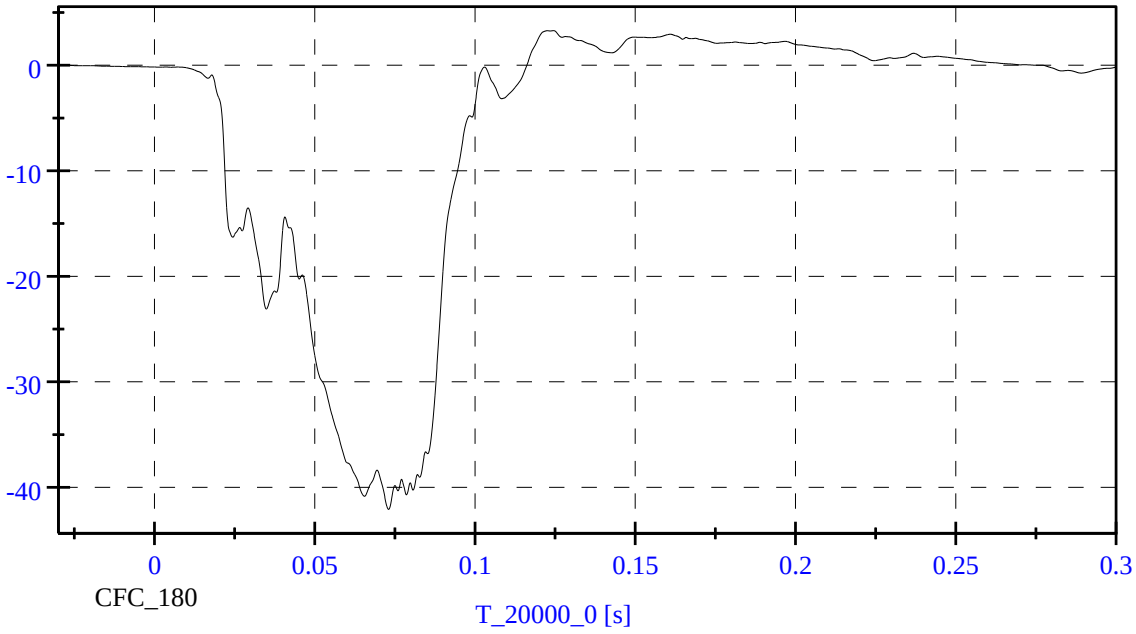
V1P1 Chest Displacement x [mm , CFC_600]

Max: 0.00 [mm] at -0.012 [s]
Min: -18.30 [mm] at 0.058 [s]



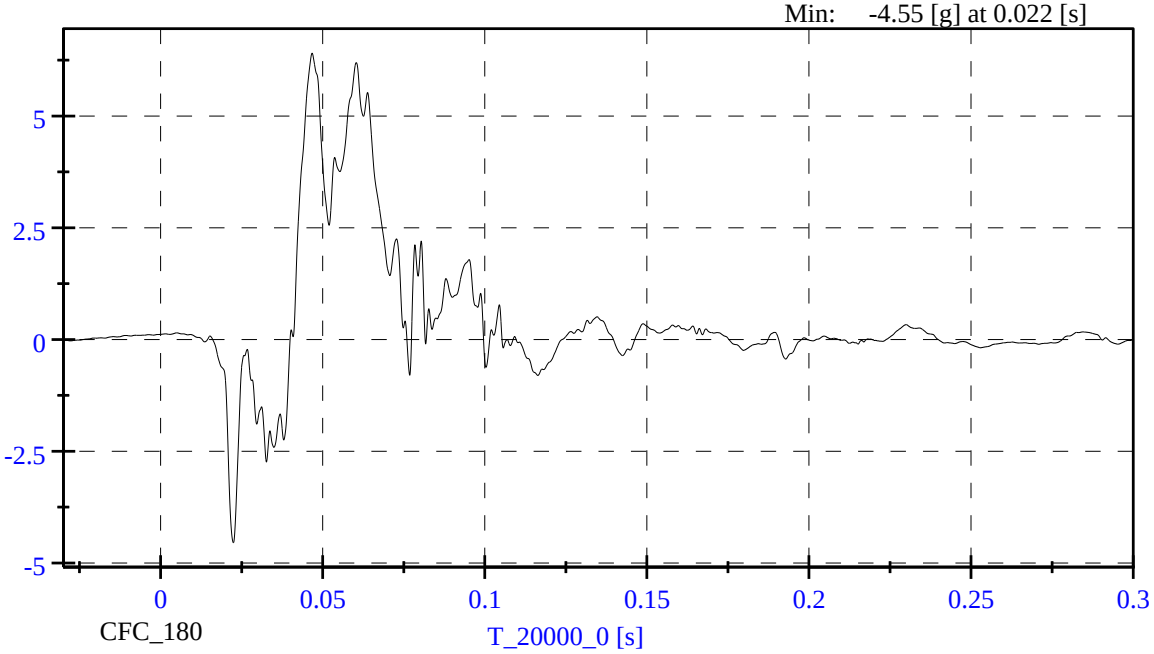
V1P1 Chest x [g , CFC_180]

Max: 3.28 [g] at 0.124 [s]
Min: -42.09 [g] at 0.073 [s]



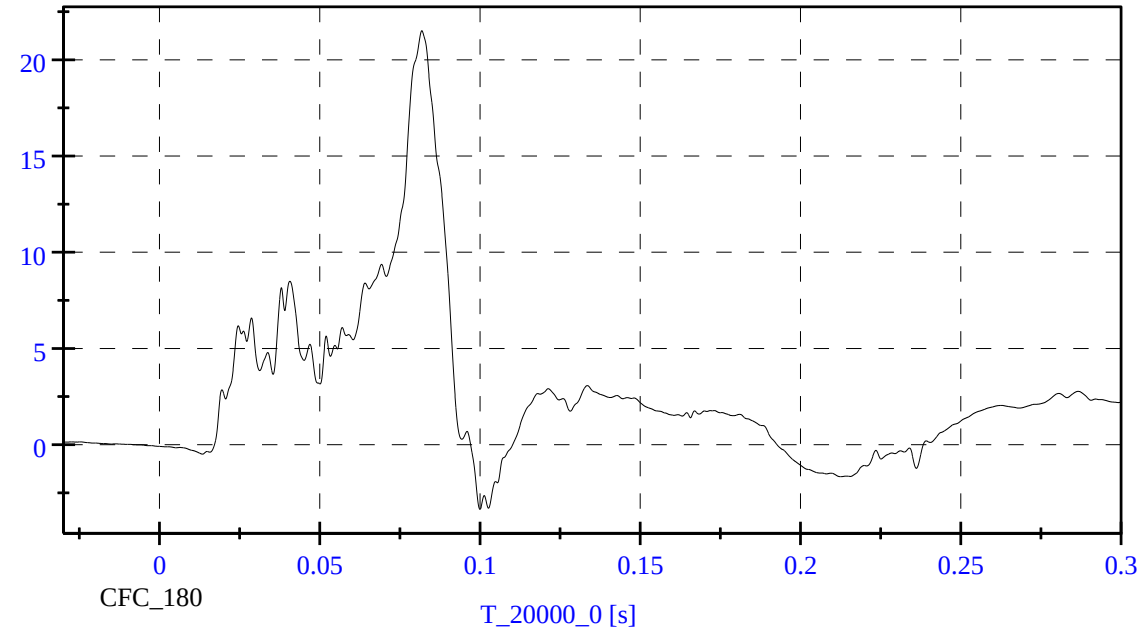
V1P1 Chest y [g , CFC_180]

Max: 6.41 [g] at 0.047 [s]
Min: -4.55 [g] at 0.022 [s]



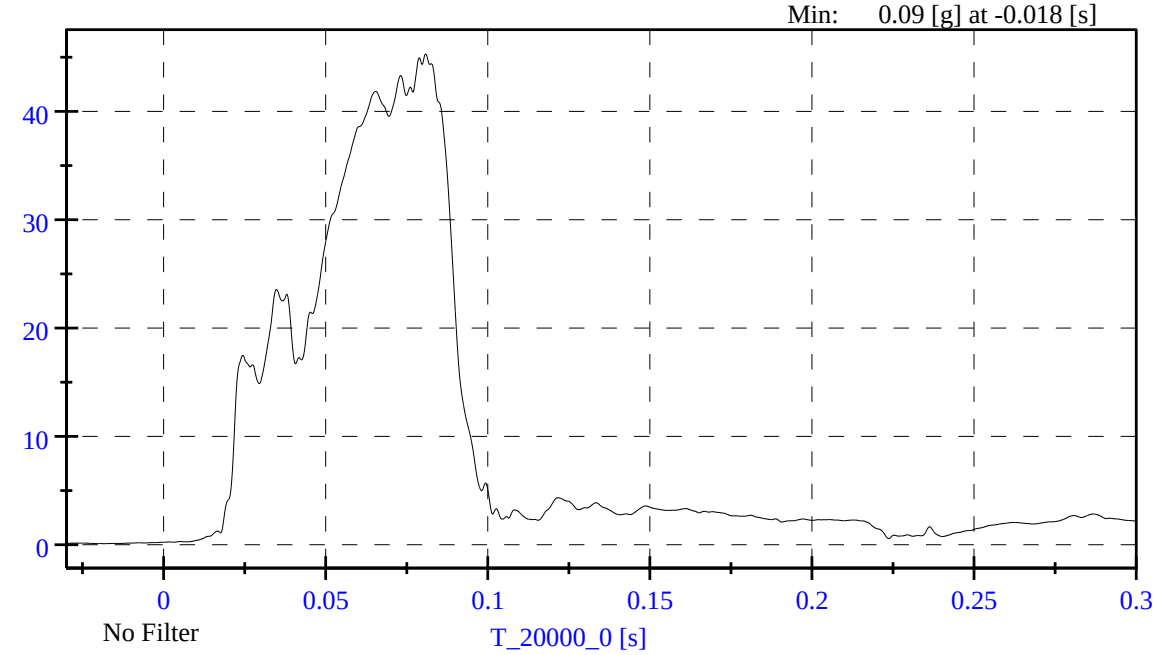
V1P1 Chest z [g , CFC_180]

Max: 21.51 [g] at 0.082 [s]
Min: -3.36 [g] at 0.100 [s]



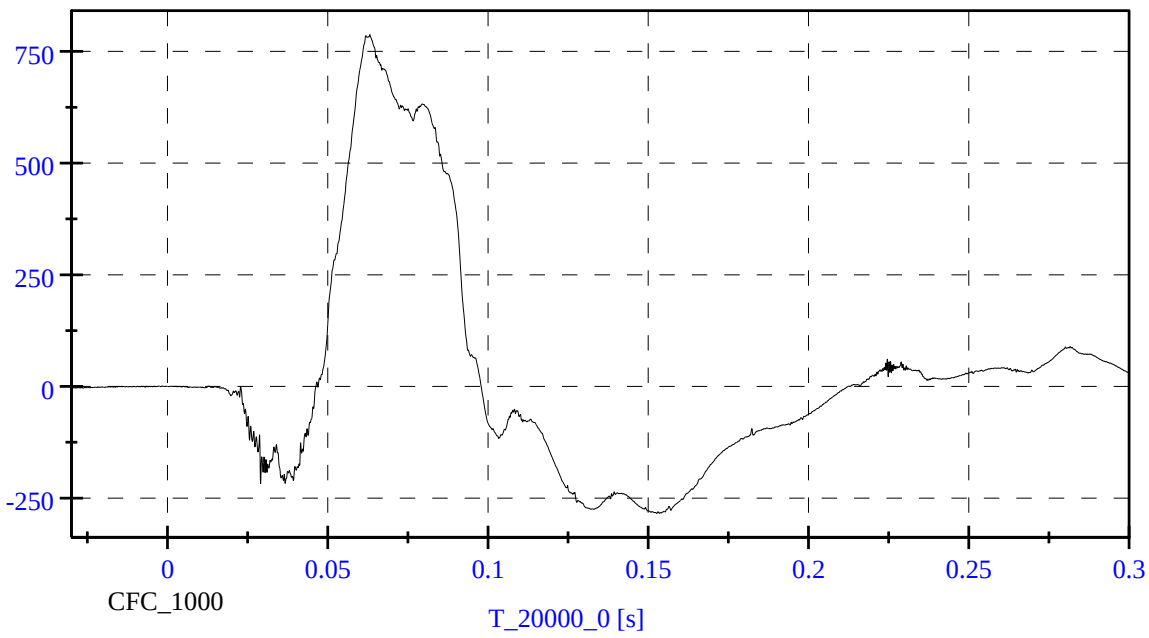
V1P1 Chest Resultant

Max: 45.28 [g] at 0.081 [s]
Min: 0.09 [g] at -0.018 [s]



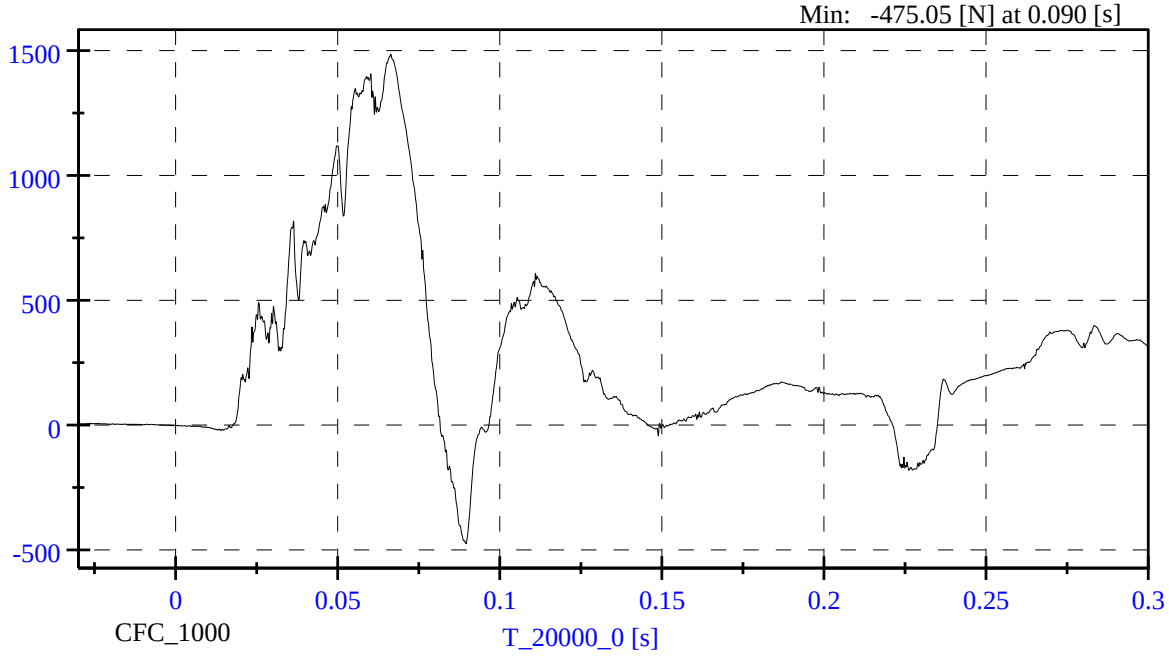
V1P1 Upper Neck Fx [N , CFC_1000]

Max: 787.49 [N] at 0.063 [s]
Min: -284.18 [N] at 0.153 [s]



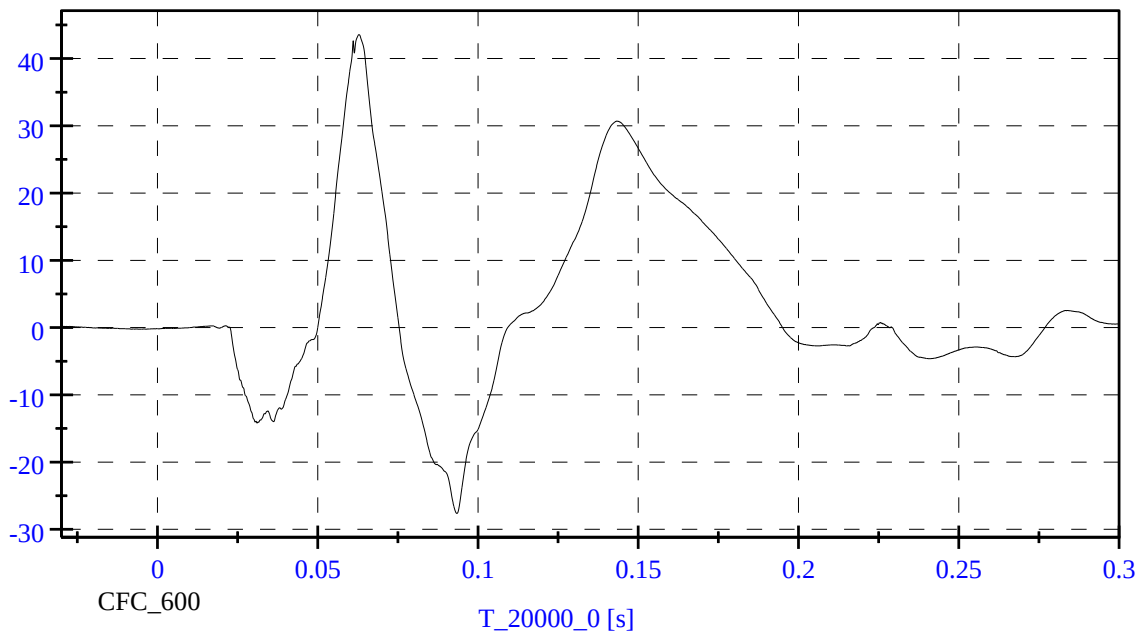
V1P1 Upper Neck Fz [N , CFC_1000]

Max: 1485.49 [N] at 0.066 [s]
Min: -475.05 [N] at 0.090 [s]



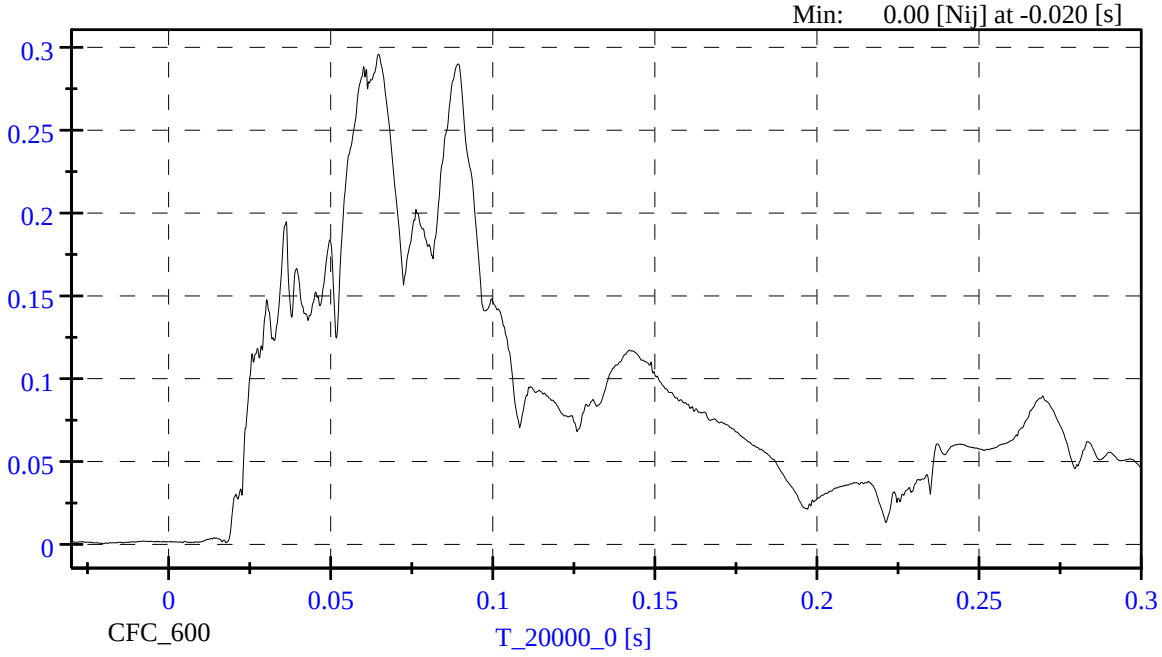
V1P1 Upper Neck My [N-m , CFC_600]

Max: 43.55 [N-m] at 0.063 [s]
Min: -27.62 [N-m] at 0.093 [s]



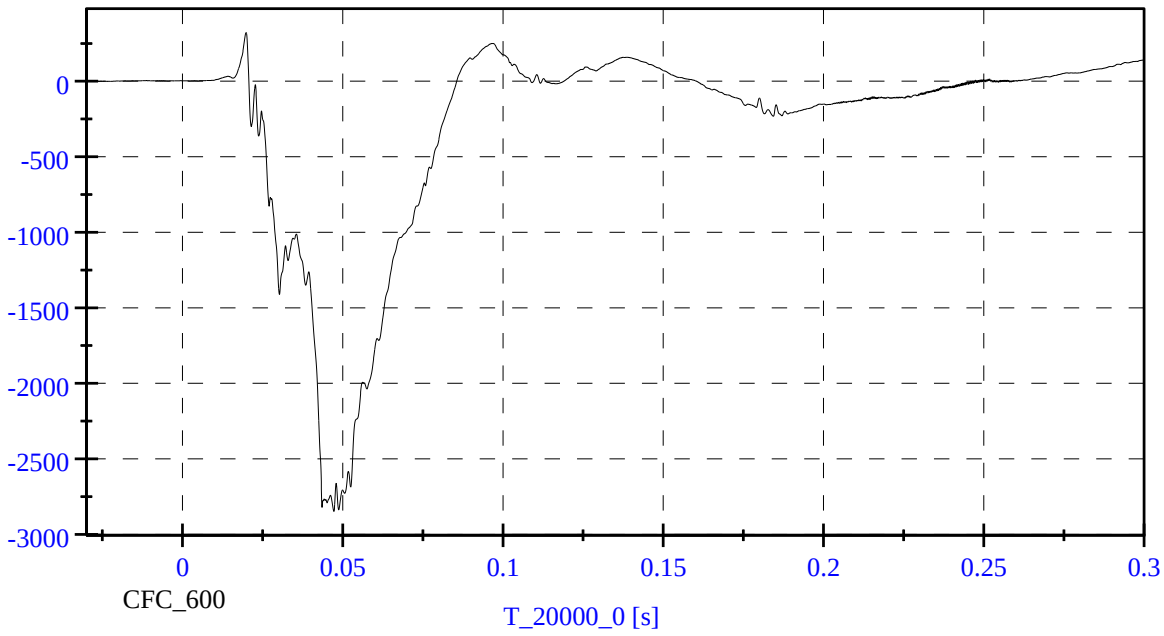
V1P1 Upper Neck Nij [Nij, CFC_600]

Max: 0.30 [Nij] at 0.065 [s]
Min: 0.00 [Nij] at -0.020 [s]



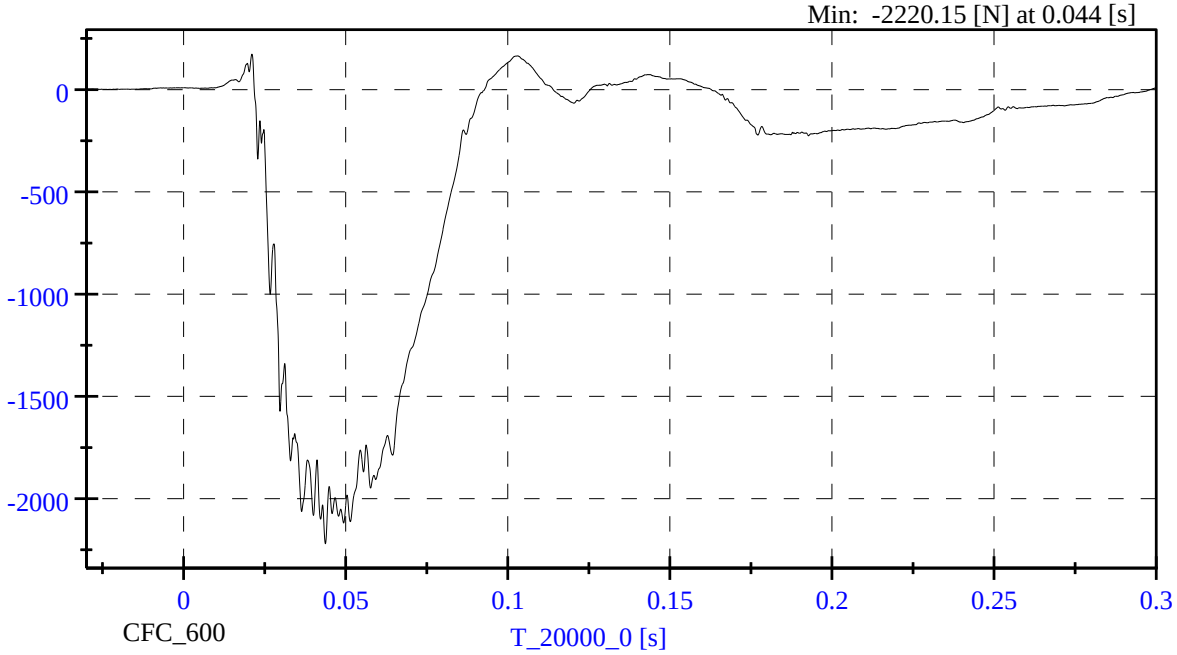
V1P1 Left Femur Fz [N , CFC_600]

Max: 321.29 [N] at 0.020 [s]
Min: -2847.60 [N] at 0.047 [s]



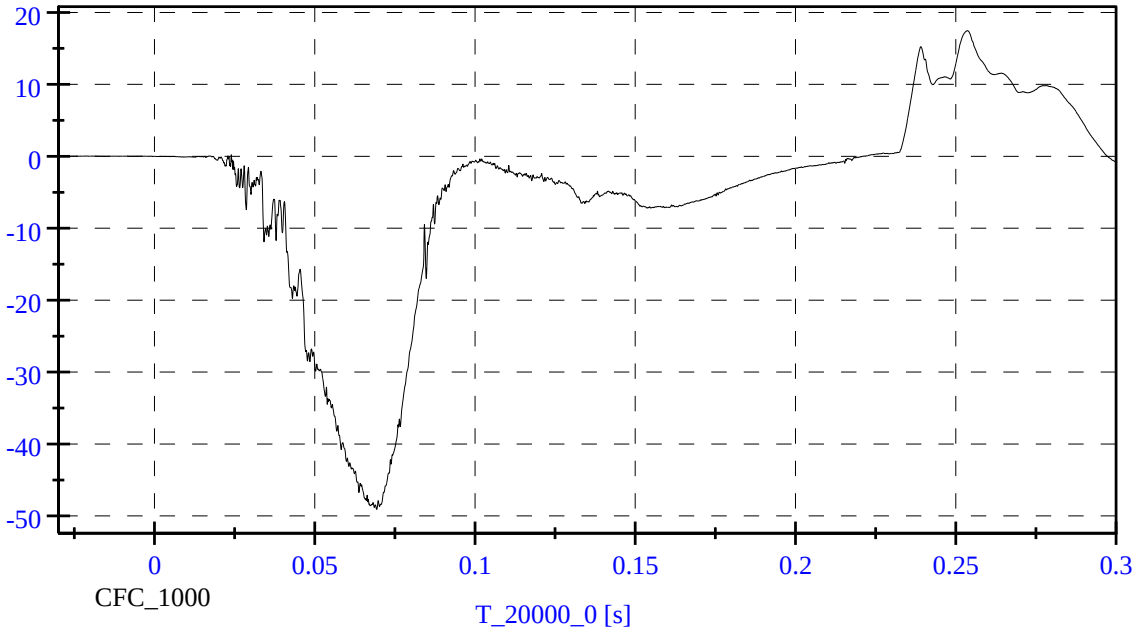
V1P1 Right Femur Fz [N , CFC_600]

Max: 173.15 [N] at 0.021 [s]
Min: -2220.15 [N] at 0.044 [s]



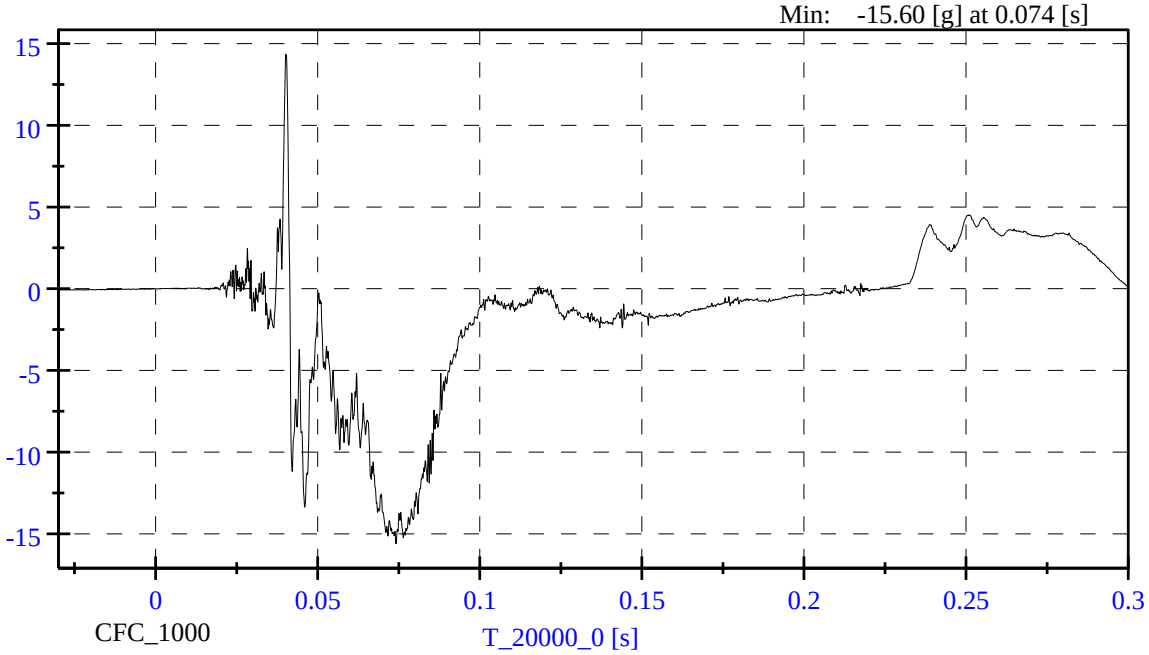
V1P2 Head CG x [g , CFC_1000]

Max: 17.47 [g] at 0.254 [s]
Min: -49.09 [g] at 0.069 [s]



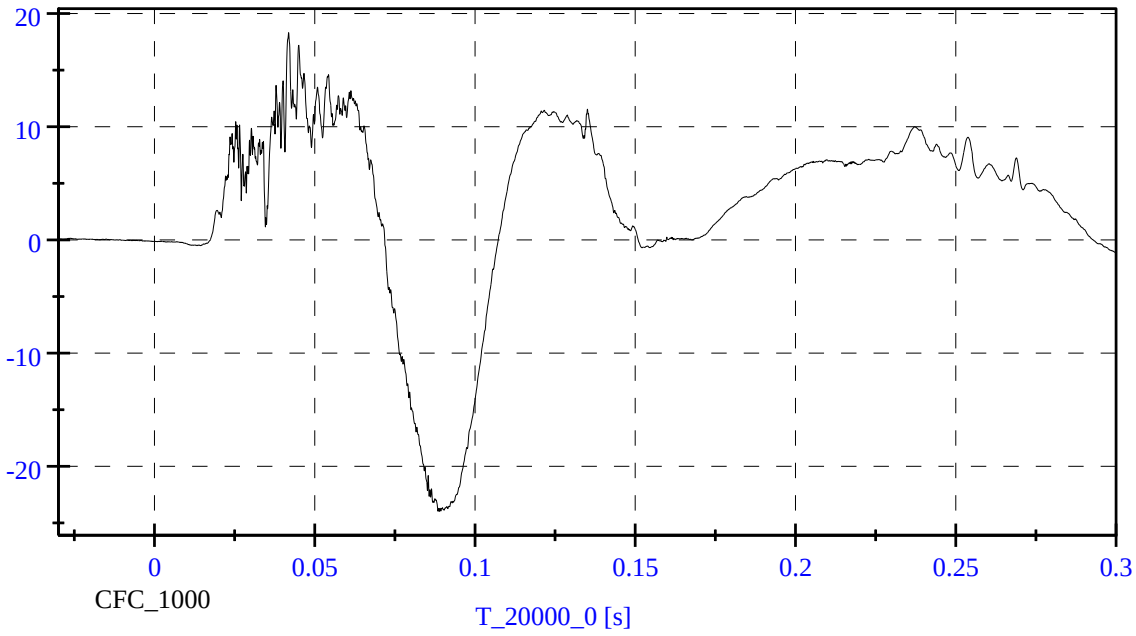
V1P2 Head CG y [g , CFC_1000]

Max: 14.35 [g] at 0.040 [s]
Min: -15.60 [g] at 0.074 [s]



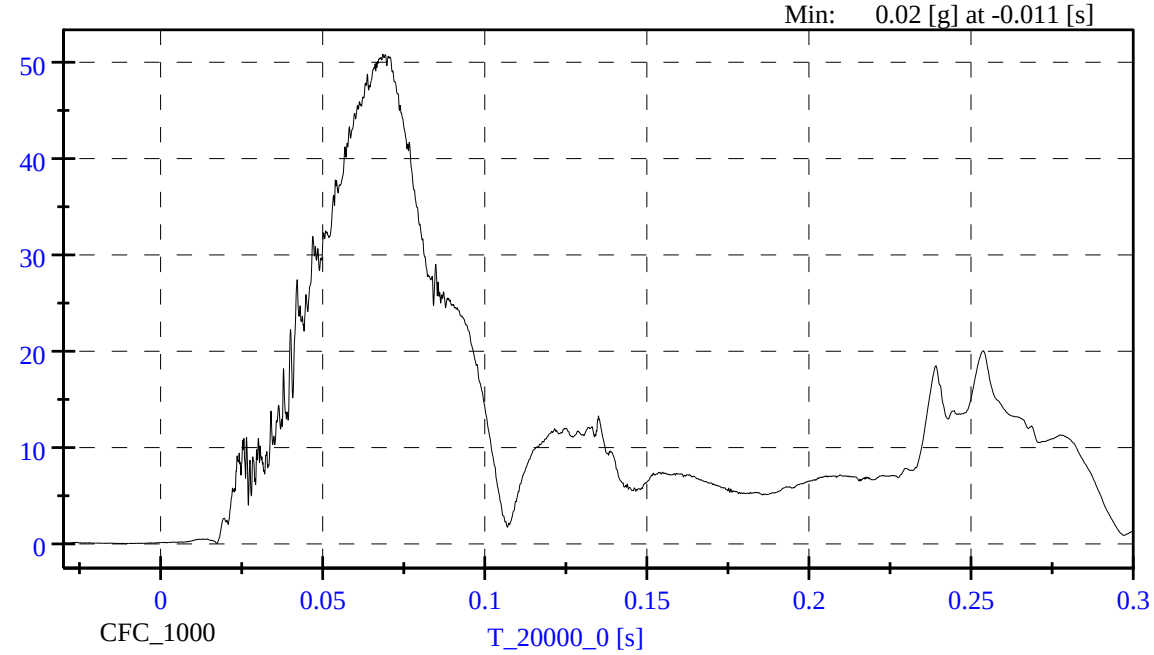
V1P2 Head CG z [g , CFC_1000]

Max: 18.30 [g] at 0.042 [s]
Min: -23.98 [g] at 0.089 [s]



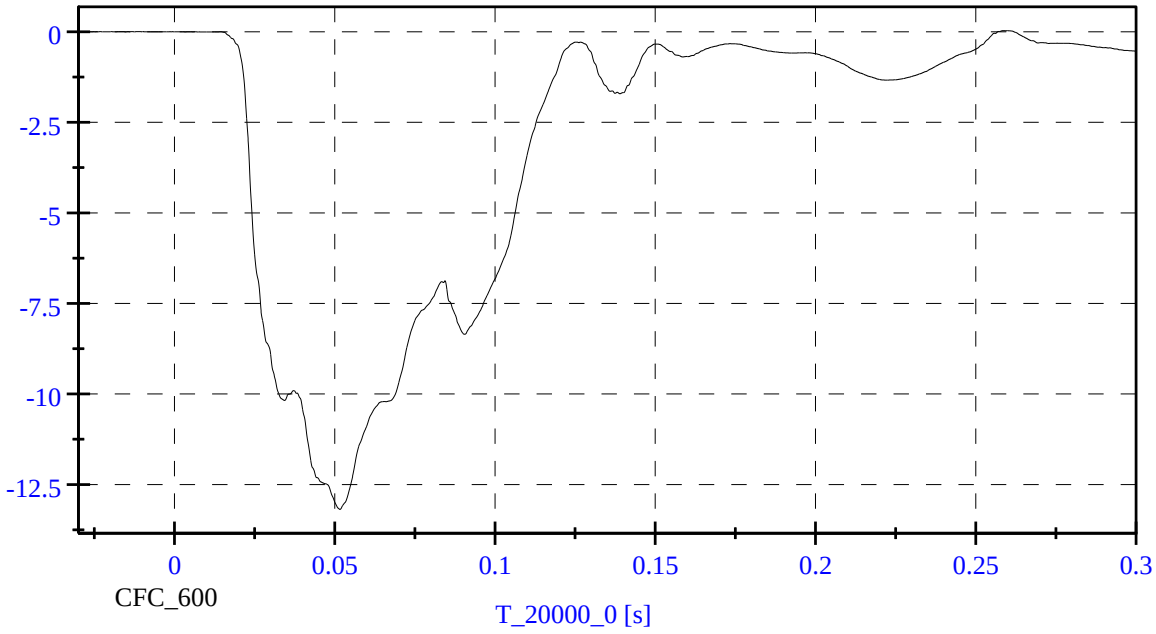
V1P2 Headform Resultant [g, CFC_1000]

Max: 50.84 [g] at 0.069 [s]
Min: 0.02 [g] at -0.011 [s]



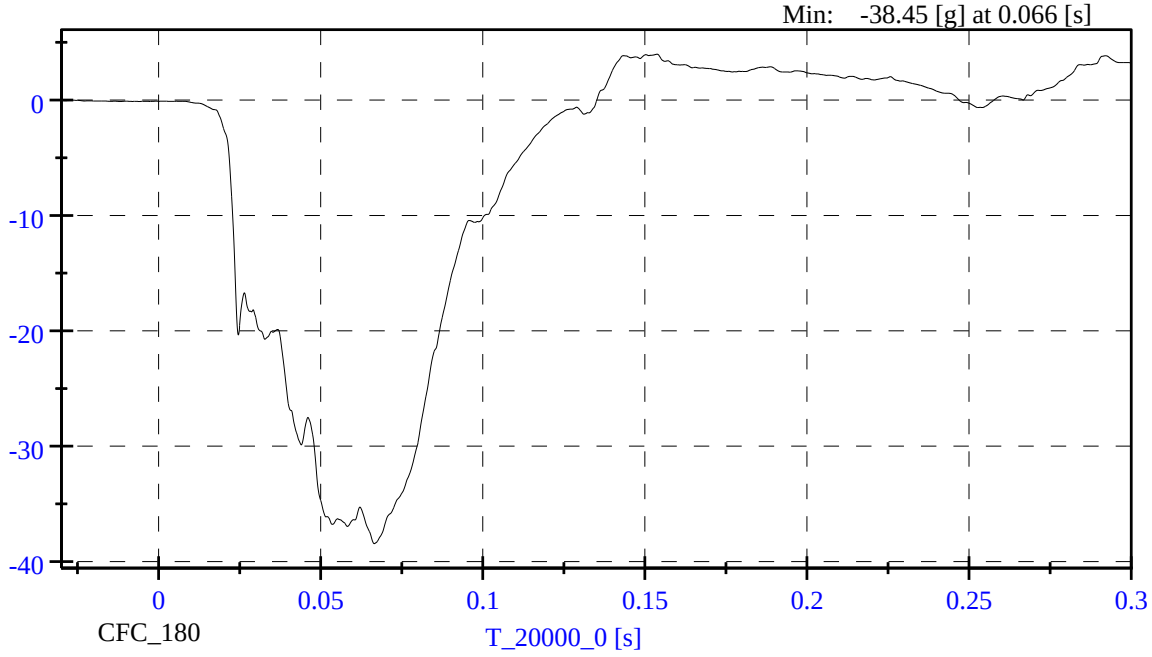
V1P2 Chest Displacement [mm , CFC_600]

Max: 0.03 [mm] at 0.259 [s]
Min: -13.19 [mm] at 0.052 [s]



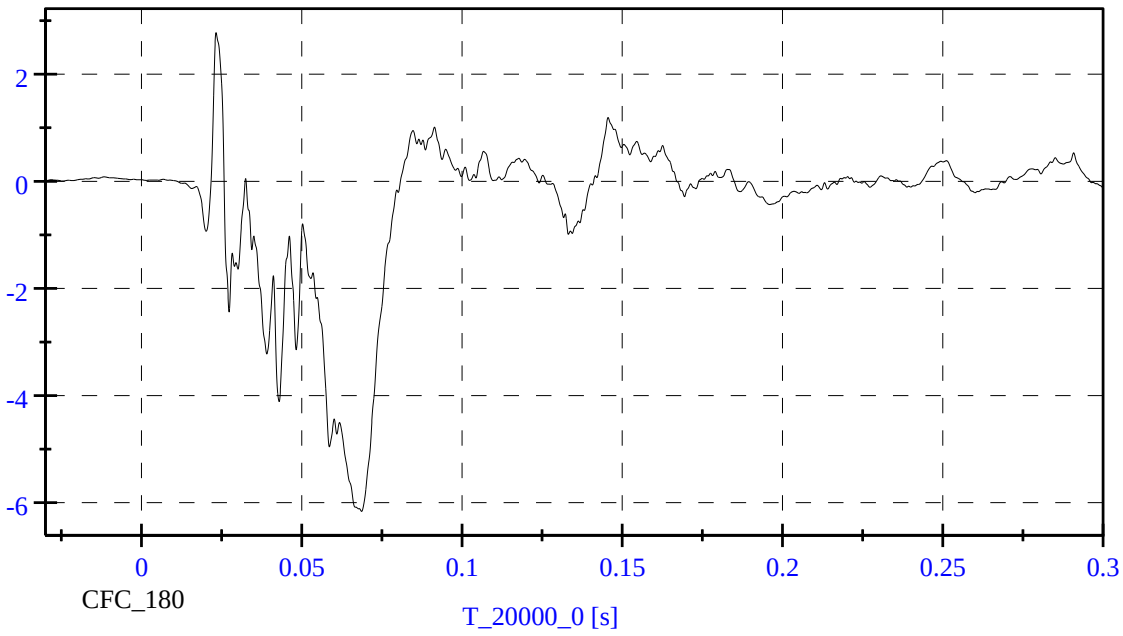
V1P2 Chest x [g , CFC_180]

Max: 3.97 [g] at 0.154 [s]
Min: -38.45 [g] at 0.066 [s]



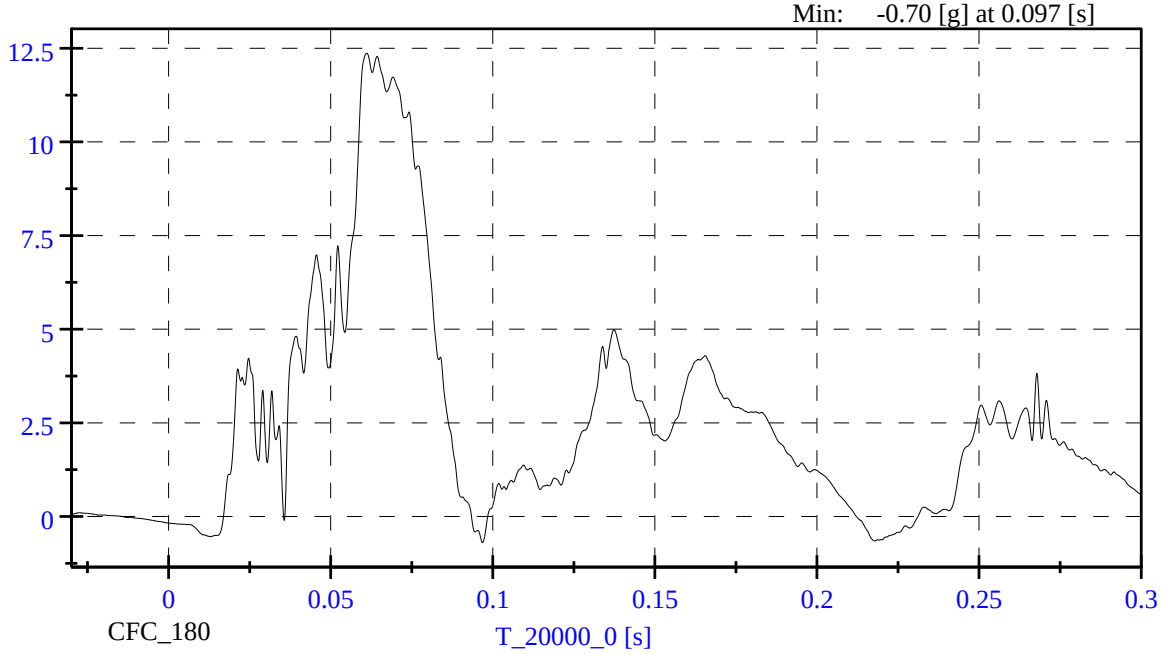
V1P2 Chest y [g , CFC_180]

Max: 2.77 [g] at 0.023 [s]
Min: -6.16 [g] at 0.069 [s]



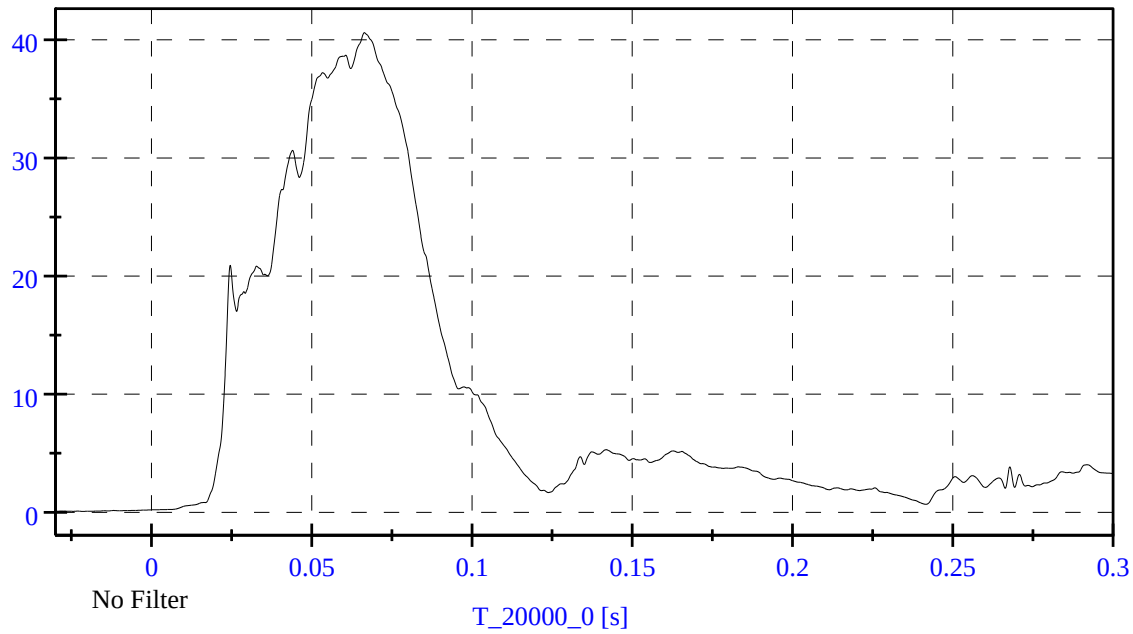
V1P2 Chest z [g , CFC_180]

Max: 12.37 [g] at 0.061 [s]
Min: -0.70 [g] at 0.097 [s]



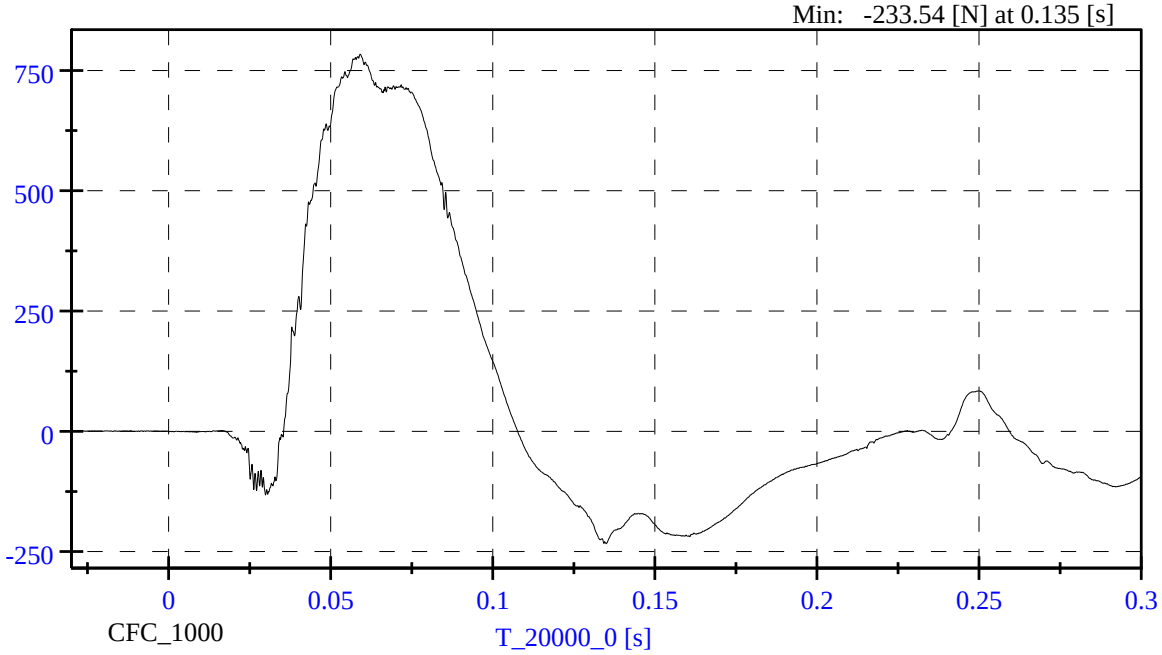
V1P2 Chest Resultant

Max: 40.61 [g] at 0.066 [s]
Min: 0.08 [g] at -0.022 [s]



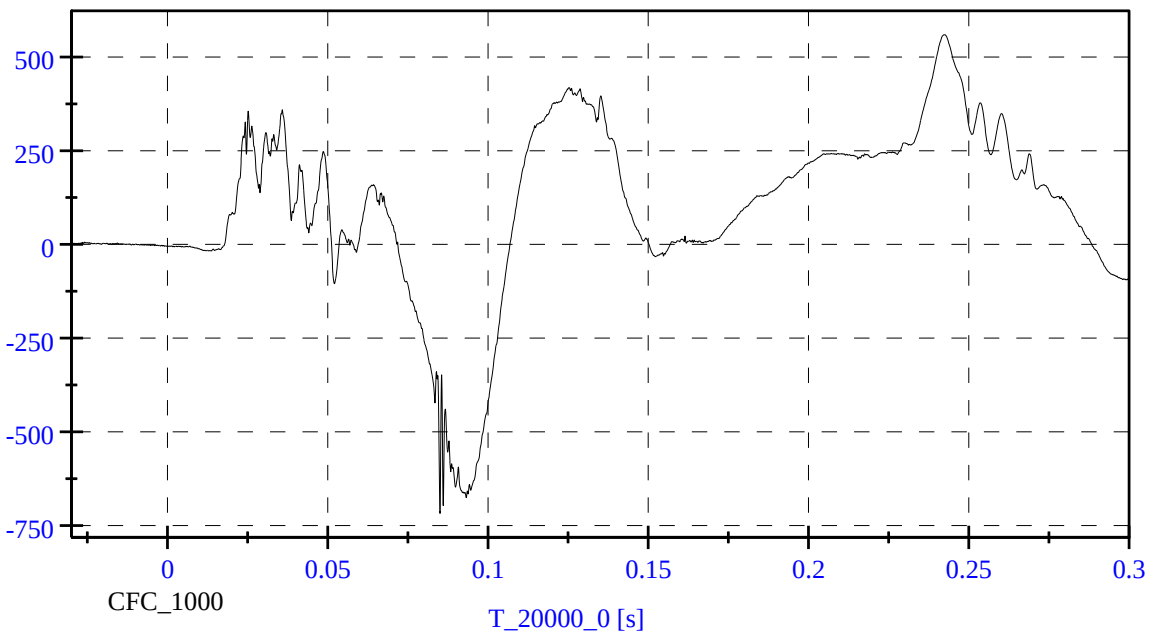
V1P2 Upper Neck Fx [N , CFC_1000]

Max: 783.76 [N] at 0.059 [s]
Min: -233.54 [N] at 0.135 [s]



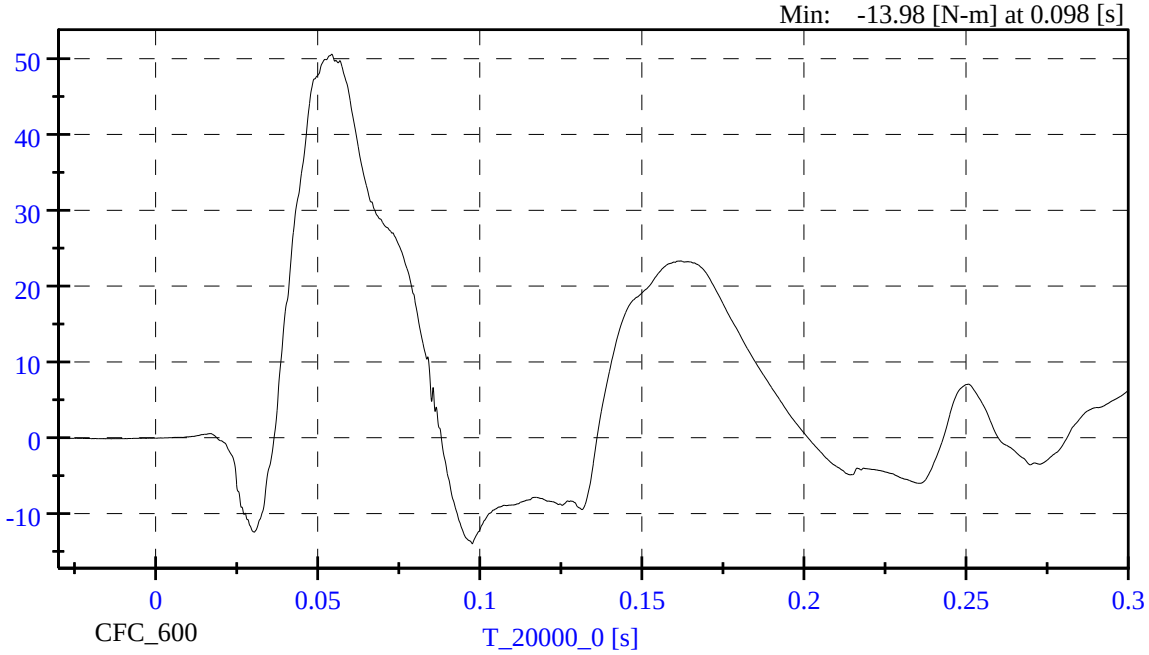
V1P2 Upper Neck Fz [N , CFC_1000]

Max: 559.56 [N] at 0.242 [s]
Min: -717.70 [N] at 0.085 [s]



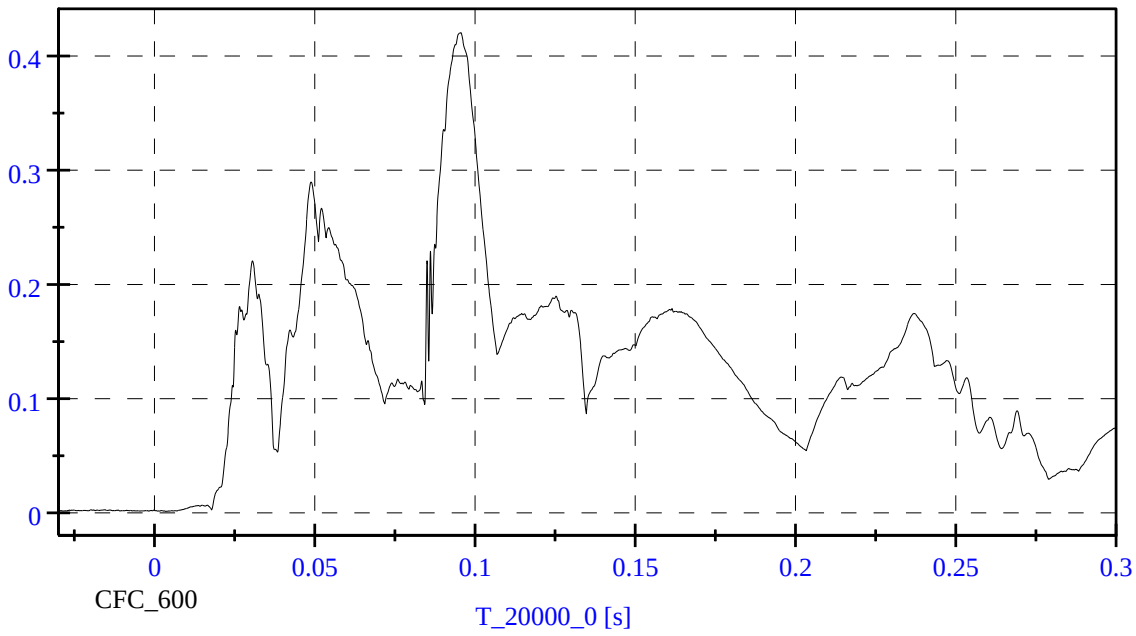
V1P2 Upper Neck My [N-m , CFC_600]

Max: 50.58 [N-m] at 0.054 [s]
Min: -13.98 [N-m] at 0.098 [s]



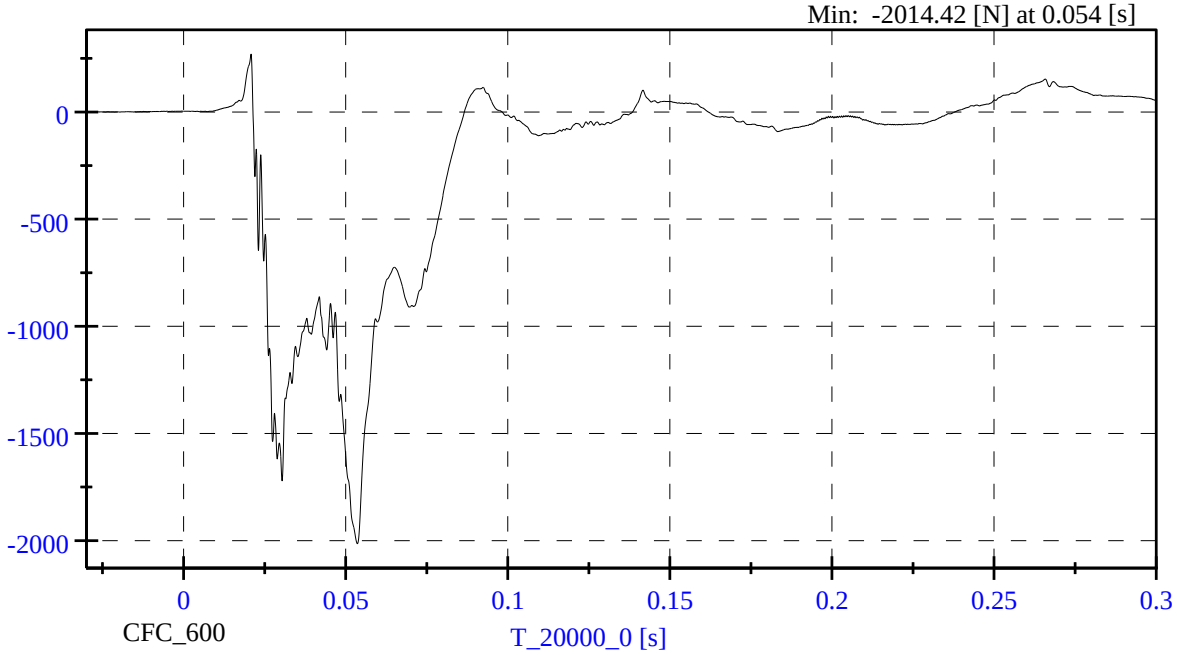
V1P2 Upper Neck Nij [Nij, CFC_600]

Max: 0.42 [Nij] at 0.096 [s]
Min: 0.00 [Nij] at 0.004 [s]



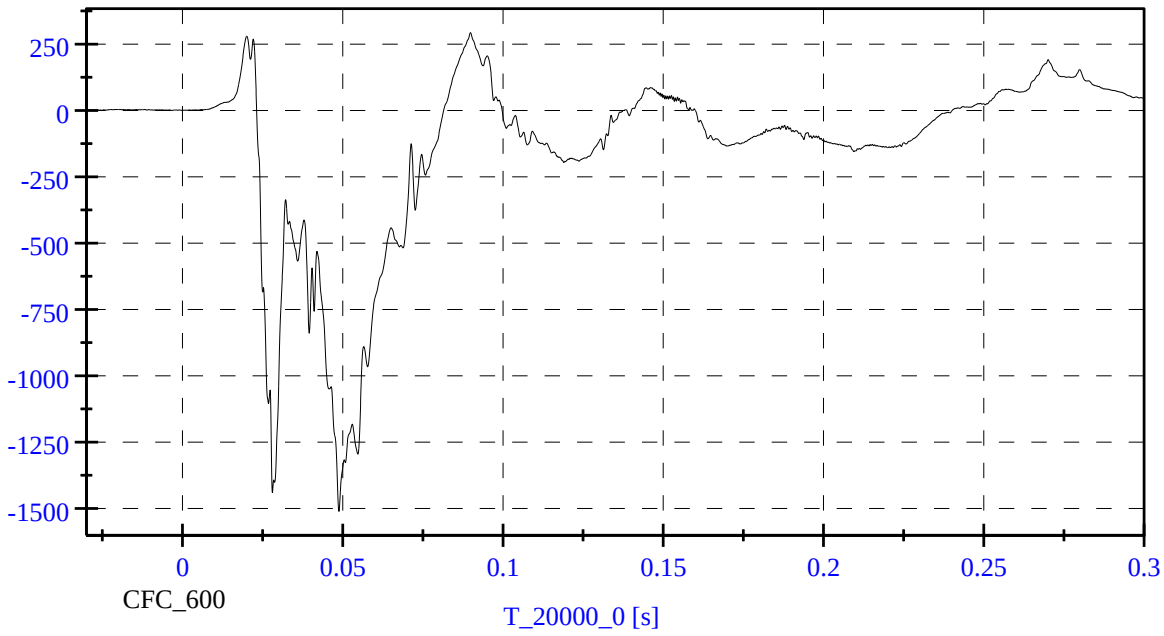
V1P2 Left Femur Fz [N , CFC_600]

Max: 269.52 [N] at 0.021 [s]
Min: -2014.42 [N] at 0.054 [s]



V1P2 Right Femur Fz [N , CFC_600]

Max: 293.32 [N] at 0.090 [s]
Min: -1511.11 [N] at 0.049 [s]



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 061

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50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.6	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.3	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.6	Yes
F	Thigh Clearance	5.5 – 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.5	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.4	Yes
J	Elbow Rest Height	7.5 – 8.3	8.2	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.7	Yes
L	Popliteal Height	16.9 – 17.9	16.9	Yes
M	Knee Pivot Height	19.1 – 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.7	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	4.0	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	Yes
Z	Waist Circumference	32.9 – 34.1	33.7	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: MPG Date: 6/6/2012

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**5/25/2012**
Test Number:	**1**	Test Time:	**11:03:48 AM**

Component Part Number	Component Serial Number
Head Skin - 78051-228	**02-20544**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.1**	deg C	P
Humidity	10	--	70	**57**	%RH	P
Resultant Acceleration	225	--	275	**244**	g	P
Oscillation	0.0	--	10.0	**0.0**	%	P
Lateral Acceleration	-15.00	--	15.00	**7.87**	g	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **11:03:48 AM** Test Date: **5/25/2012**

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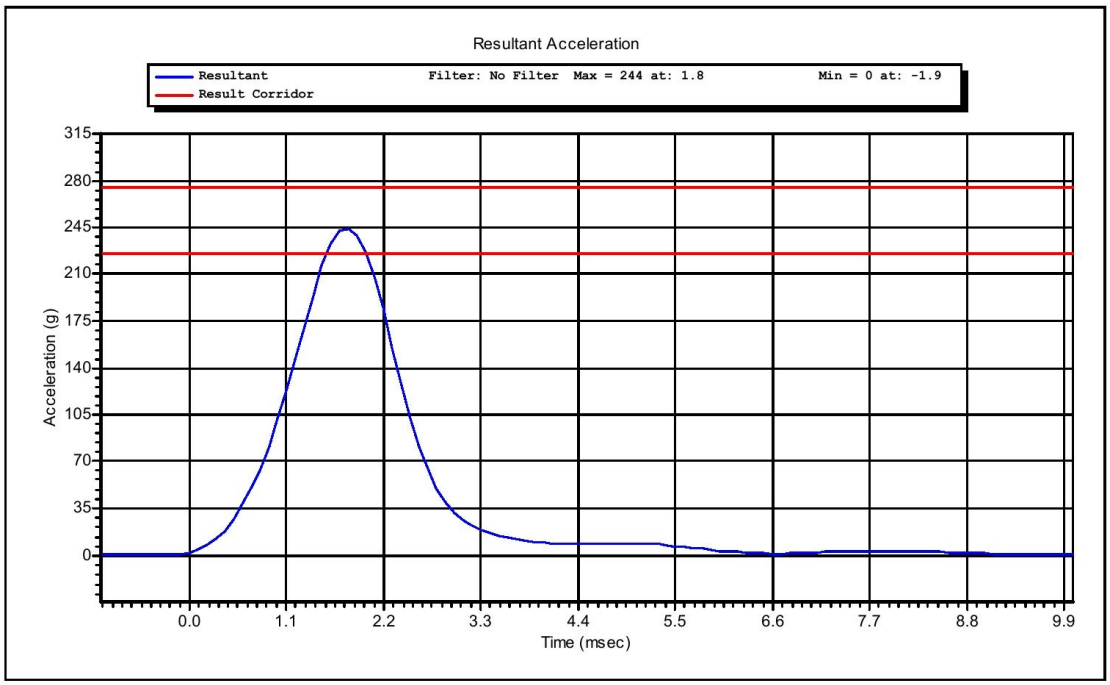
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P58904**	**5/18/2012**
Endevco	**7264-2000**	**P58911**	**5/18/2012**
Endevco	**7264-2000**	**P58757**	**5/18/2012**

Test Time: **11:03:48 AM** Test Date: **5/25/2012**

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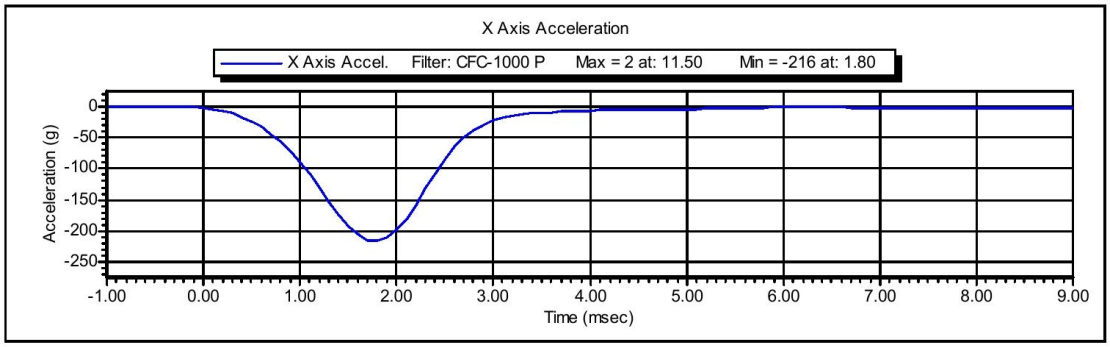
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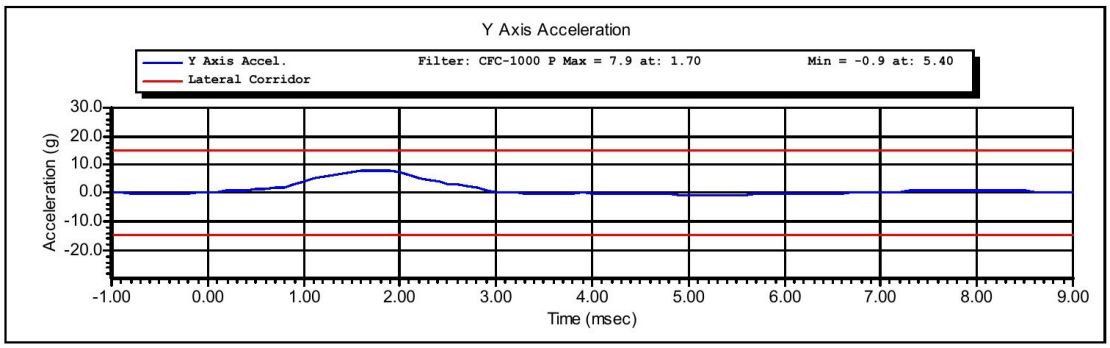
Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**5/25/2012**
Test Number:	**1**	Test Time:	**11:03:48 AM**

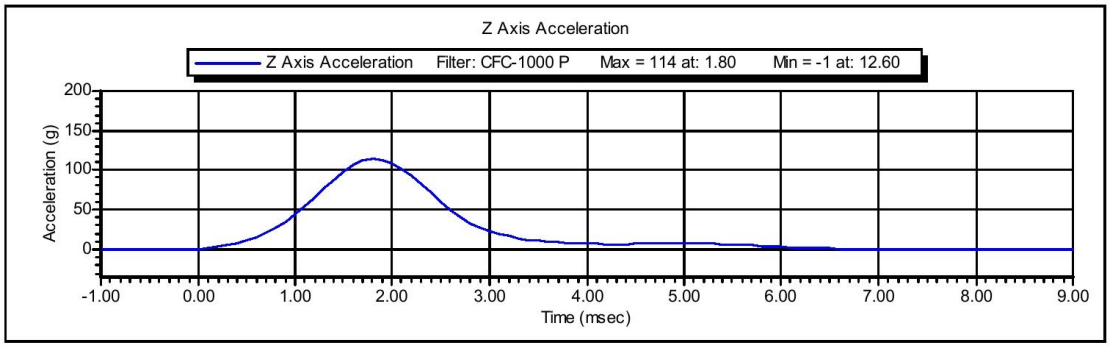


Test Time: **11:03:48 AM** Test Date: **5/25/2012**

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Test Time: **11:03:48 AM** Test Date: **5/25/2012**

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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:			
Test ID:		Test Date:	**5/29/2012**
Test Number:	**2**	Test Time:	**2:46:12 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**4194**
Front Nodding Block - 78051-351	**1797**
Rear Nodding Block - 78051-351	**1799**
Head Skin - 78051-220	**02-20544**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**22.0**	deg C	P
Humidity		10	--	70	**55**	%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	**21.5**	g	P
Pendulum Deceleration at	30 ms	12.5	--	18.5	**16.4**	g	P
Max Pendulum Deceleration After	30 ms	0.0	--	29.0	**16.4**	g	P
Deceleration time to	5 g	34.0	--	42.0	**38.4**	ms	P
D Plane Rotation		-78.0	--	-64.0	**-73.0**	degrees	P
Time at max rotation		57.0	--	64.0	**57.3**	ms	P
Rotation Decay to Zero		113.0	--	128.0	**116.2**	ms	P
Moment about OC		88.1	--	108.4	**94.4**	Nm	P
Time at Max Moment		47.0	--	58.0	**49.6**	ms	P
Moment Decay to Zero		97.0	--	107.0	**98.6**	ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **2:46:12 PM** Test Date: **5/29/2012**

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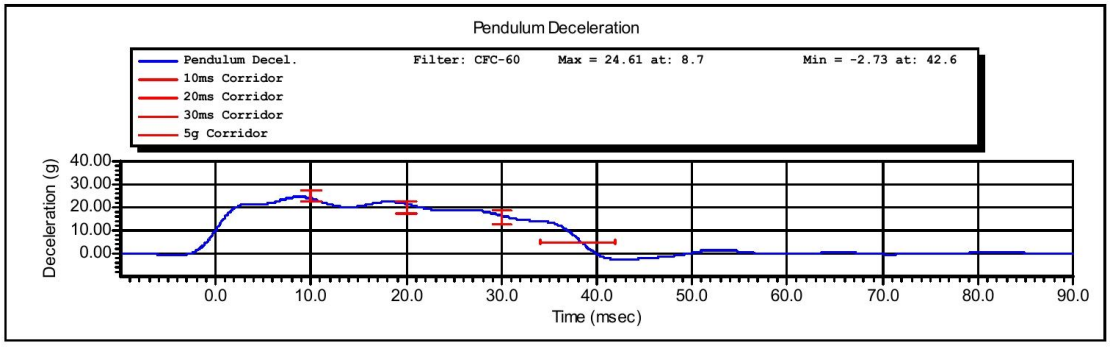
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**2/8/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**IF-205**	**LC-175 My**	**5/21/2012**
Denton	**IF-205**	**LC-175 Fx**	**5/21/2012**

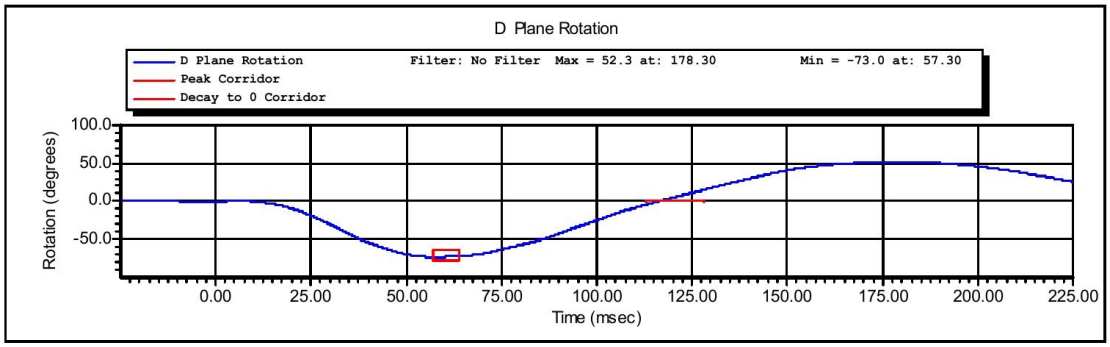
Test Time: **2:46:12 PM** Test Date: **5/29/2012**

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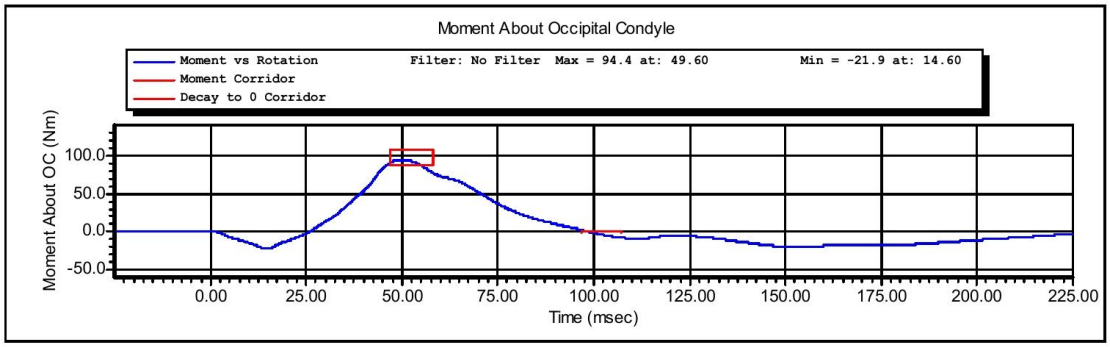
Name of Test:	**Neck Flexion**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:			
ID of Test:		Date:	**5/29/2012**
Number of Test:	**2**	Time of Test:	**2:46:12 PM**





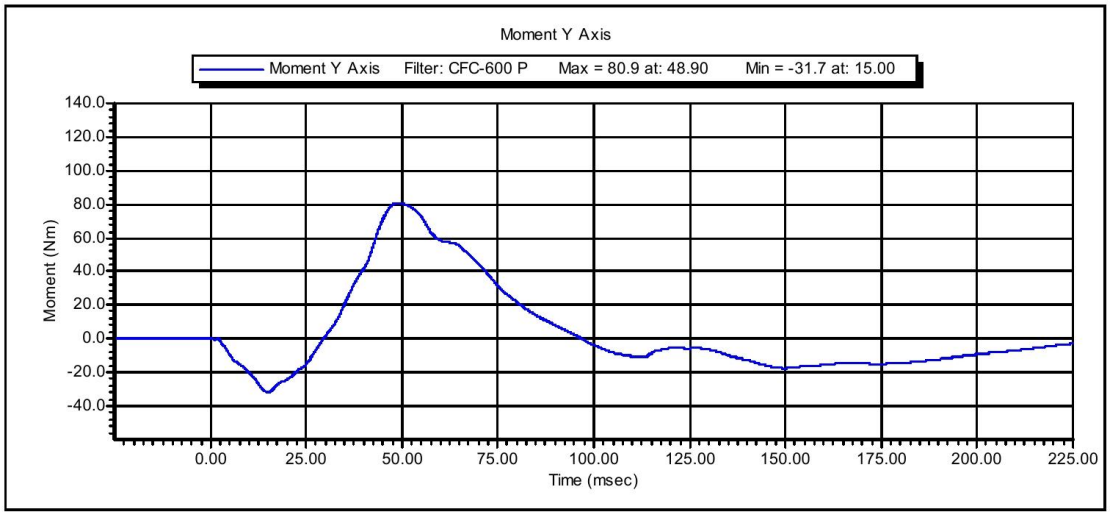
Time of Test: **2:46:12 PM** Date of Test: **5/29/2012**

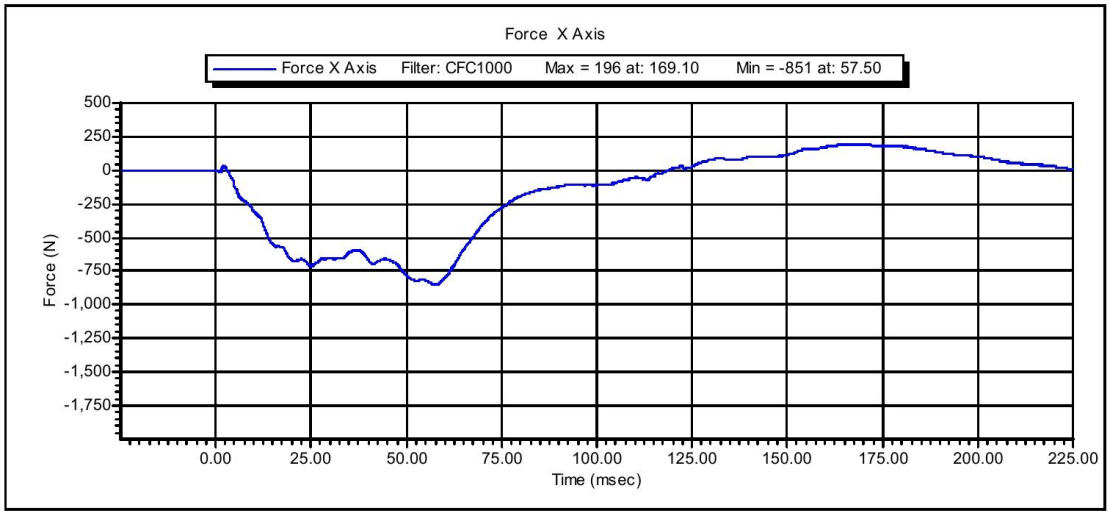
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Time of Test: **2:46:12 PM** Date of Test: **5/29/2012**

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Time of Test: **2:46:12 PM** Date of Test: **5/29/2012**

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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:	**5/29/2012**
Test Number:	**1**	Test Time:	**3:18:10 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**4194**
Front Nodding Block - 78051-351	**1797**
Rear Nodding Block - 78051-351	**1799**
Head Skin - 78051-220	**02-20544**

Test Parameters			Test Specifications			Test Results		
Temperature			20.6	--	22.2	**21.9**	deg C	P
Humidity			10	--	70	**54**	%RH	P
Velocity			5.94	--	6.19	**6.12**	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	**16.1**	g	P
Pendulum Deceleration at	30	ms	11.0	--	16.0	**11.3**	g	P
Max Pendulum Deceleration after	30	ms	0.0	--	22.0	**11.8**	g	P
Decel Time to	5	g	38.0	--	46.0	**43.0**	ms	P
D Plane Rotation			81.0	--	106.0	**94.7**	degrees	P
Time at Max Rotation			72.0	--	82.0	**76.1**	ms	P
Rotation Decay to Zero			147.0	--	174.0	**155.7**	ms	P
Moment About Occipital Condyle			-80.0	--	-52.9	**-68.3**	Nm	P
Time at Max Moment			65.0	--	79.0	**71.9**	ms	P
Moment Decay to Zero			120.0	--	148.0	**137.3**	ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **3:18:10 PM** Test Date: **5/29/2012**

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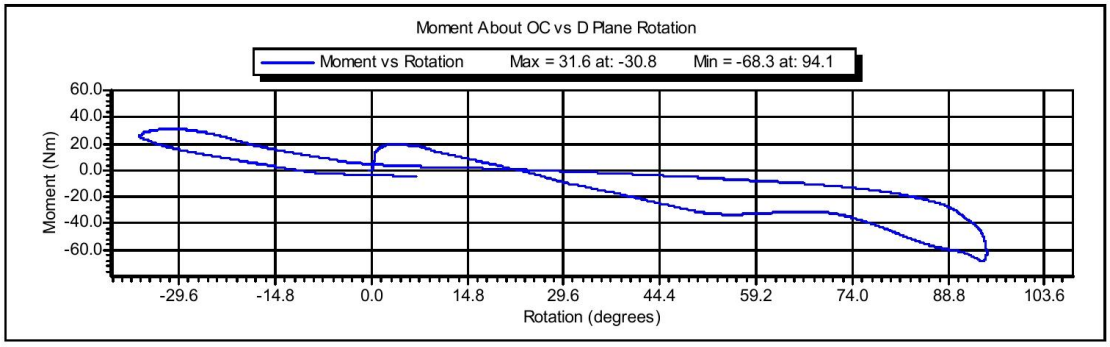
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**2/8/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**IF-205**	**LC-175 My**	**5/21/2012**
Denton	**IF-205**	**LC-175 Fx**	**5/21/2012**

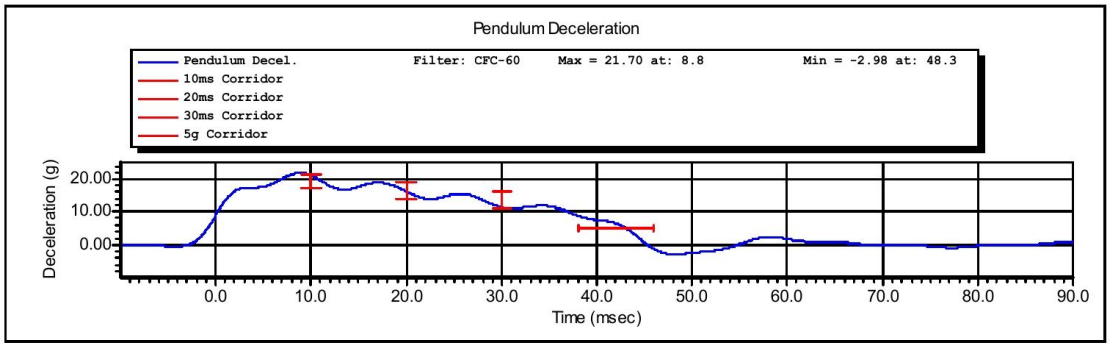
Test Time: **3:18:10 PM** Test Date: **5/29/2012**

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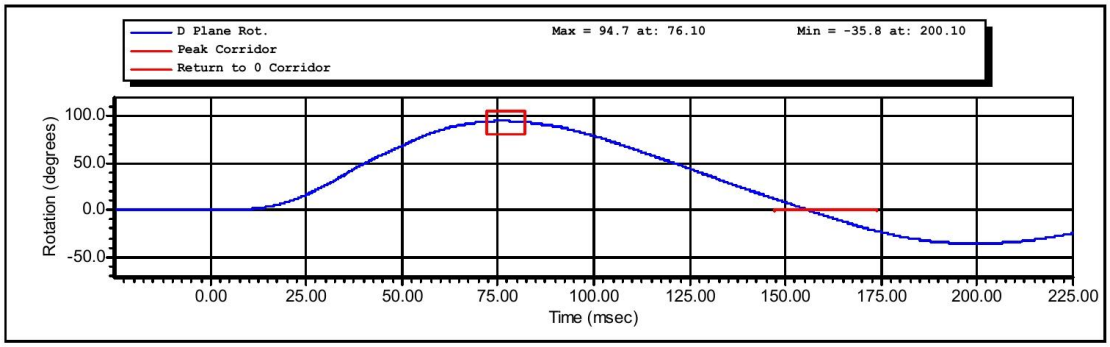
Name of Test:	**Neck Extension**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**064**		
ID of Test:		Date:	**5/29/2012**
Number of Test:	**1**	Time of Test:	**3:18:10 PM**

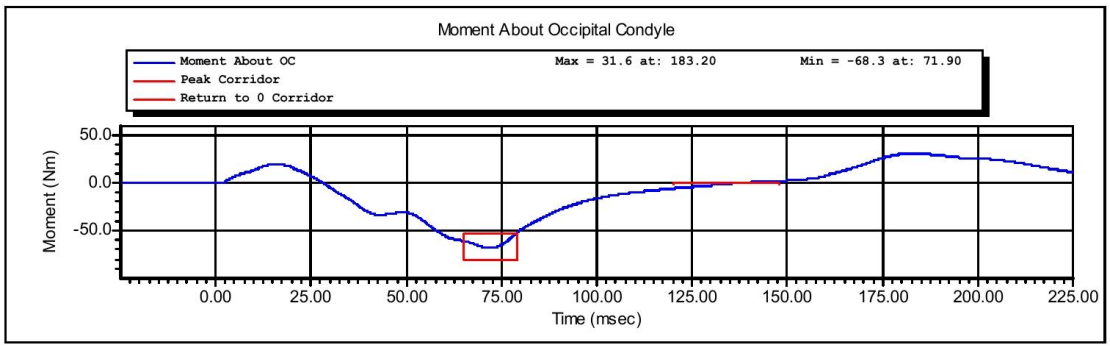




Time of Test: **3:18:10 PM** Date of Test: **5/29/2012**

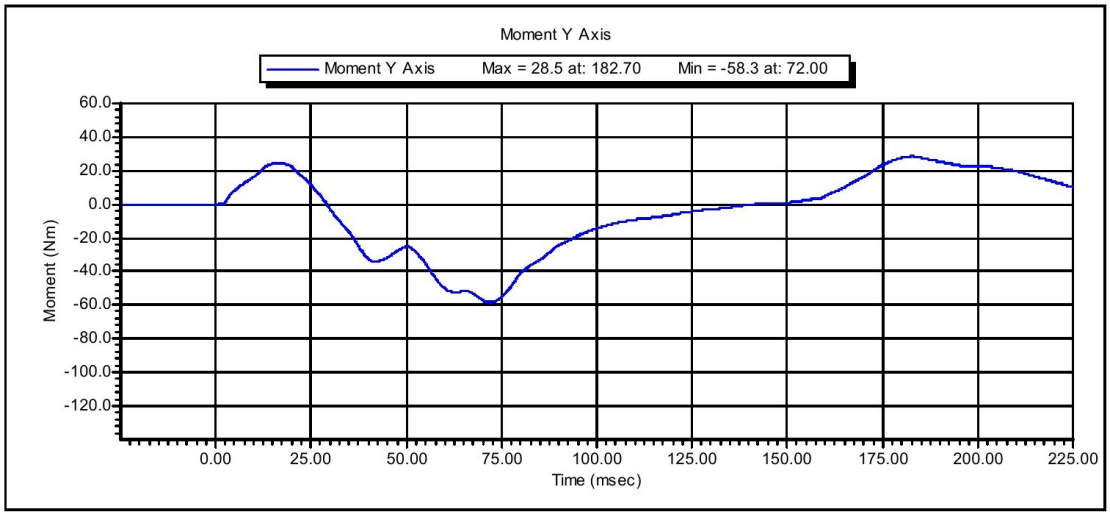
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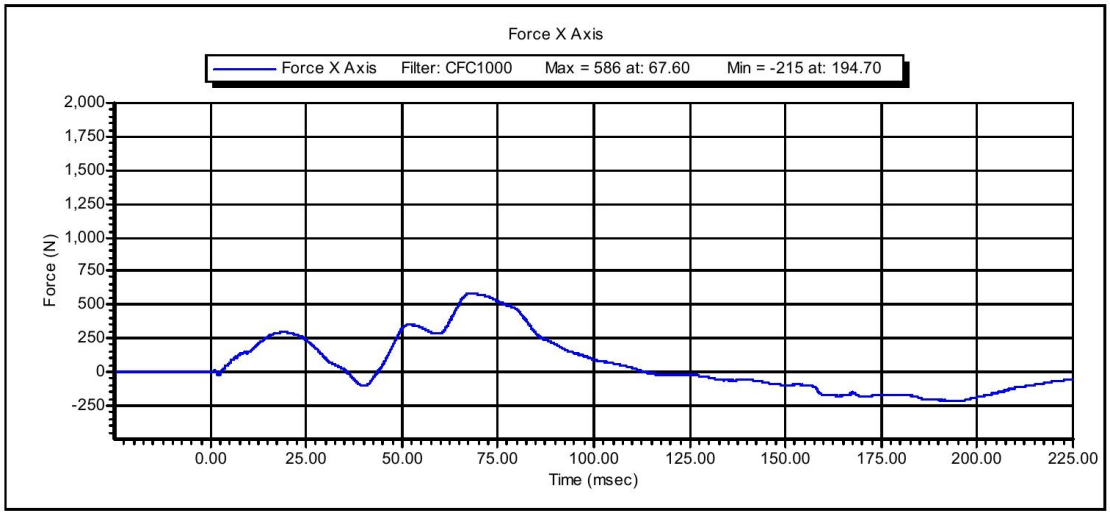




Time of Test: **3:18:10 PM** Date of Test: **5/29/2012**

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Time of Test: **3:18:10 PM** Date of Test: **5/29/2012**

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VERIFICATION REPORT

Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**5/24/2012**
Test Number:	**1**	Test Time:	**10:57:42 AM**

Component Part Number	Component Serial Number
Ribs 78051-RS	**N/A**
Chest Jacket - 78051-169	**2437**
Lumbar Spine - 78051-66	**555**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.3**	deg C	P
Humidity	10.0	--	70.0	**58.0**	%RH	P
Velocity	6.59	--	6.83	**6.61**	m/s	P
Resistive Force	-5.894	--	-5.160	**-5.497**	kN	P
Sternum Displacement	-72.6	--	-63.5	**-70.8**	mm	P
Hysteresis	69	--	85	**72**	%	P

All test parameters are within specifications

Technician: **A. Rudniski**

Supervisor: **D. Travale**

Test Time: **10:57:42 AM** Test Date: **5/24/2012**

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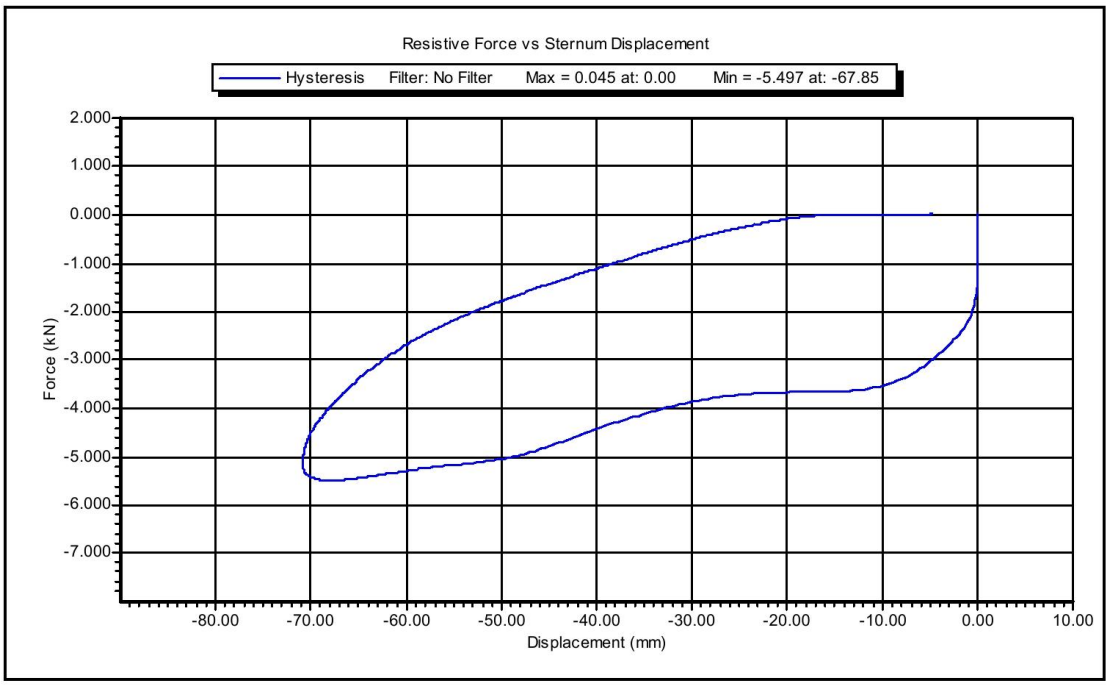
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C14953**	**2/8/2012**
DentonATD	**78051-342**	**DS-061**	**5/17/2012**

Test Time: **10:57:42 AM** Test Date: **5/24/2012**

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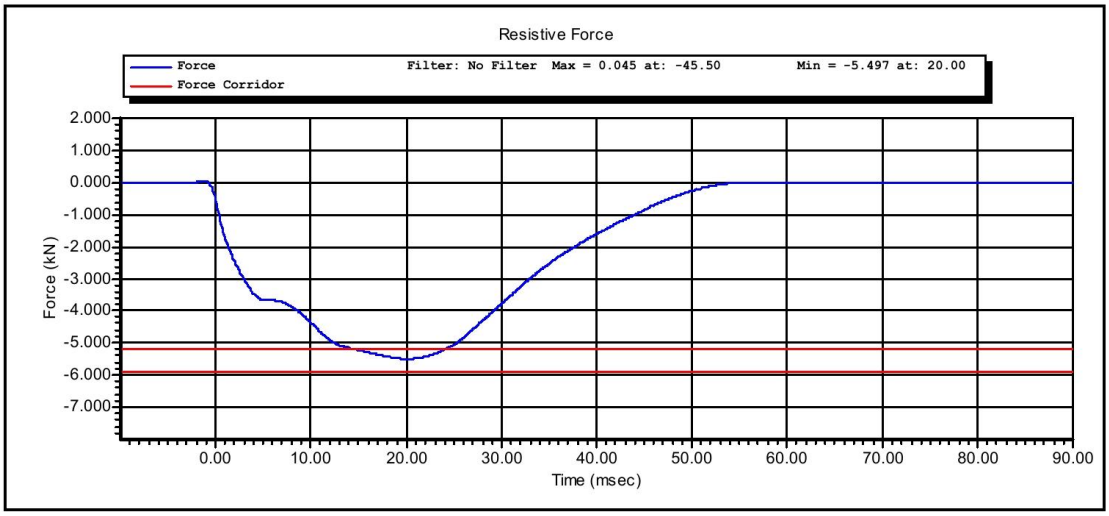
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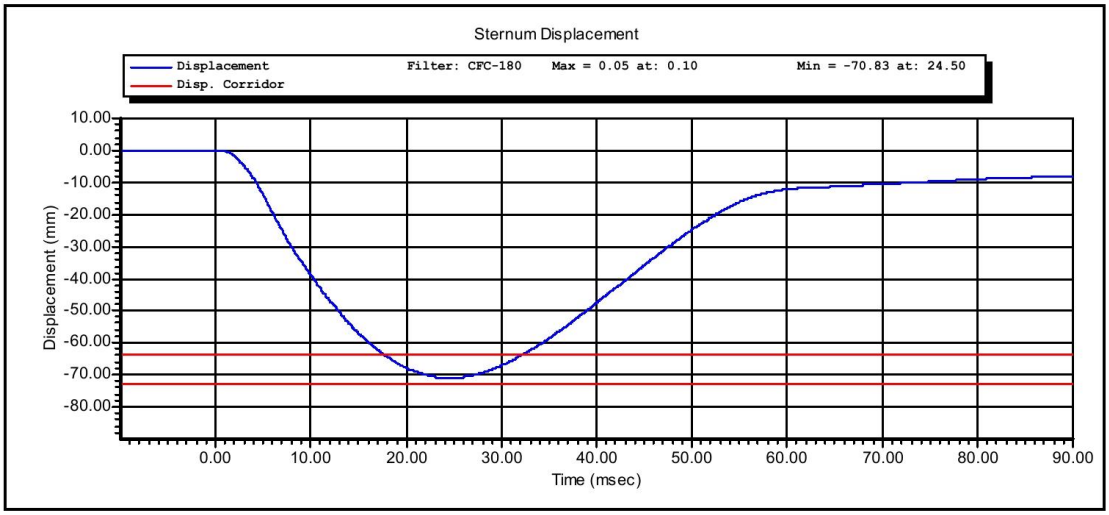
Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**5/24/2012**
Test Number:	**1**	Test Time:	**10:57:42 AM**



Test Time: **10:57:42 AM** Test Date: **5/24/2012**

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Test Time: **10:57:42 AM** Test Date: **5/24/2012**

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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:	**061**		
Test ID:		Test Date:	**5/18/2012**
Test Number:	**1**	Test Time:	**10:33:12 AM**

Component Part Number	Component Serial Number
Knee Skin - 78051(L)	**3268**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10.0	--	70.0	**32.0**	%RH	P
Velocity	2.07	--	2.13	**2.08**	m/s	P
Resistive Force	-5.78	--	-4.72	**-4.94**	kN	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **10:33:12 AM** Test Date: **5/18/2012**

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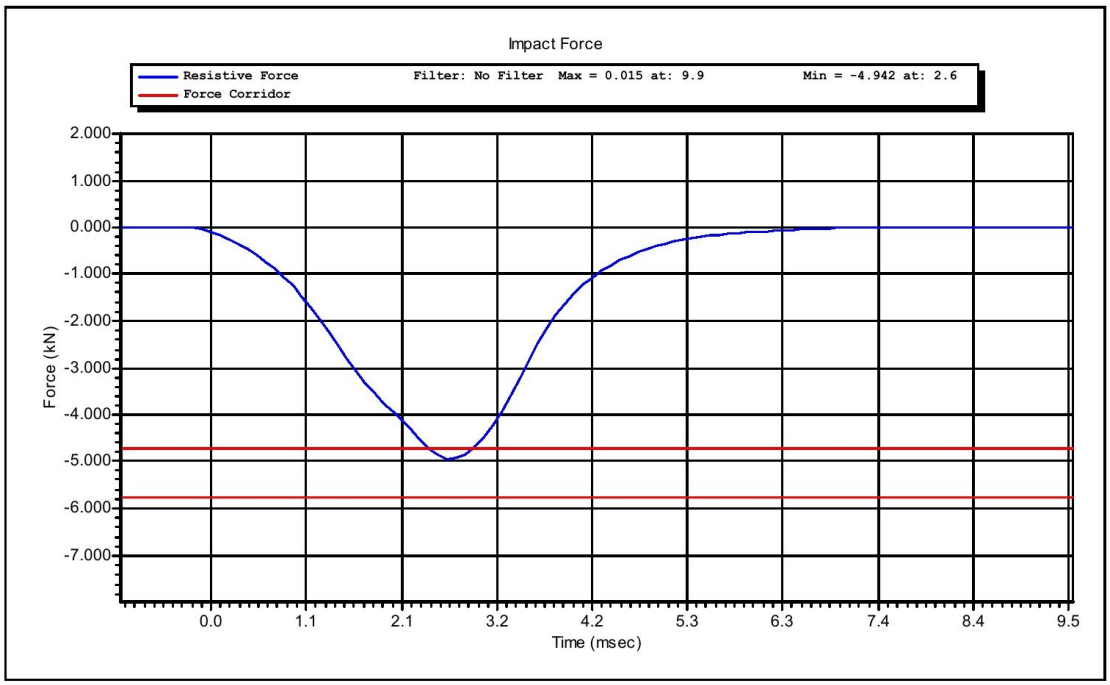
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**12/10/2011**

Test Time: **10:33:12 AM** Test Date: **5/18/2012**

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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:	**061**		
Test ID:		Test Date:	**5/18/2012**
Test Number:	**1**	Test Time:	**10:33:12 AM**



Test Time: **10:33:12 AM** Test Date: **5/18/2012**

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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:	**061**		
Test ID:	**Right Knee**	Test Date:	**5/18/2012**
Test Number:	**1**	Test Time:	**10:06:16 AM**

Component Part Number	Component Serial Number
Knee Skin - 780516(R)	**3158**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**33.0**	%RH	P
Velocity	2.07	--	2.13	**2.08**	m/s	P
Resistive Force	-5.78	--	-4.72	**-4.82**	kN	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **10:06:16 AM** Test Date: **5/18/2012**

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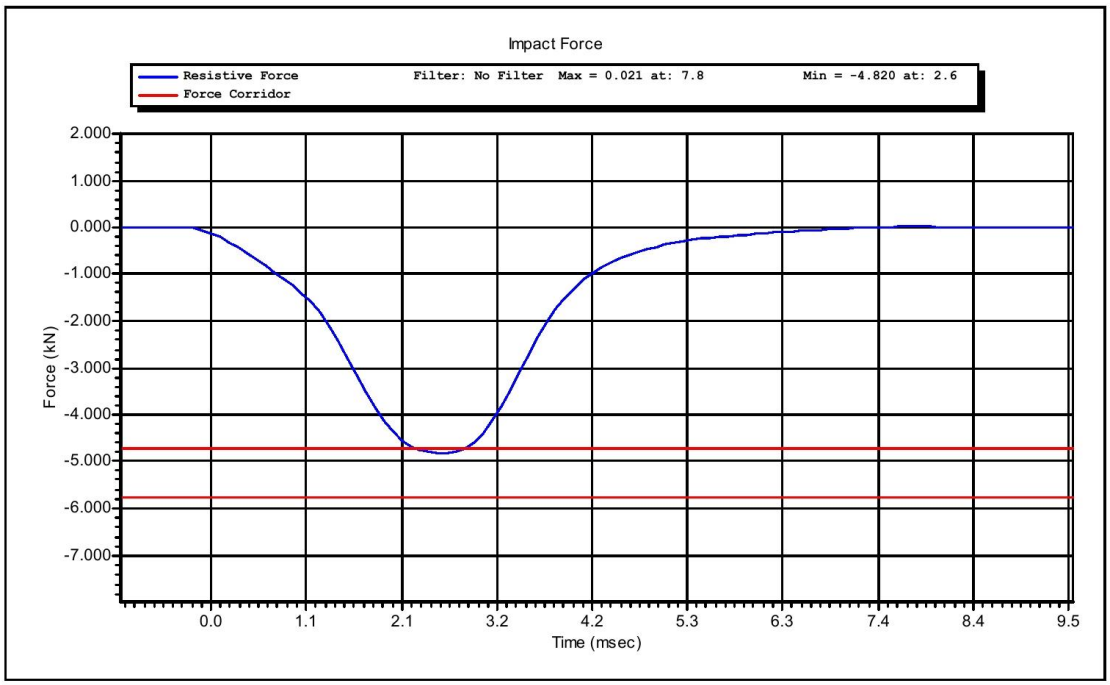
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**12/10/2011**

Test Time: **10:06:16 AM** Test Date: **5/18/2012**

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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:	**061**		
Test ID:	**Right Knee**	Test Date:	**5/18/2012**
Test Number:	**1**	Test Time:	**10:06:16 AM**



Test Time: **10:06:16 AM** Test Date: **5/18/2012**

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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**Right Hip**		
Test ID:		Test Date:	**6/21/2012**
Test Number:	**2**	Test Time:	**12:51:48 PM**

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	**2398**

Comments:

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10	--	70	**53**	%RH	P
Average Velocity	5.0	--	10.0	**6.8**	deg/s	P
Angle at 203 Nm	40.0	--	50.0	**40.0**	degrees	P
Moment at 30 degrees	0.0	--	94.9	**86.0**	Nm	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **12:51:48 PM** Test Date: **6/21/2012**

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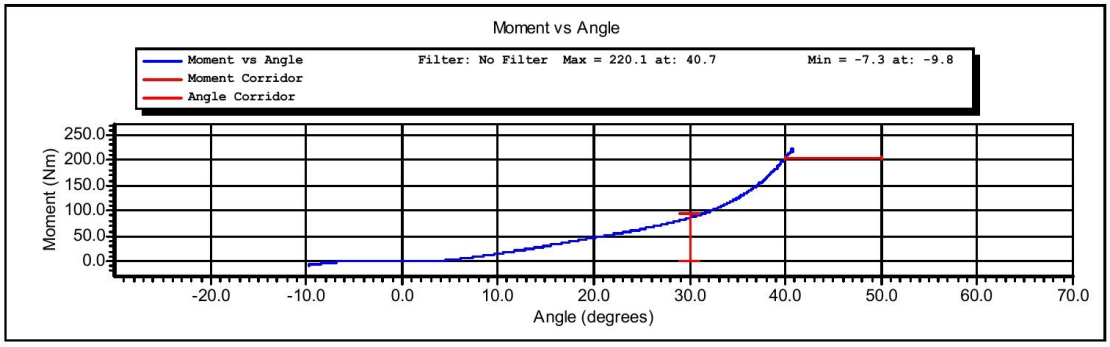
Manufacturer	Model	Serial Number	Calibration Date
Key	**2301-02**	**115**	**12/15/2011**
Transducers/PCB	**14CB1-3615**	**0008**	**3/16/2012**
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
DentonATD			

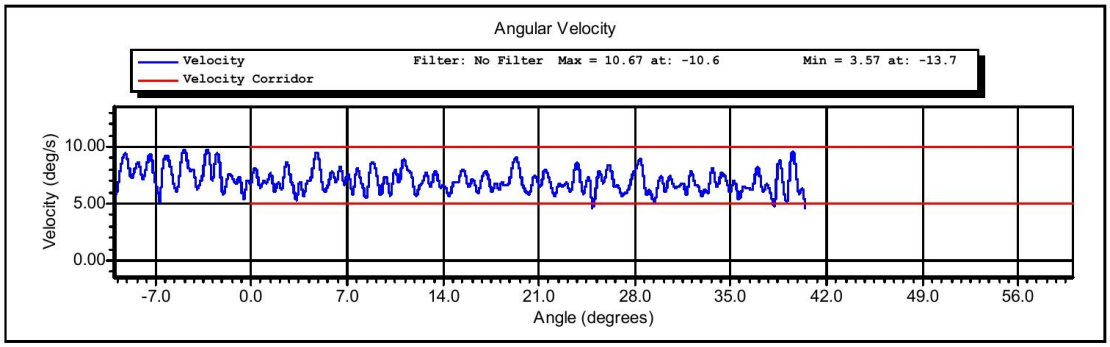
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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**Right Hip**		
Test ID:		Test Date:	**6/21/2012**
Test Number:	**2**	Test Time:	**12:51:48 PM**





Test Time: **12:51:48 PM** Test Date: **6/21/2012**

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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Left Hip**	Test Date:	**6/21/2012**
Test Number:	**2**	Test Time:	**3:05:13 PM**

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	**2398**

Comments:

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2**	deg C	P
Humidity	10	--	70	**51**	%RH	P
Average Velocity	5.0	--	10.0	**6.9**	deg/s	P
Angle at 203 Nm	40.0	--	50.0	**40.6**	degrees	P
Moment at 30 degrees	0.0	--	94.9	**75.9**	Nm	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **3:05:13 PM** Test Date: **6/21/2012**

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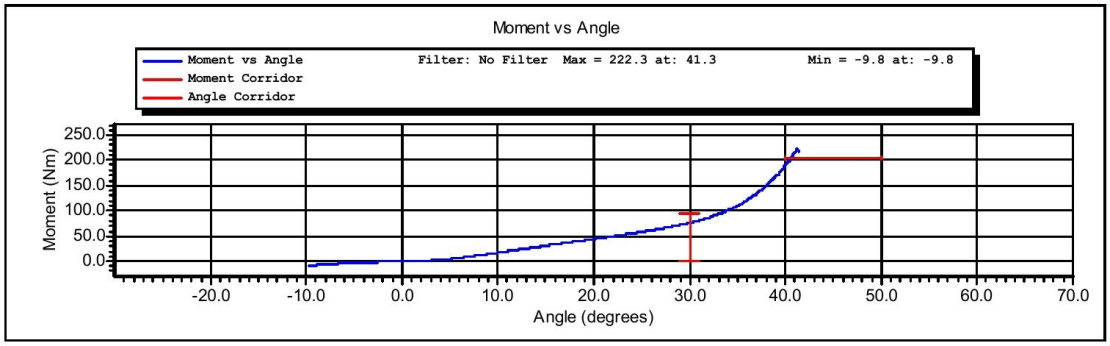
Manufacturer	Model	Serial Number	Calibration Date
Key	**2301-02**	**115**	**12/15/2011**
Transducers/PCB	**14CB1-3615**	**0008**	**3/16/2012**
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
DentonATD			

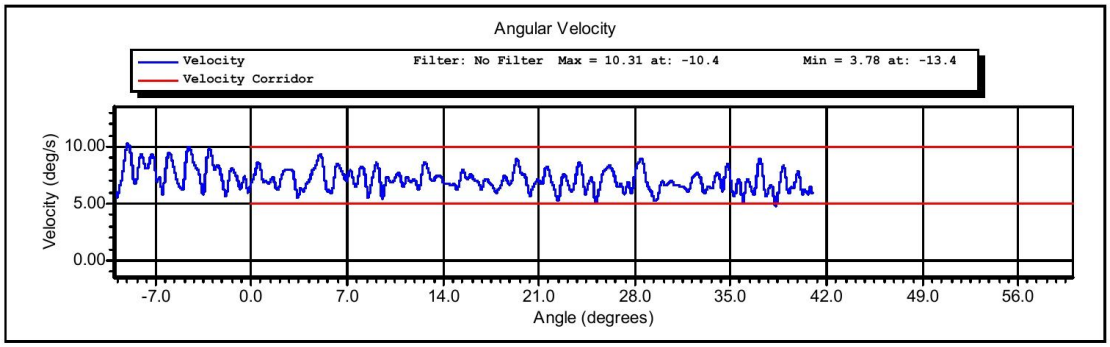
Test Time: **3:05:13 PM** Test Date: **6/21/2012**

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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Left Hip**	Test Date:	**6/21/2012**
Test Number:	**2**	Test Time:	**3:05:13 PM**





Test Time: **3:05:13 PM** Test Date: **6/21/2012**

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CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 273

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External Measurements

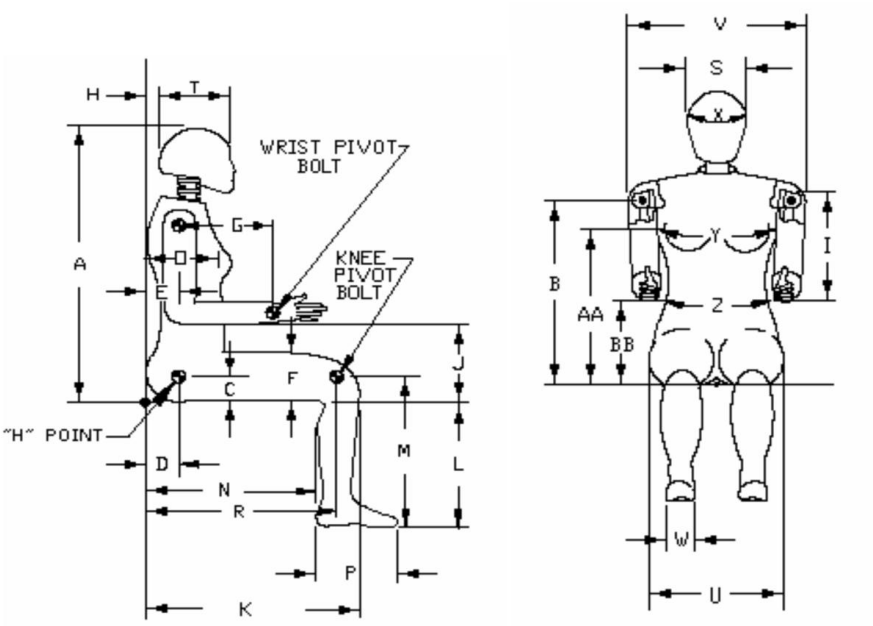
5th Female SN 273

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	787	Yes
B	Shoulder Pivot Height	431.8 – 457.2	456	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	75	Yes
F	Thigh Clearance	119.4 – 134.6	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	247	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	287	Yes
J	Elbow Rest Height	182.8 – 203.2	197	Yes
K	Buttock to Knee Length	520.7 – 546.1	539	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	395	Yes
N	Buttock Popliteal Length	414 – 439.4	433	Yes
O	Chest Depth without Jacket	175.3 – 190.5	185	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	473	Yes
S	Head Breadth	137.1 – 147.3	142	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	83	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	863	Yes
Z	Waist Circumference	759.5 – 789.9	773	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: MPG Date: 6/6/2012

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:	**5/16/2012**
Test Number:	**1**	Test Time:	**9:55:02 AM**

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

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.2**	deg C	P
Humidity	10	--	70	**45**	%RH	P
Resultant Acceleration	250	--	300	**267**	g	P
Oscillation	0.0	--	10.0	**1.7**	%	P
Lateral Acceleration	-15.00	--	15.00	**1.92**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **9:55:02 AM** Test Date: **5/16/2012**

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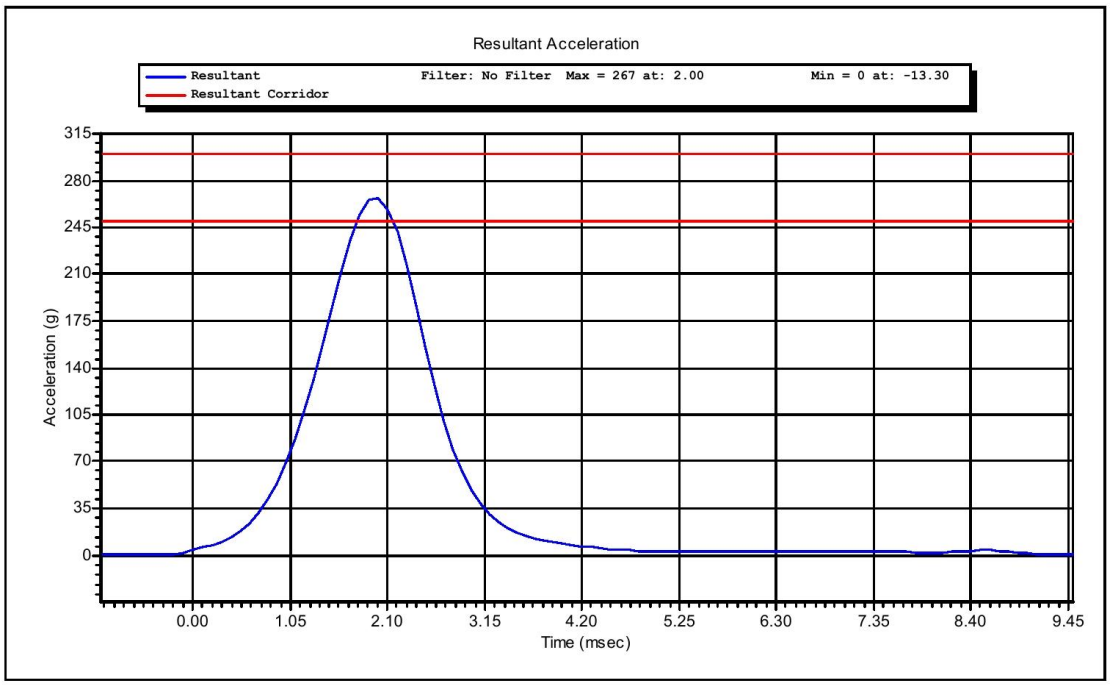
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Endevco	**7264-2000**	**P52054**	**5/15/2012**
Endevco	**7264-2000**	**P52007**	**5/15/2012**
Endevco	**7264-2000**	**P51298**	**5/15/2012**

Test Time: **9:55:02 AM** Test Date: **5/16/2012**

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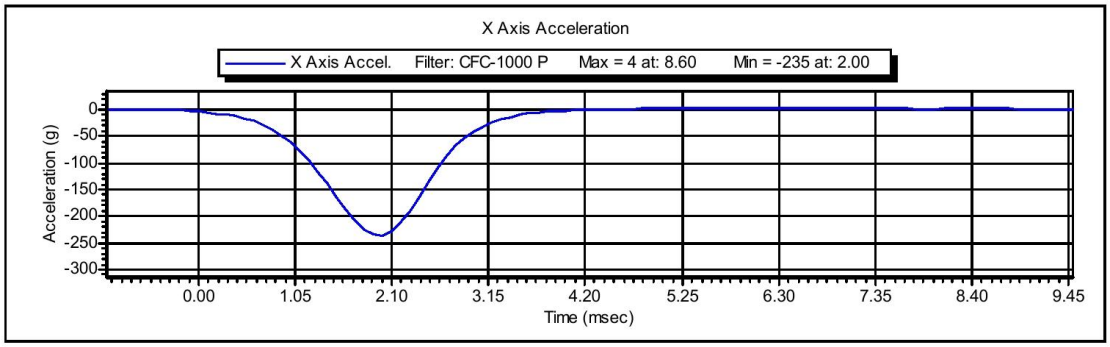
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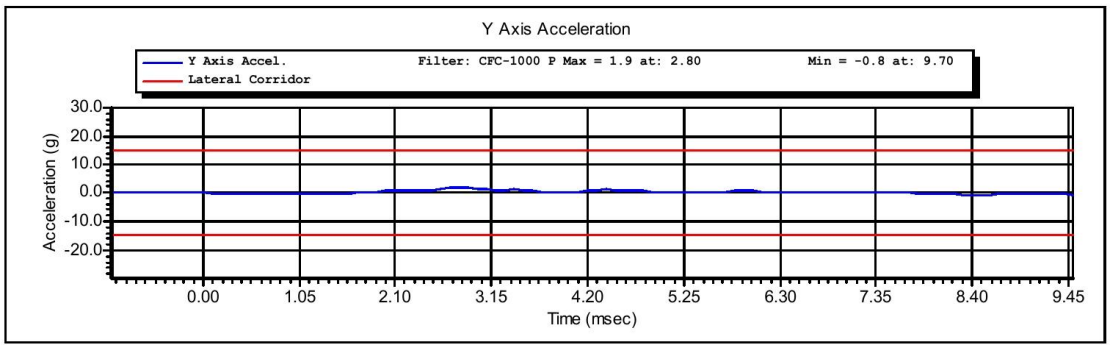
Test Name:	**Head Drop**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**5/16/2012**
Test Number:	**1**	Test Time:	**9:55:02 AM**

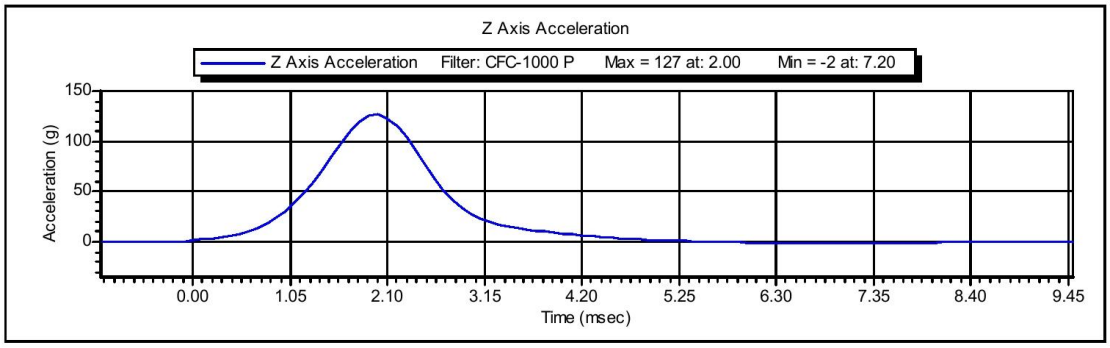


Test Time: **9:55:02 AM** Test Date: **5/16/2012**

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Test Time: **9:55:02 AM** Test Date: **5/16/2012**

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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:			
Test ID:		Test Date:	**5/25/2012**
Test Number:	**3**	Test Time:	**8:36:11 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	**62** %RH	P
Velocity	6.89 -- 7.13	**7.12** m/s	P
Pendulum Impulse at 10 ms	2.10 -- 2.50	**2.34** m/s	P
Pendulum Impulse at 20 ms	4.00 -- 5.00	**4.75** m/s	P
Pendulum Impulse at 30 ms	5.80 -- 7.00	**6.85** m/s	P
D Plane Rotation	-91.0 -- -77.0	**-79.5** degrees	P
Moment During Rotation Interval	69.0 -- 83.0	**73.1** Nm	P
Moment Decay to 10.0 Nm	80.0 -- 100.0	**84.7** ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **8:36:11 AM** Test Date: **5/25/2012**

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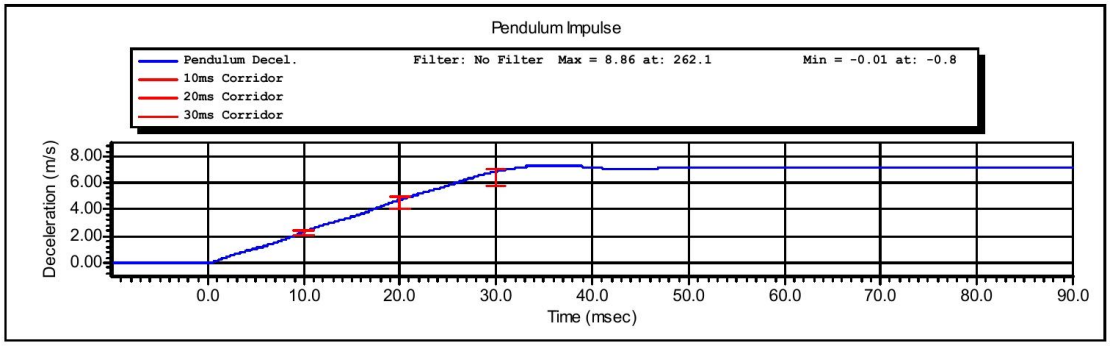
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**2/8/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**1716A**	**LC-1629My**	**5/21/2012**
Denton	**1716A**	**LC-1629Fx**	**5/21/2012**

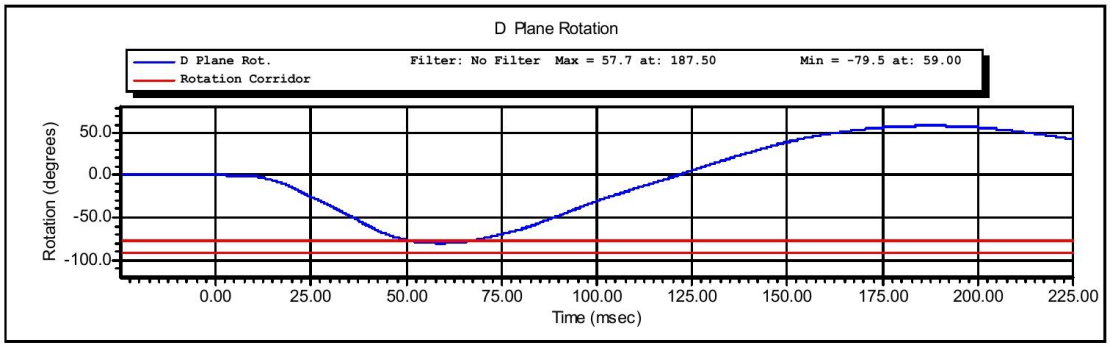
Test Time: **8:36:11 AM** Test Date: **5/25/2012**

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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:			
Test ID:		Test Date:	**5/25/2012**
Test Number:	**3**	Test Time:	**8:36:11 AM**

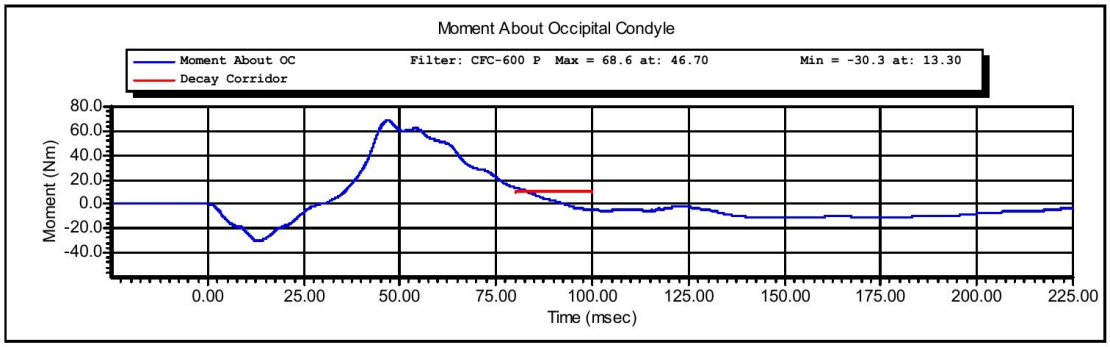




Test Time: **8:36:11 AM** Test Date: **5/25/2012**

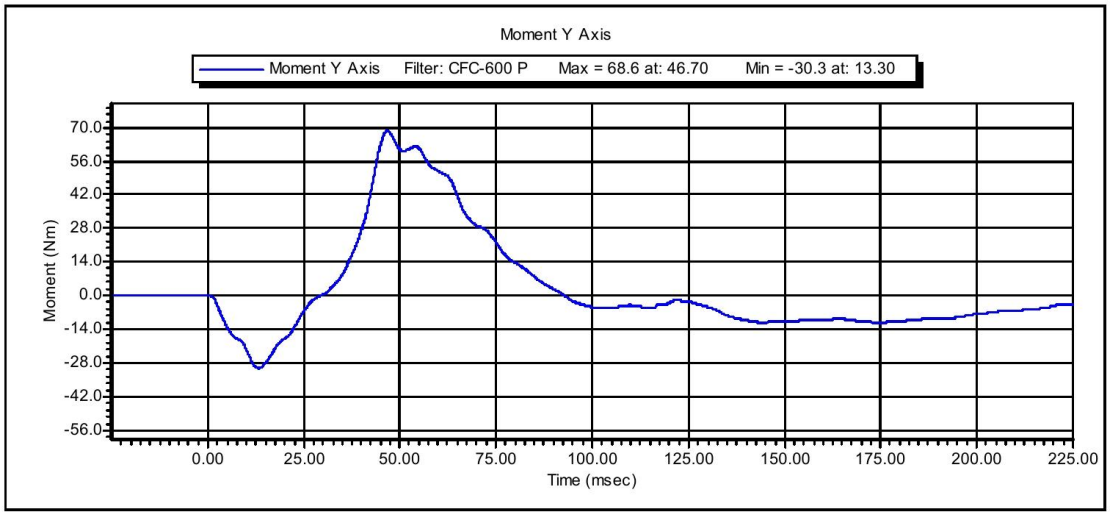
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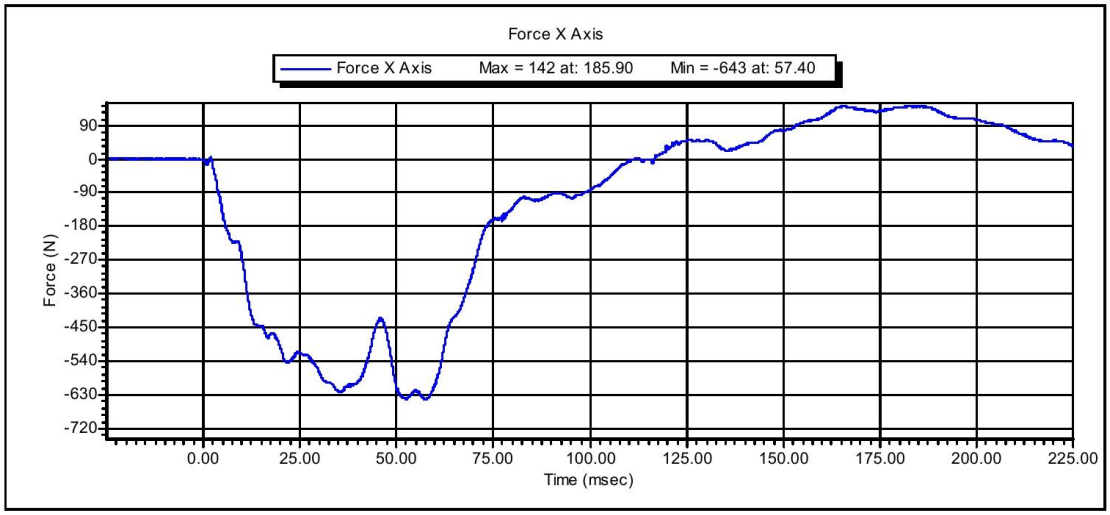
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Test Time: **8:36:11 AM** Test Date: **5/25/2012**

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Test Time: **8:36:11 AM** Test Date: **5/25/2012**

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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:	**5/25/2012**
Test Number:	**1**	Test Time:	**9:35:30 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	**63** %RH	P
Velocity	5.95 -- 6.19	**6.16** m/s	P
Pendulum Impulse at 10 ms	1.50 -- 1.90	**1.78** m/s	P
Pendulum Impulse at 20 ms	3.10 -- 3.90	**3.65** m/s	P
Pendulum Impulse at 30 ms	4.60 -- 5.60	**5.35** m/s	P
D Plane Rotation	99.0 -- 114.0	**102.2** degrees	P
Moment During Rotation Interval	-65.0 -- -53.0	**-56.1** Nm	P
Moment Decay to -10.0 Nm	94.0 -- 114.0	**98.2** ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **9:35:30 AM** Test Date: **5/25/2012**

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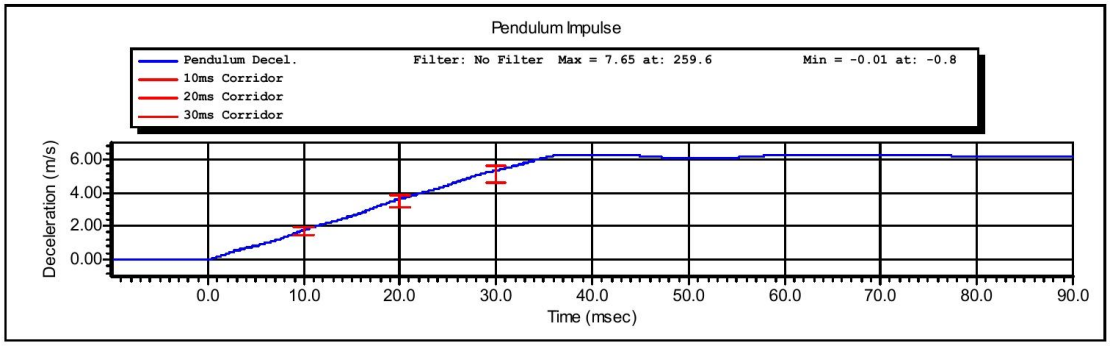
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**2/8/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**1716A**	**LC-1629My**	**5/21/2012**
Denton	**1716A**	**LC-1629Fx**	**5/21/2012**

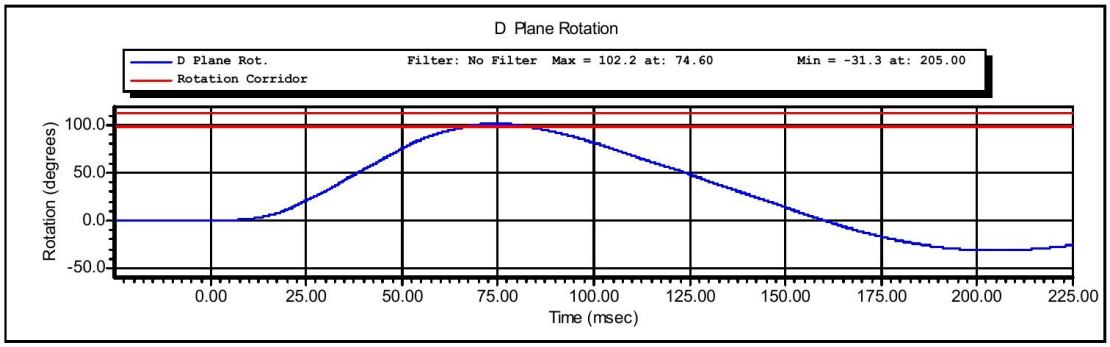
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Test Name:	**Neck Extension**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**5/25/2012**
Test Number:	**1**	Test Time:	**9:35:30 AM**

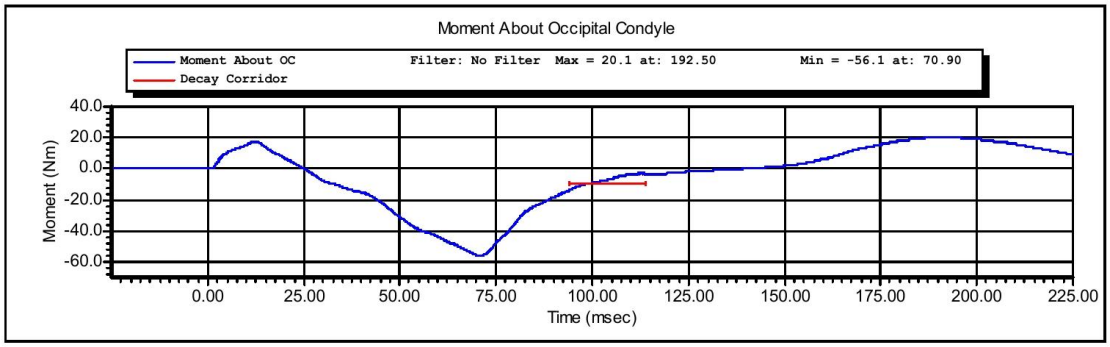




Test Time: **9:35:30 AM** Test Date: **5/25/2012**

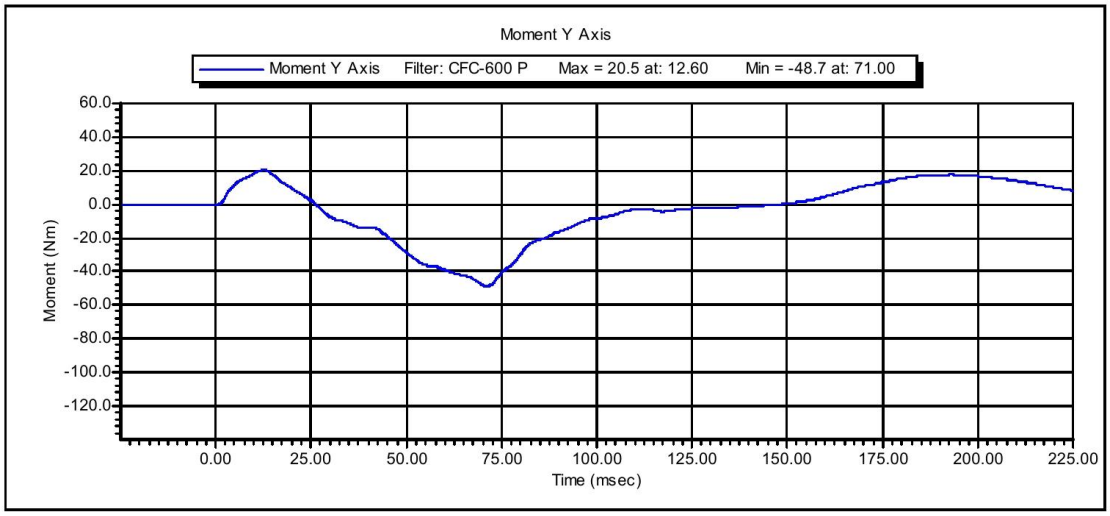
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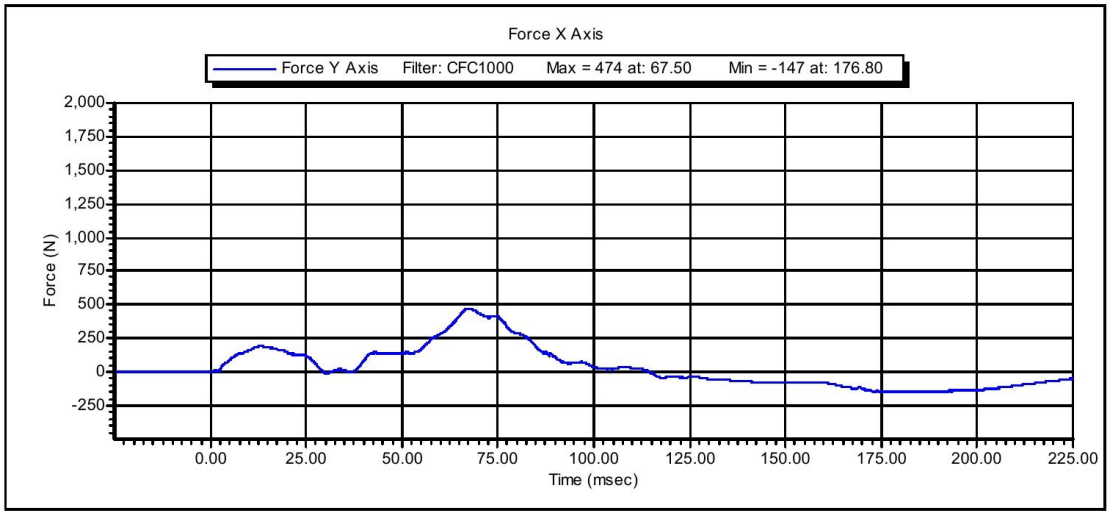
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Test Time: **9:35:30 AM** Test Date: **5/25/2012**

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Test Time: **9:35:30 AM** Test Date: **5/25/2012**

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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:	**5/22/2012**
Test Number:	**1**	Test Time:	**3:08:49 PM**

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	**21.6**	deg C	P
Humidity	10.0	--	70.0	**55.0**	%RH	P
Velocity	6.59	--	6.83	**6.60**	m/s	P
Sternum Displacement	-58.0	--	-50.0	**-52.9**	mm	P
Force During Displacement Interval	-4400	--	-3900	**-4217**	N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	**-4180**	N	P
Hysteresis	69	--	85	**70**	%	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **3:08:49 PM** Test Date: **5/22/2012**

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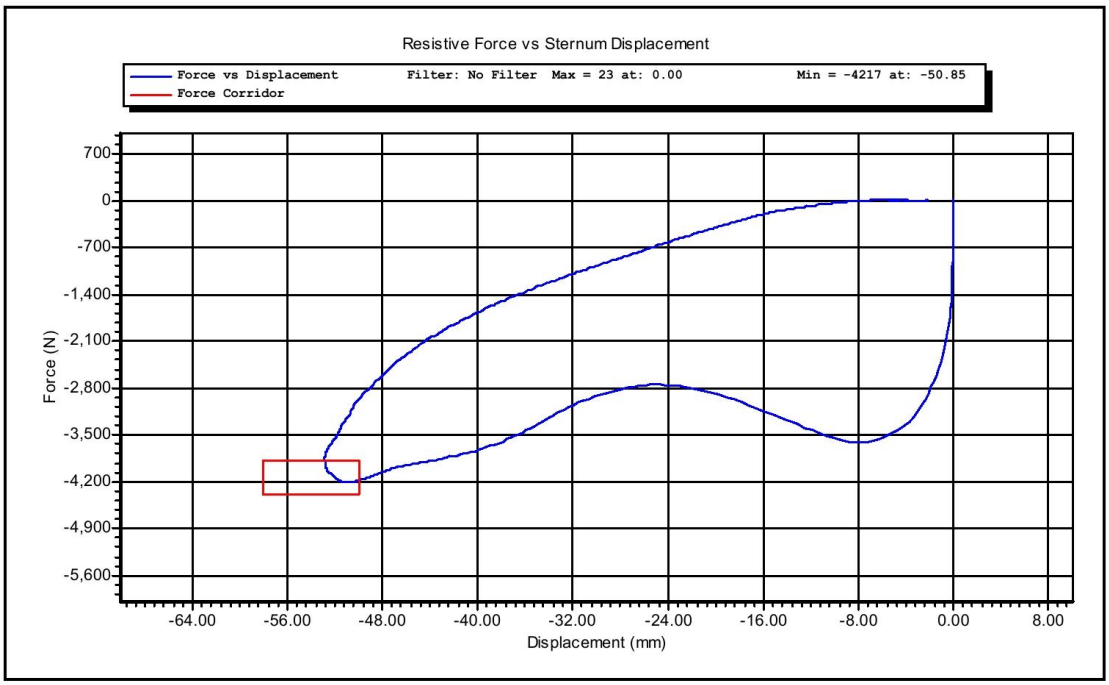
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C14953**	**2/8/2012**
DentonATD	**78051-342**	**DS-273**	**10/10/2011**

Test Time: **3:08:49 PM** Test Date: **5/22/2012**

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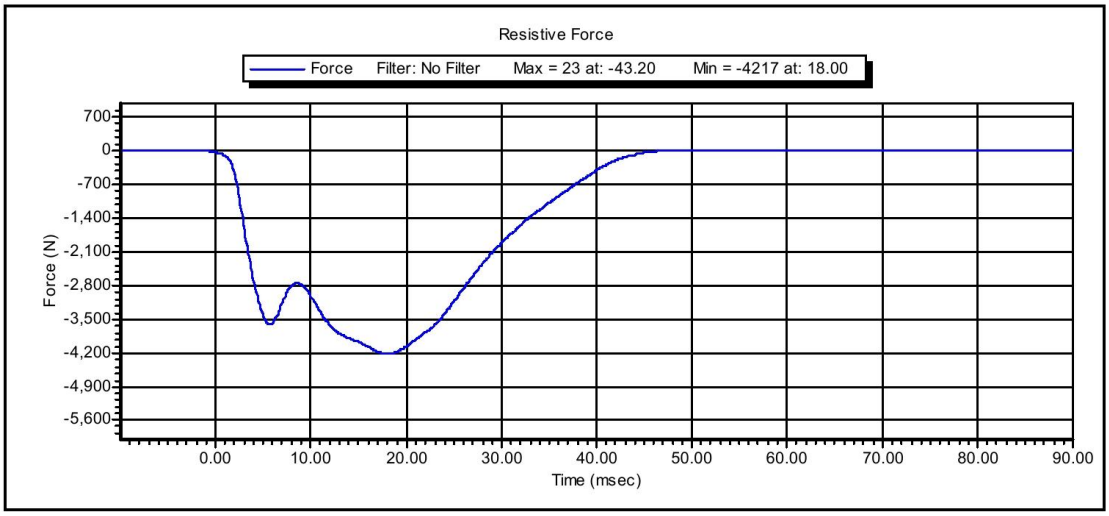
Test Name:	**Thorax Impact**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:		Test Date:	**5/22/2012**
Test Number:	**1**	Test Time:	**3:08:49 PM**

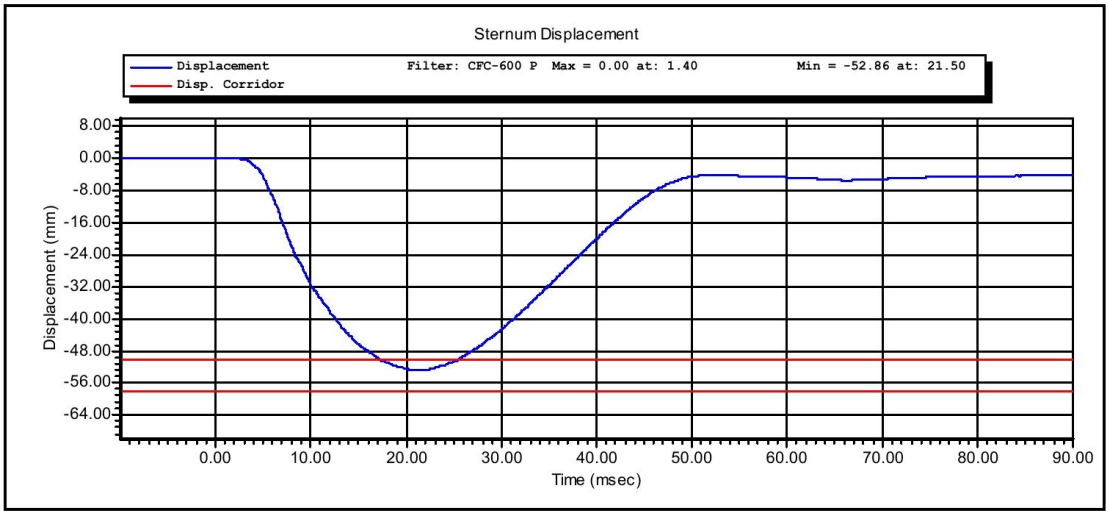


Test Time: **3:08:49 PM** Test Date: **5/22/2012**

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Test Time: **3:08:49 PM** Test Date: **5/22/2012**

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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:		Test Date:	**5/17/2012**
Test Number:	**1**	Test Time:	**11:17:31 AM**

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	**32.0** %RH	P
Velocity	2.07 -- 2.13	**2.12** m/s	P
Resistive Force	-4060 -- -3450	**-3800** N	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **11:17:31 AM** Test Date: **5/17/2012**

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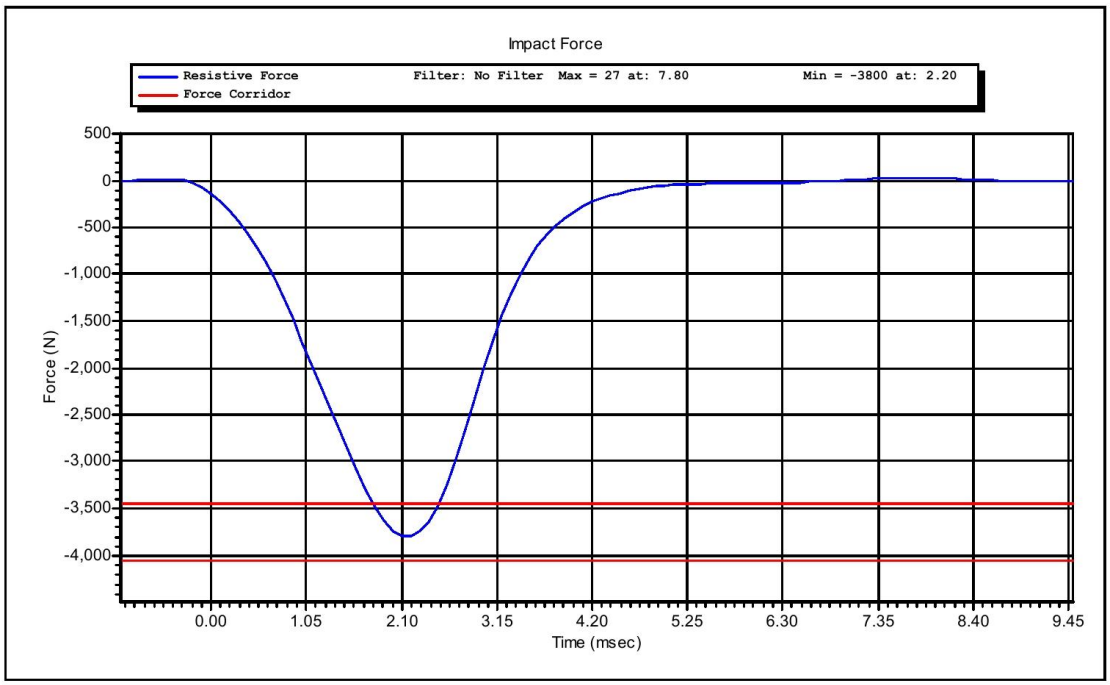
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**12/10/2011**

Test Time: **11:17:31 AM** Test Date: **5/17/2012**

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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:		Test Date:	**5/17/2012**
Test Number:	**1**	Test Time:	**11:17:31 AM**



Test Time: **11:17:31 AM** Test Date: **5/17/2012**

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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:	**5/17/2012**
Test Number:	**1**	Test Time:	**10:57:14 AM**

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	**32.0** %RH	P
Velocity	2.07 -- 2.13	**2.08** m/s	P
Resistive Force	-4060 -- -3450	**-3770** N	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **10:57:14 AM** Test Date: **5/17/2012**

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REFERENCE EQUIPMENT

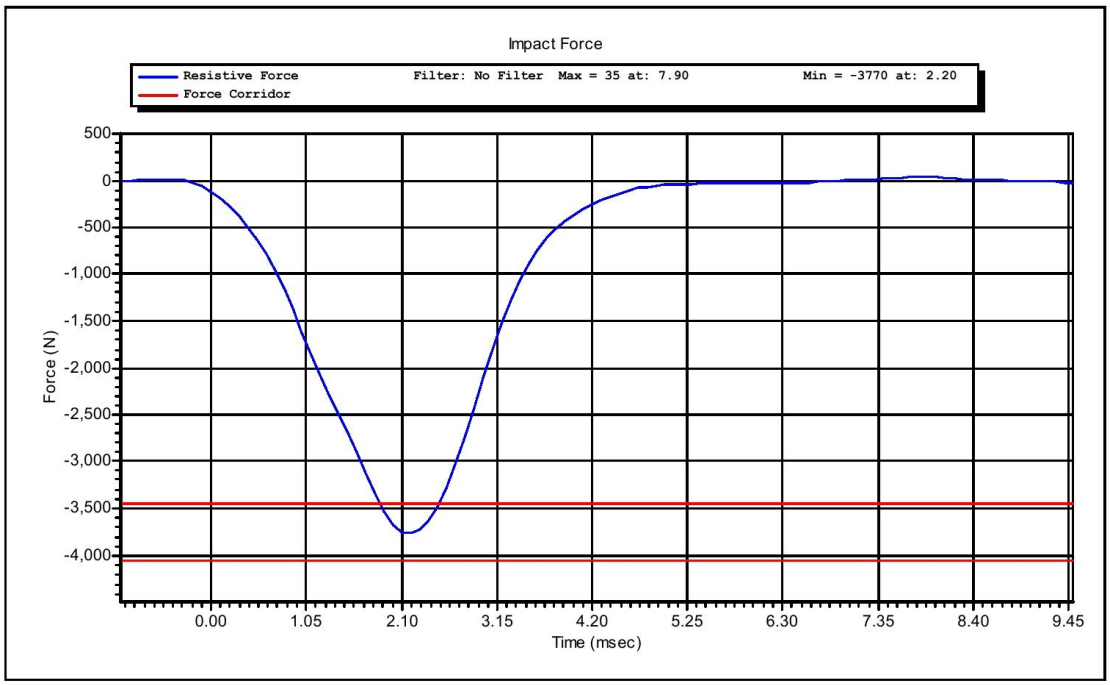
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**12/10/2011**

Test Time: **10:57:14 AM** Test Date: **5/17/2012**

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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:	**5/17/2012**
Test Number:	**1**	Test Time:	**10:57:14 AM**



Test Time: **10:57:14 AM** Test Date: **5/17/2012**

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Torso Flexion

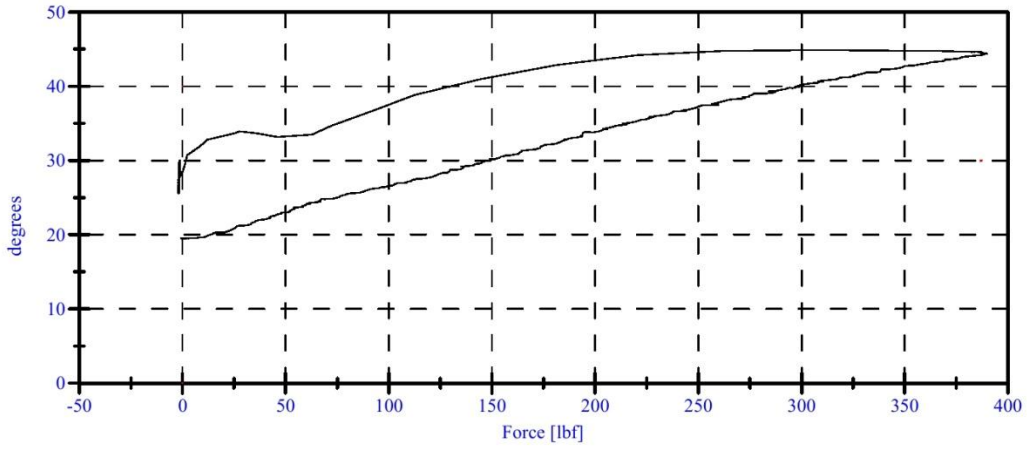
Pre-Test

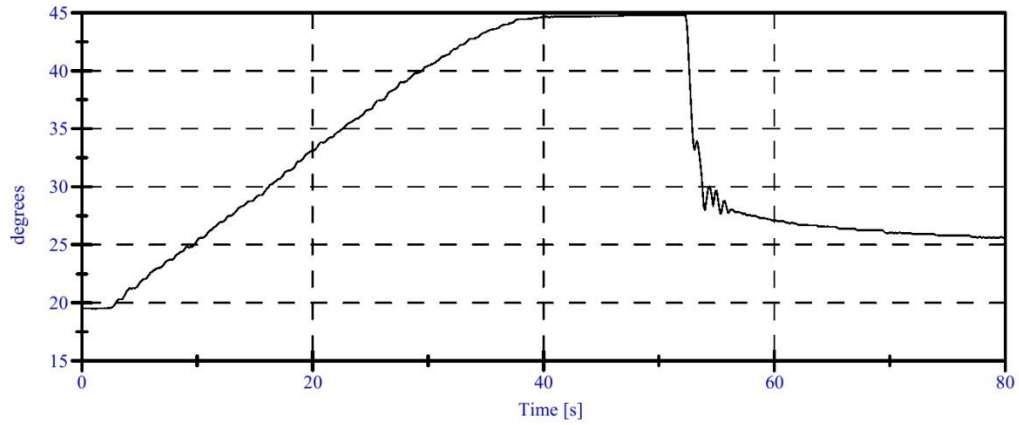
Part 572O HIII 5% Female

ATD Serial No: 273	Laboratory Supervisor D. Travale
Date: 9/24/2012	Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	22.0 C	Passed
Lab Humidity:	10-70 %	34.00 %	Passed
Initial Angle:	0.00-20.00 deg	19.51 deg	Passed
Force at 45 Deg	320.00-390.00 N	387.22 N	Passed
Return Angle	8 Deg Max from Initial	25.26 deg	Passed

LUMBAR SPINE FLEXION TEST





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 061

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50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.3	Yes
C	H-Point Height	3.3 – 3.5	3.5	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	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	8.0	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.7	Yes
L	Popliteal Height	16.9 – 17.9	16.9	Yes
M	Knee Pivot Height	19.1 – 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.6	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.7	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	4.0	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.8	Yes
Z	Waist Circumference	32.9 – 34.1	33.7	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: MPG Date: 10/2/2012

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VERIFICATION REPORT

Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**8:47:22 AM**

Component Part Number	Component Serial Number
Head Skin - 78051-228	**02-20544**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**21.2**	deg C	P
Humidity	10	--	70	**46**	%RH	P
Resultant Acceleration	225	--	275	**250**	g	P
Oscillation	0.0	--	10.0	**0.0**	%	P
Lateral Acceleration	-15.00	--	15.00	**6.49**	g	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **8:47:22 AM** Test Date: **10/1/2012**

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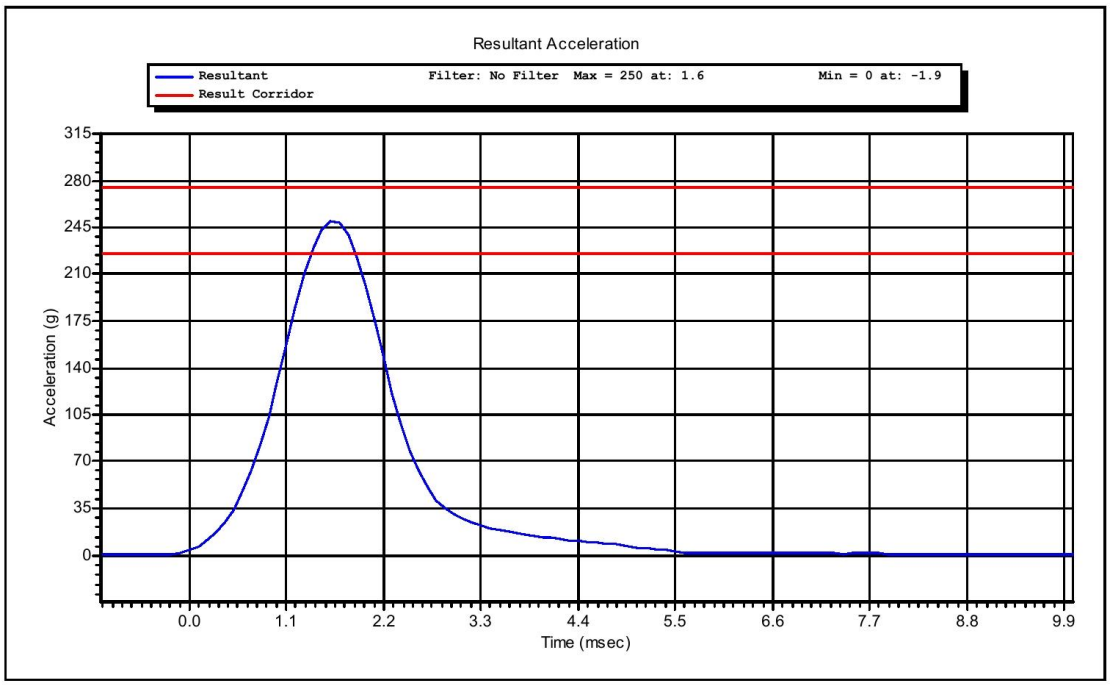
Manufacturer	Model	Serial Number	Calibration Date
Endevco	**7264-2000**	**P58904**	**5/18/2012**
Endevco	**7264-2000**	**P58911**	**5/18/2012**
Endevco	**7264-2000**	**P58757**	**5/18/2012**

Test Time: **8:47:22 AM** Test Date: **10/1/2012**

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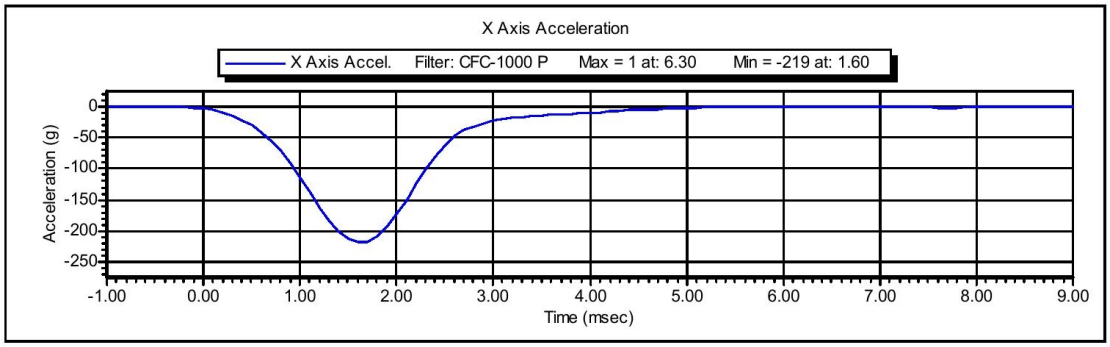
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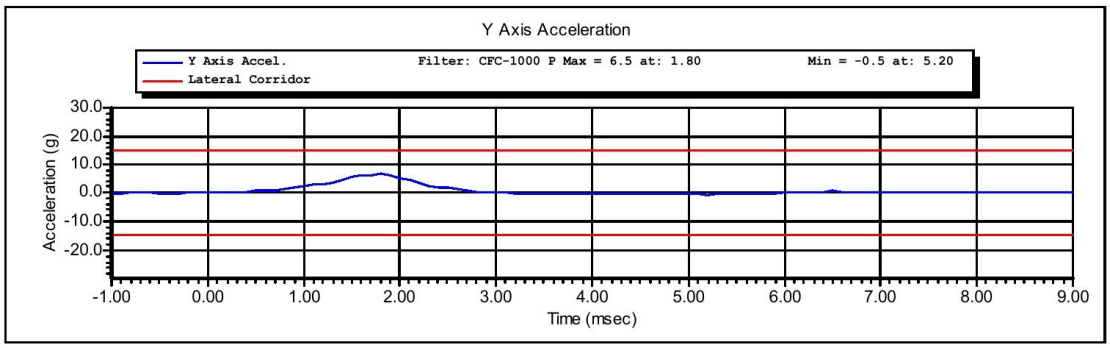
Test Name:	**Head Drop**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**8:47:22 AM**

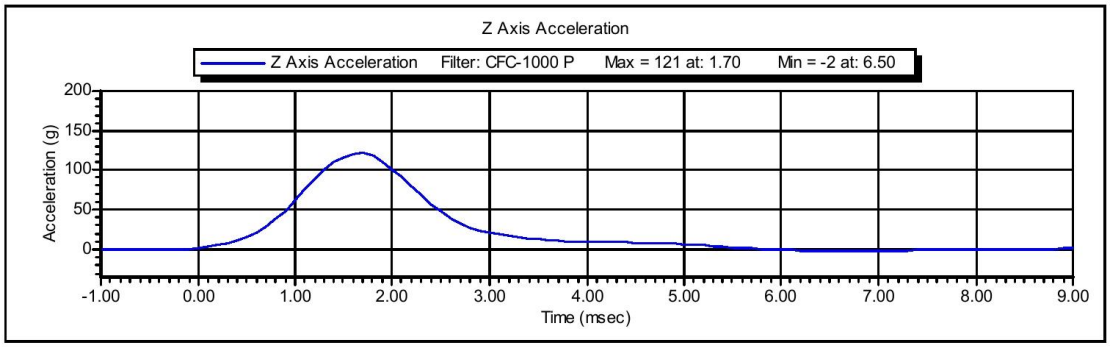


Test Time: **8:47:22 AM** Test Date: **10/1/2012**

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Test Time: **8:47:22 AM** Test Date: **10/1/2012**

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VERIFICATION REPORT

Test Name:	**Neck Flexion**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**10/1/2012**
Test Number:	**3**	Test Time:	**2:14:17 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**4194**
Front Nodding Block - 78051-351	**1797**
Rear Nodding Block - 78051-351	**1799**
Head Skin - 78051-220	**02-20544**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.8**	deg C	P
Humidity		10	--	70	**45**	%RH	P
Velocity		6.89	--	7.13	**7.12**	m/s	P
Pendulum Deceleration at	10 ms	22.5	--	27.5	**24.0**	g	P
Pendulum Deceleration at	20 ms	17.6	--	22.6	**22.6**	g	P
Pendulum Deceleration at	30 ms	12.5	--	18.5	**18.0**	g	P
Max Pendulum Deceleration After	30 ms	0.0	--	29.0	**18.0**	g	P
Deceleration time to	5 g	34.0	--	42.0	**36.5**	ms	P
D Plane Rotation		-78.0	--	-64.0	**-74.8**	degrees	P
Time at max rotation		57.0	--	64.0	**61.9**	ms	P
Rotation Decay to Zero		113.0	--	128.0	**117.1**	ms	P
Moment about OC		88.1	--	108.4	**99.1**	Nm	P
Time at Max Moment		47.0	--	58.0	**47.3**	ms	P
Moment Decay to Zero		97.0	--	107.0	**99.3**	ms	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **2:14:17 PM** Test Date: **10/1/2012**

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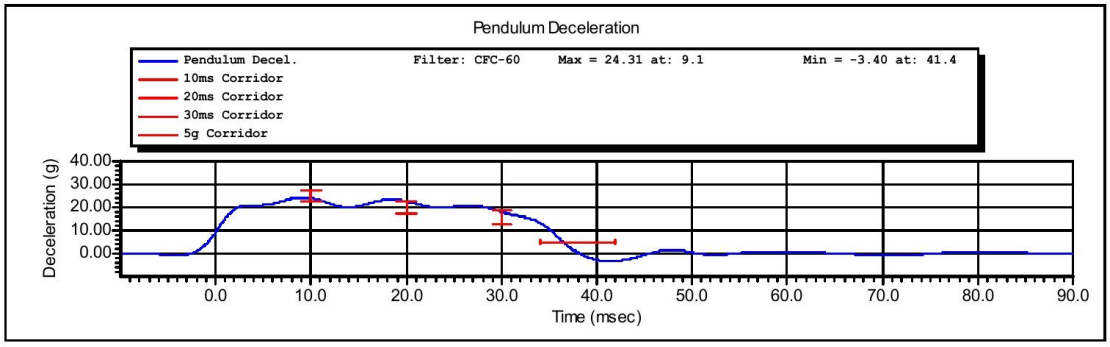
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**8/15/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**IF-205**	**LC-175 My**	**5/21/2012**
Denton	**1716A**	**LC-130 Fx**	**6/5/2012**

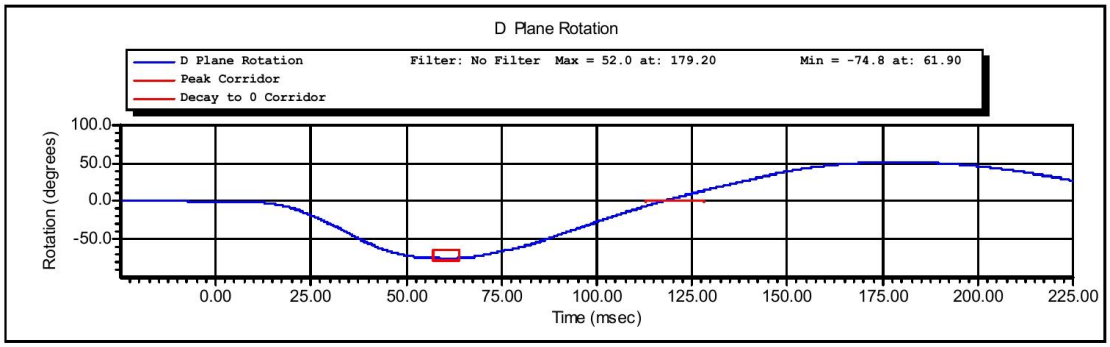
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Name of Test:	**Neck Flexion**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
ID of Test:		Date:	**10/1/2012**
Number of Test:	**3**	Time of Test:	**2:14:17 PM**

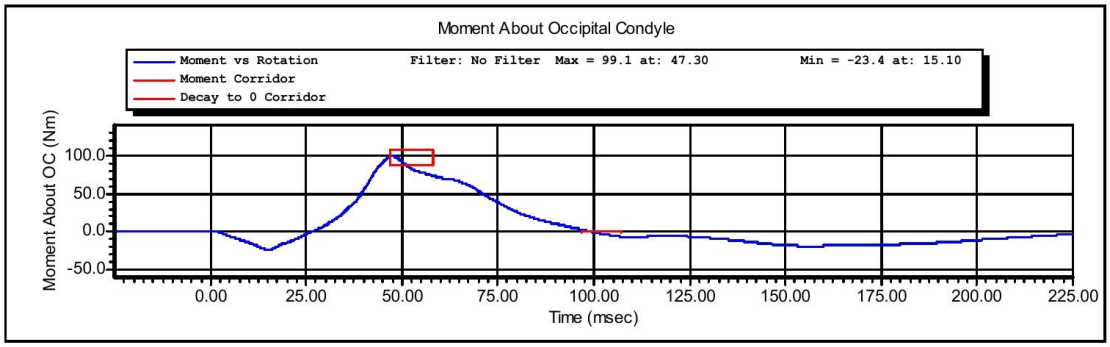




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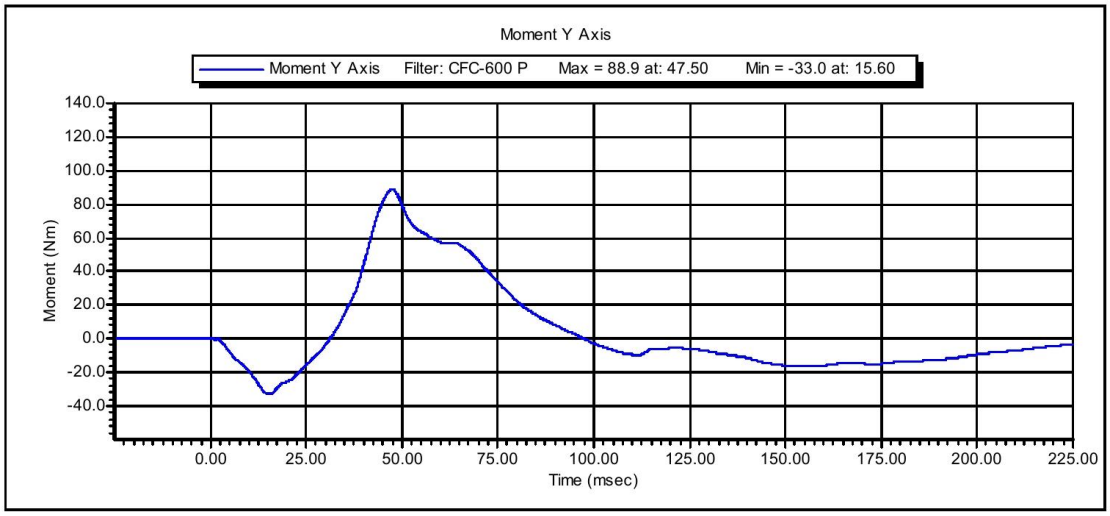
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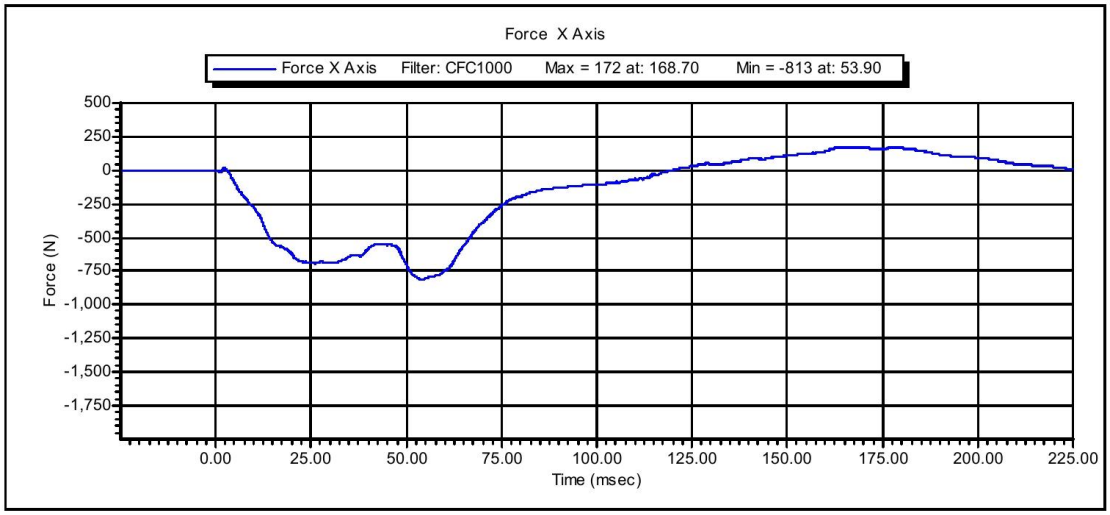
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Time of Test: **2:14:17 PM** Date of Test: **10/1/2012**

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VERIFICATION REPORT

Test Name:	**Neck Extension**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Neck Extension**	Test Date:	**10/1/2012**
Test Number:	**2**	Test Time:	**3:36:53 PM**

Component Part Number	Component Serial Number
Neck - 78051-336	**4194**
Front Nodding Block - 78051-351	**1797**
Rear Nodding Block - 78051-351	**1799**
Head Skin - 78051-220	**02-20544**

Test Parameters		Test Specifications			Test Results		
Temperature		20.6	--	22.2	**21.6**	deg C	P
Humidity		10	--	70	**44**	%RH	P
Velocity		5.94	--	6.19	**6.13**	m/s	P
Pendulum Deceleration at	10 ms	17.2	--	21.2	**19.0**	g	P
Pendulum Deceleration at	20 ms	14.0	--	19.0	**16.9**	g	P
Pendulum Deceleration at	30 ms	11.0	--	16.0	**13.5**	g	P
Max Pendulum Deceleration after	30 ms	0.0	--	22.0	**13.5**	g	P
Decel Time to	5 g	38.0	--	46.0	**41.7**	ms	P
D Plane Rotation		81.0	--	106.0	**98.3**	degrees	P
Time at Max Rotation		72.0	--	82.0	**77.1**	ms	P
Rotation Decay to Zero		147.0	--	174.0	**158.8**	ms	P
Moment About Occipital Condyle		-80.0	--	-52.9	**-67.5**	Nm	P
Time at Max Moment		65.0	--	79.0	**72.2**	ms	P
Moment Decay to Zero		120.0	--	148.0	**138.4**	ms	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **3:36:53 PM** Test Date: **10/1/2012**

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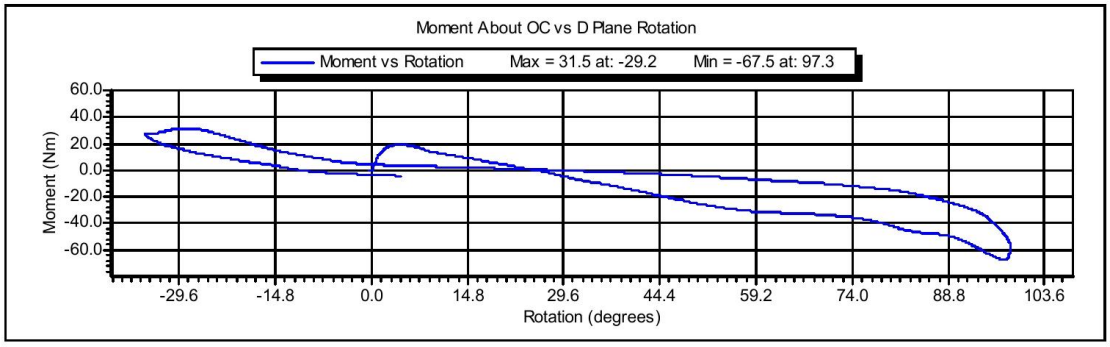
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**8/15/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**IF-205**	**LC-175 My**	**5/21/2012**
Denton	**IF-205**	**LC-175 Fx**	**5/21/2012**

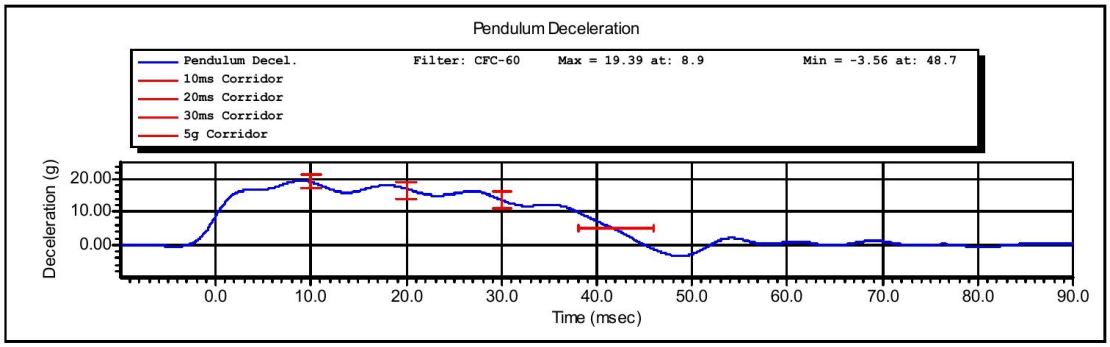
Test Time: **3:36:53 PM** Test Date: **10/1/2012**

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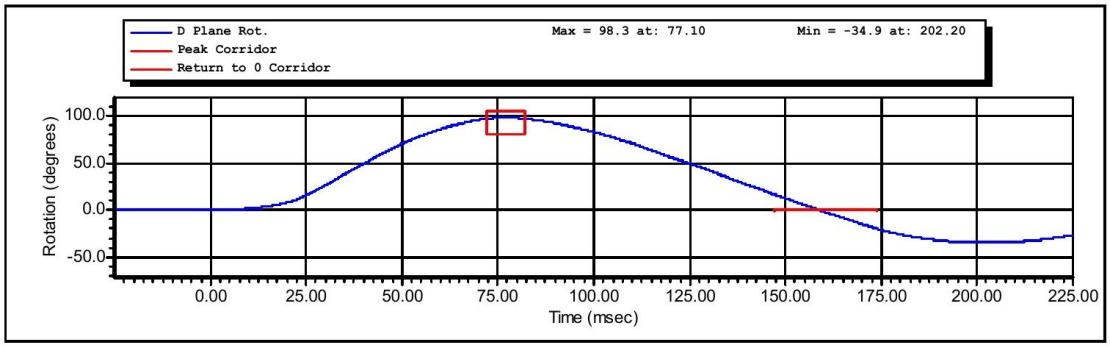
Name of Test:	**Neck Extension**	REVISION:	**10/1/2001**
Name of Sub Test:		Type of Spec:	**NHTSA**
Type of ATD:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
ID of Test:	**Neck Extension**	Date:	**10/1/2012**
Number of Test:	**2**	Time of Test:	**3:36:53 PM**

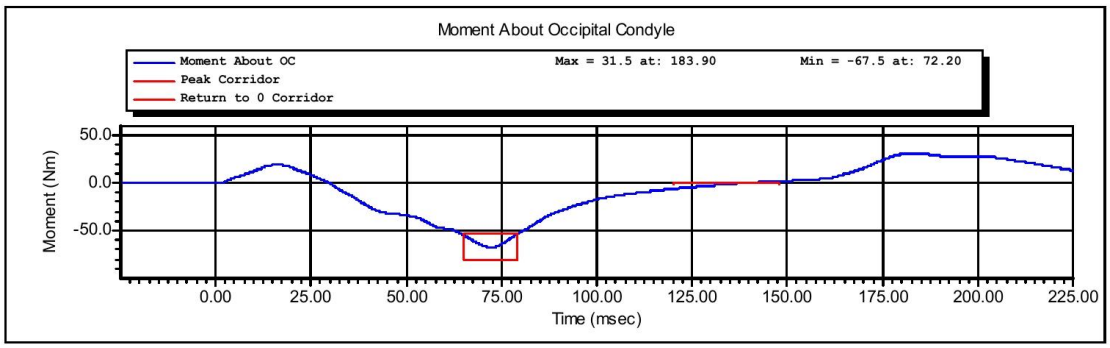




Time of Test: **3:36:53 PM** Date of Test: **10/1/2012**

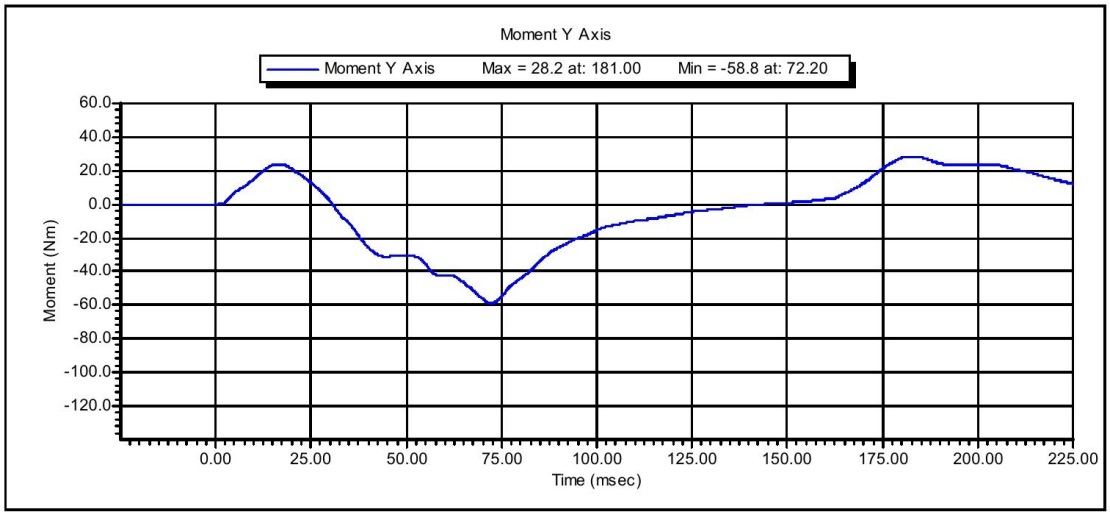
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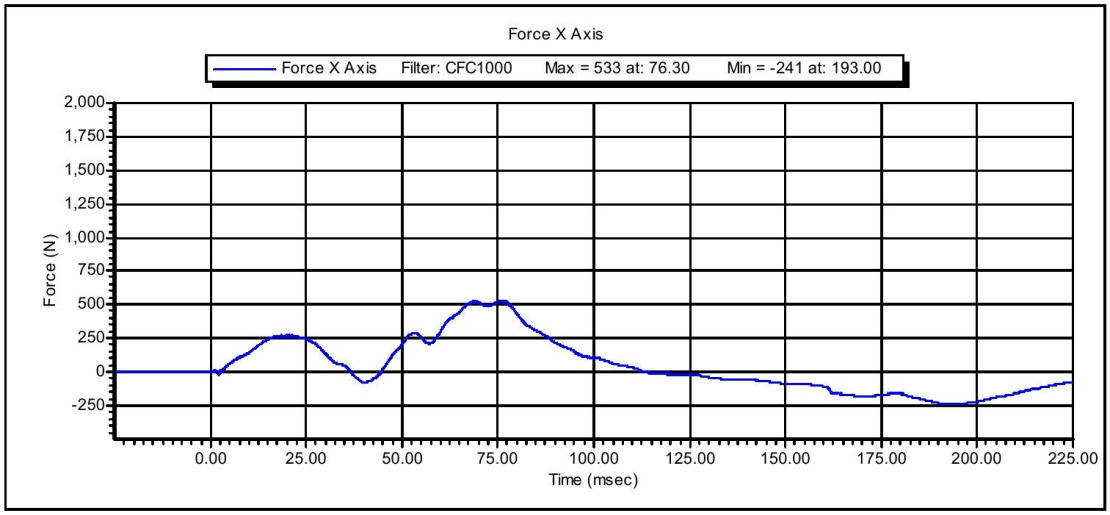




Time of Test: **3:36:53 PM** Date of Test: **10/1/2012**

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Time of Test: **3:36:53 PM** Date of Test: **10/1/2012**

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Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**9:29:03 AM**

Component Part Number	Component Serial Number
Chest Jacket - 78051-169	**2437**
Lumbar Spine - 78051-66	**555**

Test Parameters	Test Specifications			Test Results		
Temperature	20.6	--	22.2	**21.9**	deg C	P
Humidity	10.0	--	70.0	**46.0**	%RH	P
Velocity	6.59	--	6.83	**6.59**	m/s	P
Resistive Force	-5.894	--	-5.160	**-5.507**	kN	P
Sternum Displacement	-72.6	--	-63.5	**-69.6**	mm	P
Hysteresis	69	--	85	**72**	%	P

All test parameters are within specifications

Technician: **S. Zito**

Supervisor: **D. Travale**

Test Time: **9:29:03 AM** Test Date: **10/2/2012**

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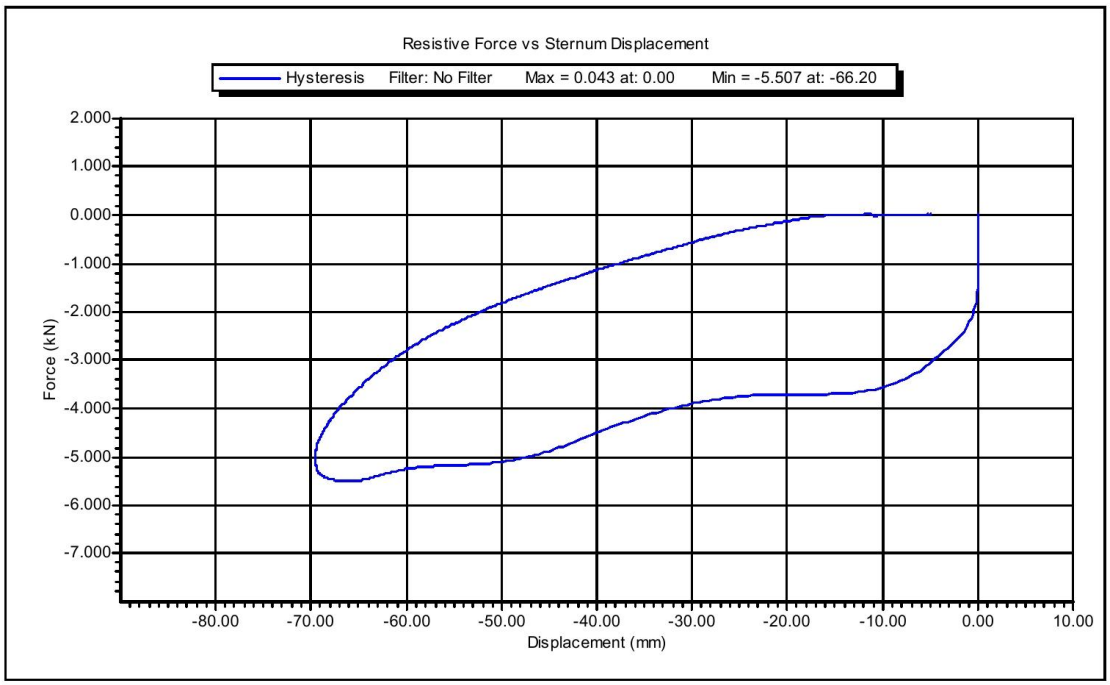
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C14953**	**5/25/2012**
DentonATD	**78051-342**	**DS-061**	**5/17/2012**

Test Time: **9:29:03 AM** Test Date: **10/2/2012**

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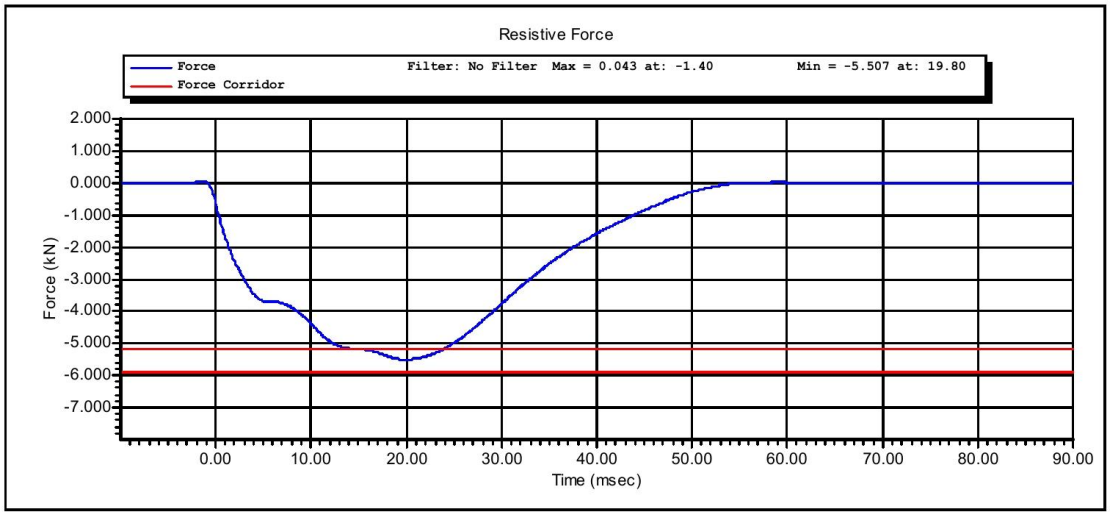
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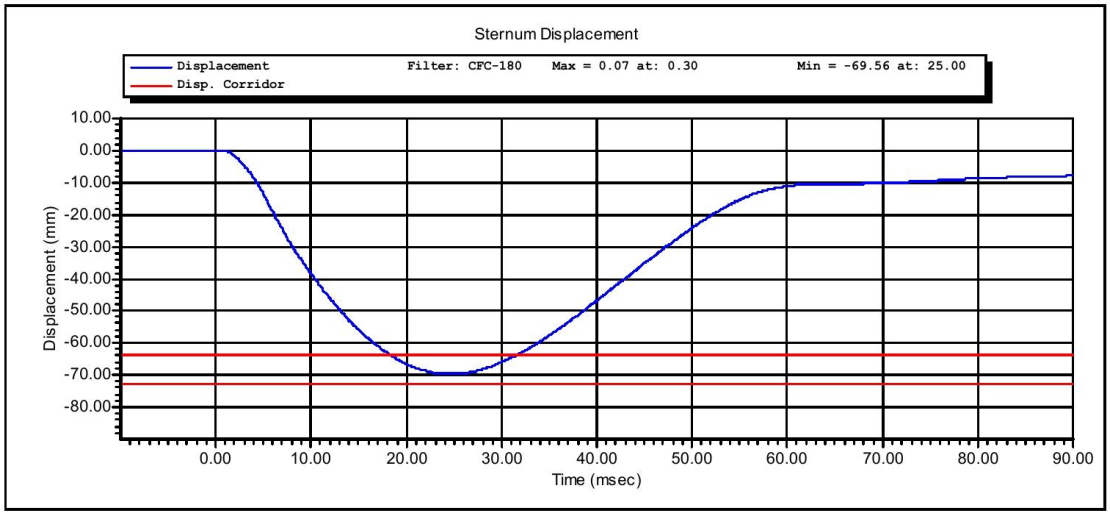
Test Name:	**Thorax Impact**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:		Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**9:29:03 AM**



Test Time: **9:29:03 AM** Test Date: **10/2/2012**

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Test Time: **9:29:03 AM** Test Date: **10/2/2012**

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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:	**061**		
Test ID:	**Knee Impact Left**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**2:19:02 PM**

Component Part Number	Component Serial Number
Knee Skin - 78051(L)	**3268**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**39.0**	%RH	P
Velocity	2.07	--	2.13	**2.13**	m/s	P
Resistive Force	-5.78	--	-4.72	**-5.25**	kN	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **2:19:02 PM** Test Date: **10/1/2012**

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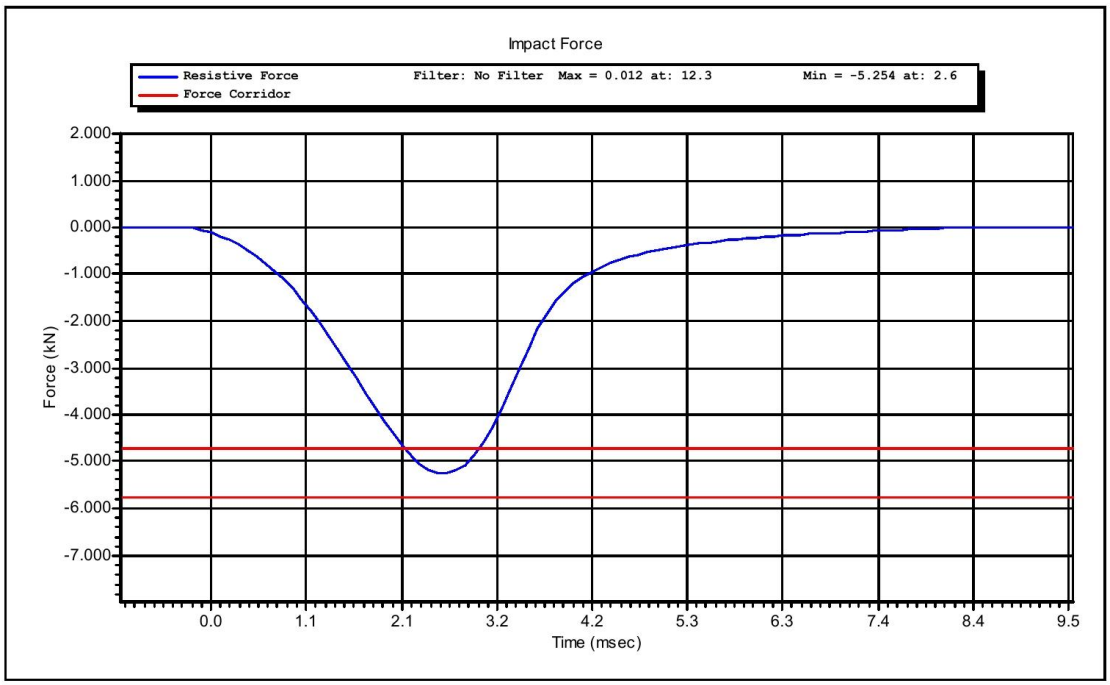
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**6/15/2012**

Test Time: **2:19:02 PM** Test Date: **10/1/2012**

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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:	**061**		
Test ID:	**Knee Impact Left**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**2:19:02 PM**



Test Time: **2:19:02 PM** Test Date: **10/1/2012**

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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:	**061**		
Test ID:	**Knee Impact Right**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**2:30:11 PM**

Component Part Number	Component Serial Number
Knee Skin - 78056(R)	**3158**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.0**	deg C	P
Humidity	10.0	--	70.0	**39.2**	%RH	P
Velocity	2.07	--	2.13	**2.11**	m/s	P
Resistive Force	-5.78	--	-4.72	**-5.27**	kN	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **2:30:11 PM** Test Date: **10/1/2012**

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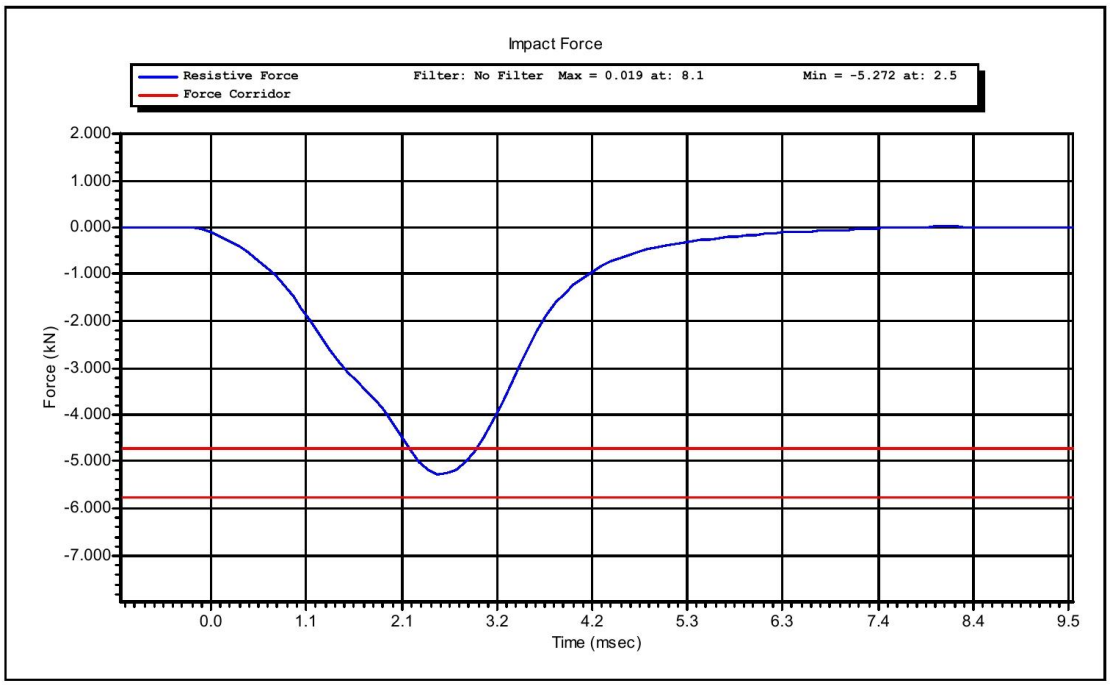
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**6/15/2012**

Test Time: **2:30:11 PM** Test Date: **10/1/2012**

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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:	**061**		
Test ID:	**Knee Impact Right**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**2:30:11 PM**



Test Time: **2:30:11 PM** Test Date: **10/1/2012**

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VERIFICATION REPORT

Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Hip ROM Left**	Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**2:17:35 PM**

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	**2398**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2** deg C		P
Humidity	10	--	70	**46** %RH		P
Average Velocity	5.0	--	10.0	**6.9** deg/s		P
Angle at 203 Nm	40.0	--	50.0	**40.3** degrees		P
Moment at 30 degrees	0.0	--	94.9	**80.6** Nm		P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **2:17:35 PM** Test Date: **10/2/2012**

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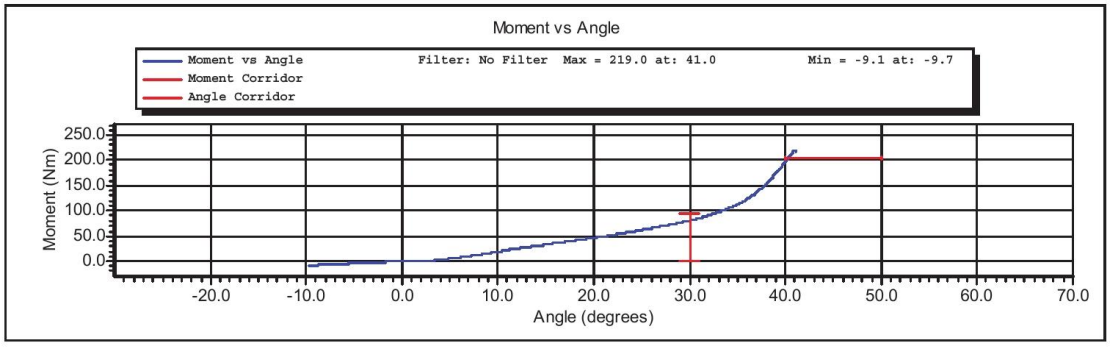
Manufacturer	Model	Serial Number	Calibration Date
Key	**2301-02**	**115**	**12/15/2011**
Transducers/PCB	**14CB1-3615**	**0008**	**3/16/2012**
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
DentonATD			

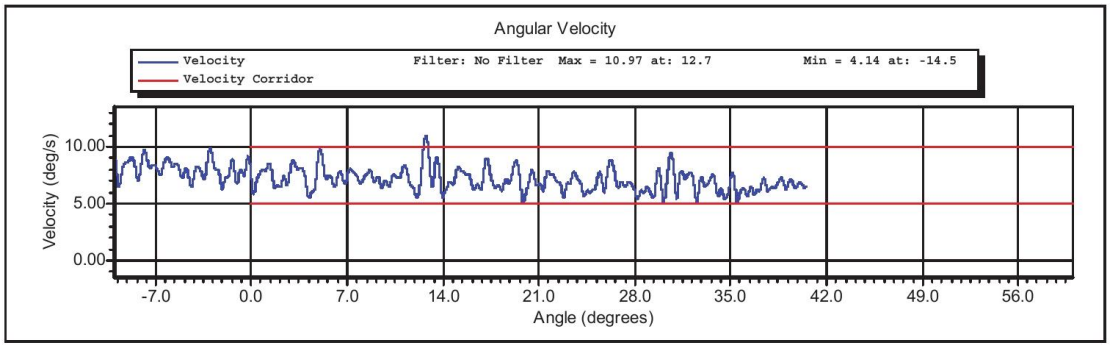
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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Hip ROM Left**	Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**2:17:35 PM**





Test Time: **2:17:35 PM** Test Date: **10/2/2012**

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VERIFICATION REPORT

Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Hip ROM Right**	Test Date:	**10/2/2012**
Test Number:	**2**	Test Time:	**1:35:34 PM**

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	**2398**

Test Parameters	Test Specifications			Test Results		
Temperature	18.9	--	25.6	**22.2** deg C		P
Humidity	10	--	70	**49** %RH		P
Average Velocity	5.0	--	10.0	**7.1** deg/s		P
Angle at 203 Nm	40.0	--	50.0	**40.0** degrees		P
Moment at 30 degrees	0.0	--	94.9	**83.8** Nm		P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **1:35:34 PM** Test Date: **10/2/2012**

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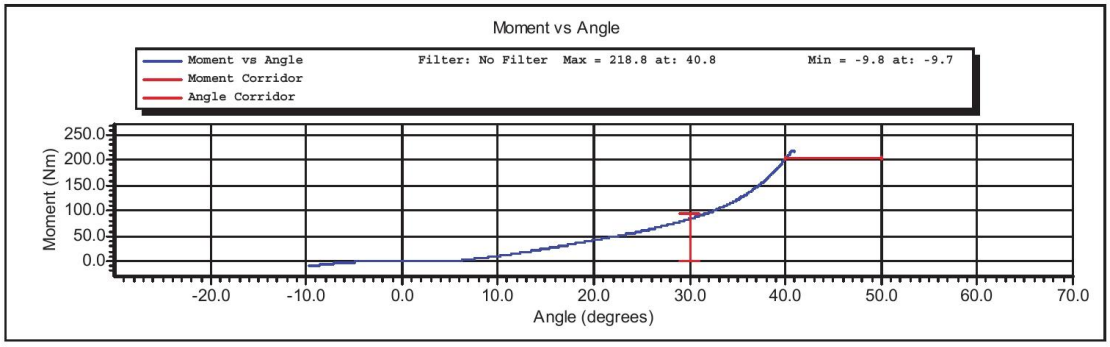
Manufacturer	Model	Serial Number	Calibration Date
Key	**2301-02**	**115**	**12/15/2011**
Transducers/PCB	**14CB1-3615**	**0008**	**3/16/2012**
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
DentonATD			

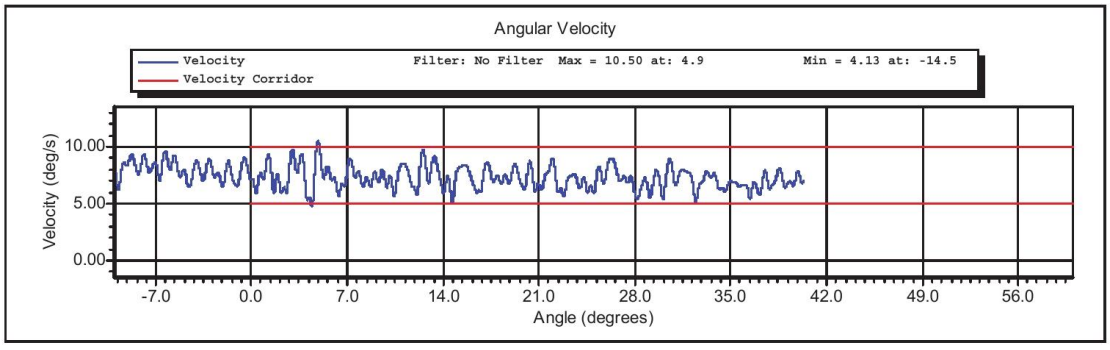
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Test Name:	**Hip Flexion (ROM)**	Revision:	**10/1/2001**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 50'th**		
ATD Serial Number:	**061**		
Test ID:	**Hip ROM Right**	Test Date:	**10/2/2012**
Test Number:	**2**	Test Time:	**1:35:34 PM**





Test Time: **1:35:34 PM** Test Date: **10/2/2012**

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 273

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External Measurements

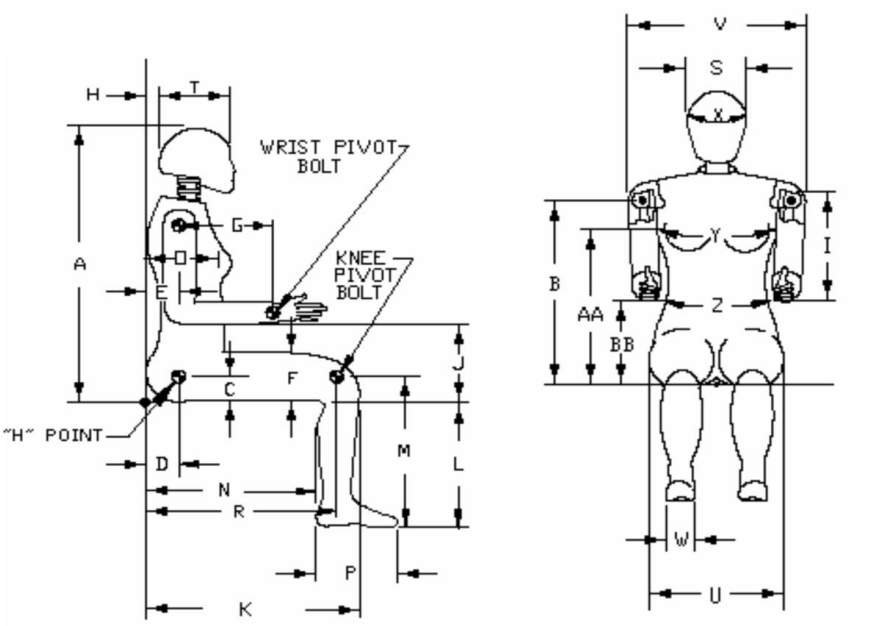
5th Female SN 273

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	452	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	286	Yes
J	Elbow Rest Height	182.8 – 203.2	194	Yes
K	Buttock to Knee Length	520.7 – 546.1	537	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	420	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	469	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	861	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: M. Goehle Date: 10/2/2012

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:	**Head Drop**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**3:17:02 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	**45**	%RH	P
Resultant Acceleration	250	--	300	**287**	g	P
Oscillation	0.0	--	10.0	**0.0**	%	P
Lateral Acceleration	-15.00	--	15.00	**1.56**	g	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **3:17:02 PM** Test Date: **10/1/2012**

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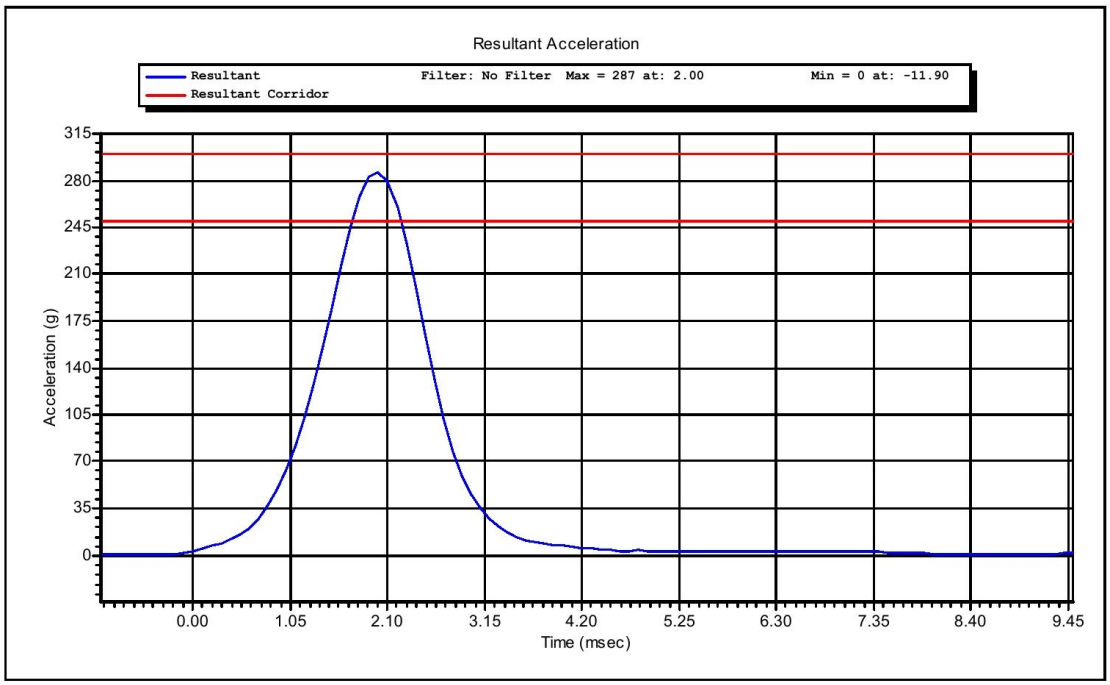
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Endevco	**7264-2000**	**P52054**	**5/15/2012**
Endevco	**7264-2000**	**P52007**	**5/15/2012**
Endevco	**7264-2000**	**P51298**	**5/15/2012**

Test Time: **3:17:02 PM** Test Date: **10/1/2012**

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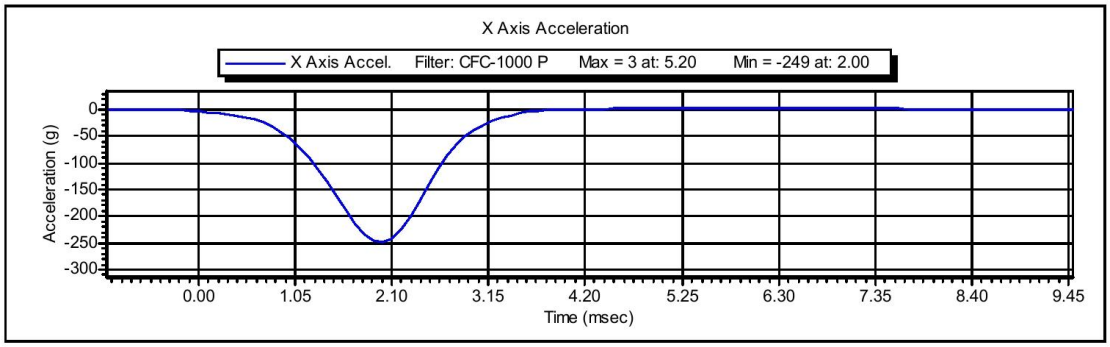
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Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:	**Head Drop**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**3:17:02 PM**

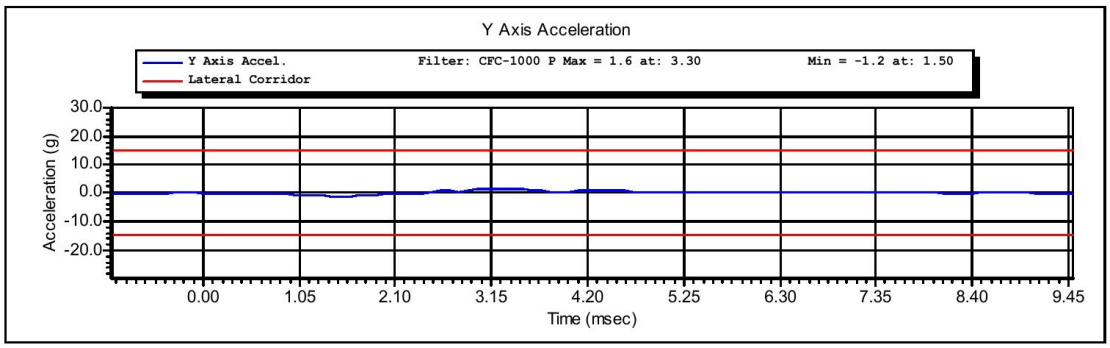


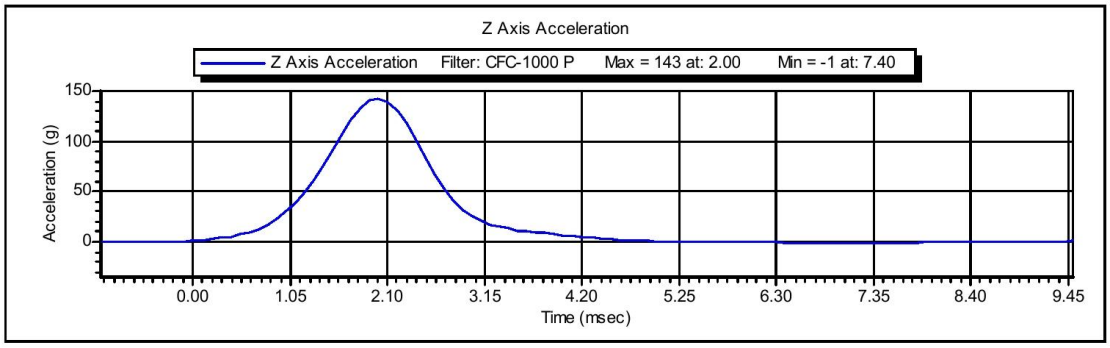
Test Time: **3:17:02 PM** Test Date: **10/1/2012**

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Test Time: **3:17:02 PM** Test Date: **10/1/2012**

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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:	**272**		
Test ID:	**Neck Flexion**	Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**8:31:16 AM**

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

Test Parameters	Test Specifications	Test Results	
Temperature	20.6 -- 22.2	**21.8** deg C	P
Humidity	10 -- 70	**49** %RH	P
Velocity	6.89 -- 7.13	**7.12** m/s	P
Pendulum Impulse at 10 ms	2.10 -- 2.50	**2.40** m/s	P
Pendulum Impulse at 20 ms	4.00 -- 5.00	**4.76** m/s	P
Pendulum Impulse at 30 ms	5.80 -- 7.00	**6.87** m/s	P
D Plane Rotation	-91.0 -- -77.0	**-80.8** degrees	P
Moment During Rotation Interval	69.0 -- 83.0	**69.6** Nm	P
Moment Decay to 10.0 Nm	80.0 -- 100.0	**84.3** ms	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **8:31:16 AM** Test Date: **10/2/2012**

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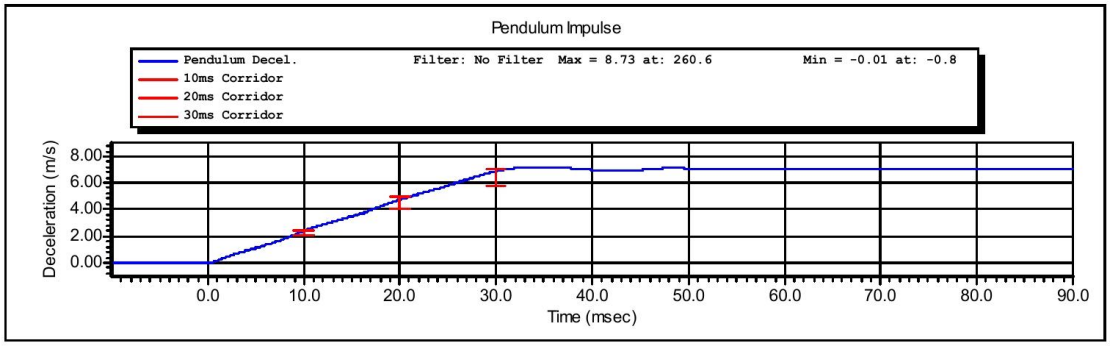
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**8/15/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**1716A**	**LC-1629 My**	**5/21/2012**
Denton	**1716A**	**LC-1629 Fx**	**5/21/2012**

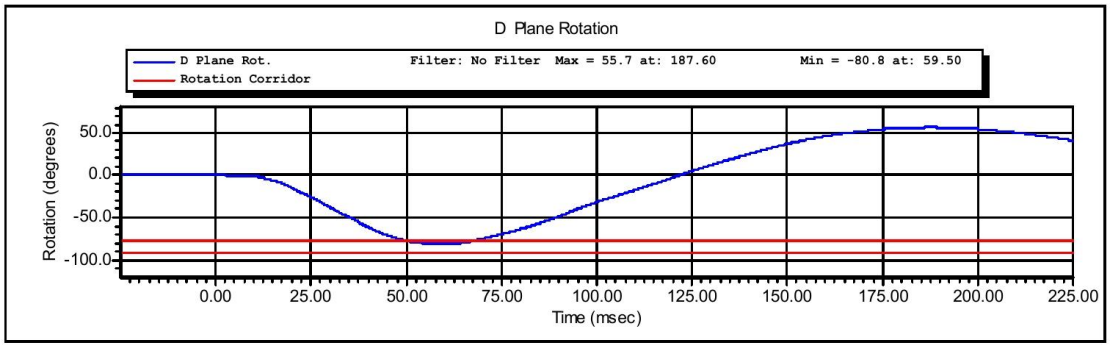
Test Time: **8:31:16 AM** Test Date: **10/2/2012**

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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:	**272**		
Test ID:	**Neck Flexion**	Test Date:	**10/2/2012**
Test Number:	**1**	Test Time:	**8:31:16 AM**

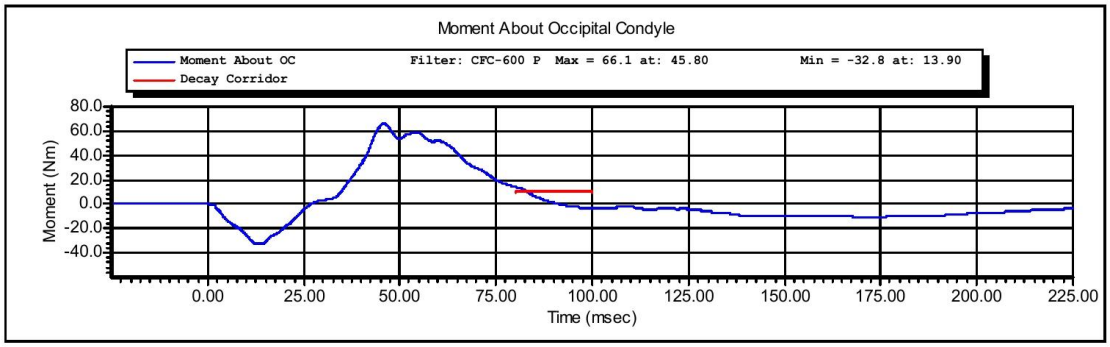




Test Time: **8:31:16 AM** Test Date: **10/2/2012**

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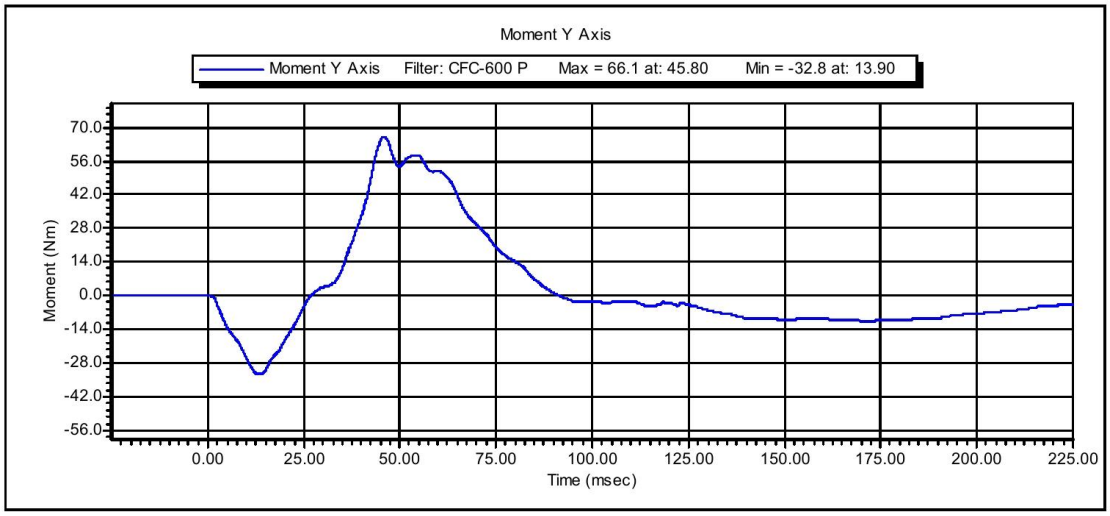
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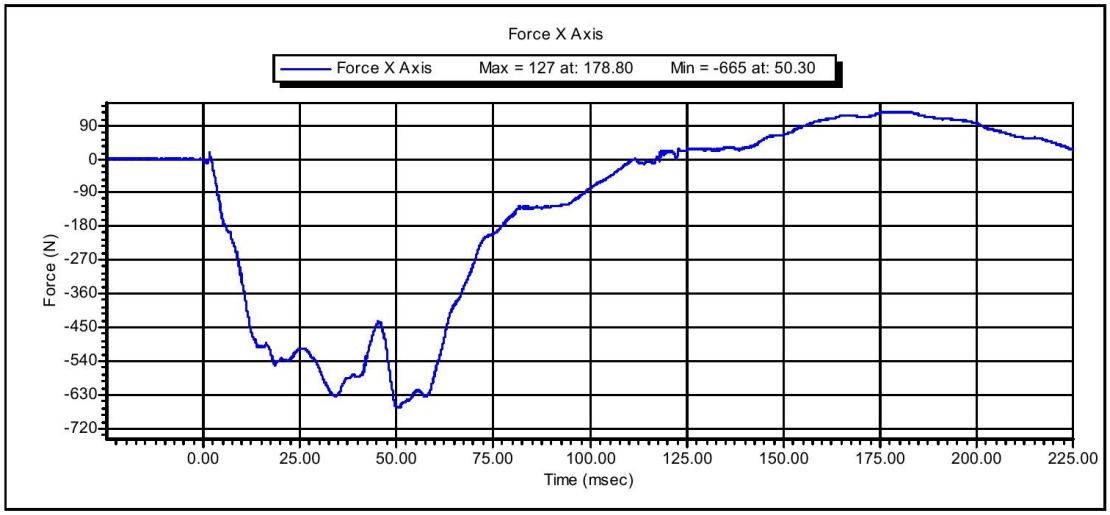


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VERIFICATION REPORT

Test Name:	**Neck Extension**	Revision:	**7/15/2002**
Sub Test Name:		Spec Type:	**NHTSA**
ATD Type:	**Hybrid III 5'th**		
ATD Serial Number:	**273**		
Test ID:	**Neck Extension**	Test Date:	**10/2/2012**
Test Number:	**2**	Test Time:	**9:25:24 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	**46** %RH	P
Velocity	5.95 -- 6.19	**6.14** m/s	P
Pendulum Impulse at 10 ms	1.50 -- 1.90	**1.84** m/s	P
Pendulum Impulse at 20 ms	3.10 -- 3.90	**3.75** m/s	P
Pendulum Impulse at 30 ms	4.60 -- 5.60	**5.60** m/s	P
D Plane Rotation	99.0 -- 114.0	**105.7** degrees	P
Moment During Rotation Interval	-65.0 -- -53.0	**-58.4** Nm	P
Moment Decay to -10.0 Nm	94.0 -- 114.0	**99.8** ms	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **9:25:24 AM** Test Date: **10/2/2012**

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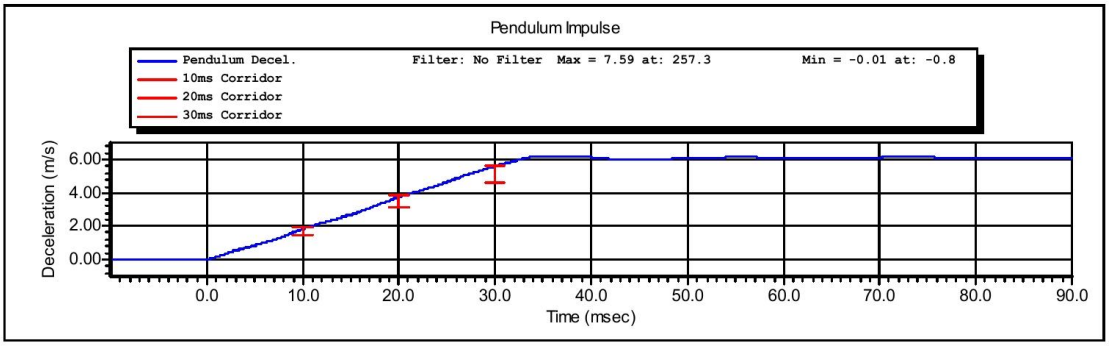
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C15016**	**8/15/2012**
DentonATD	**78051-342**	**PENDULUM POT**	**1/25/2012**
DentonATD	**78051-342**	**CONDYLE POT**	**1/25/2012**
Denton	**1716A**	**LC-1629 My**	**5/21/2012**
Denton	**1716A**	**LC-1629 Fx**	**5/21/2012**

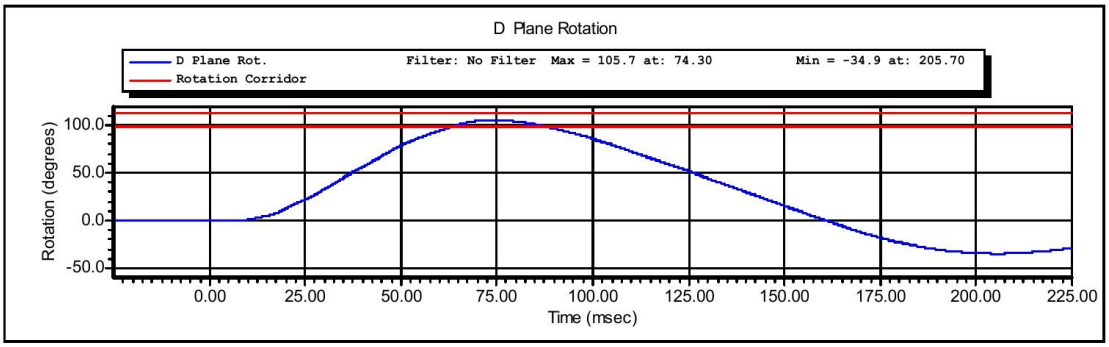
Test Time: **9:25:24 AM** Test Date: **10/2/2012**

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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:	**Neck Extension**	Test Date:	**10/2/2012**
Test Number:	**2**	Test Time:	**9:25:24 AM**

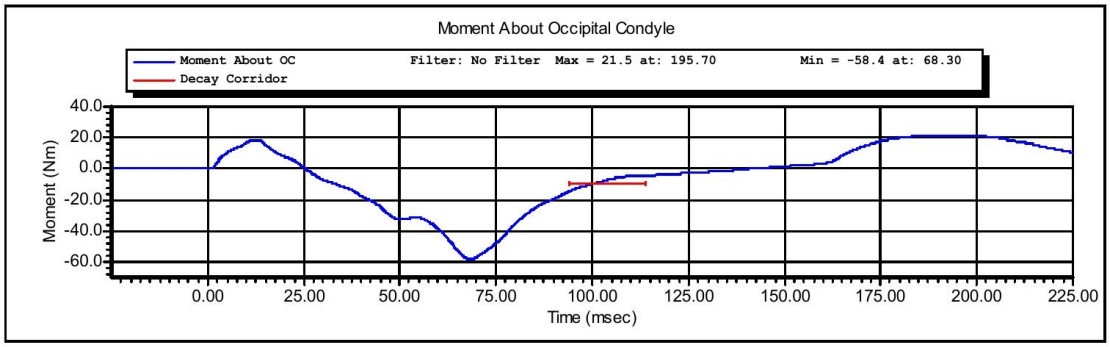




Test Time: **9:25:24 AM** Test Date: **10/2/2012**

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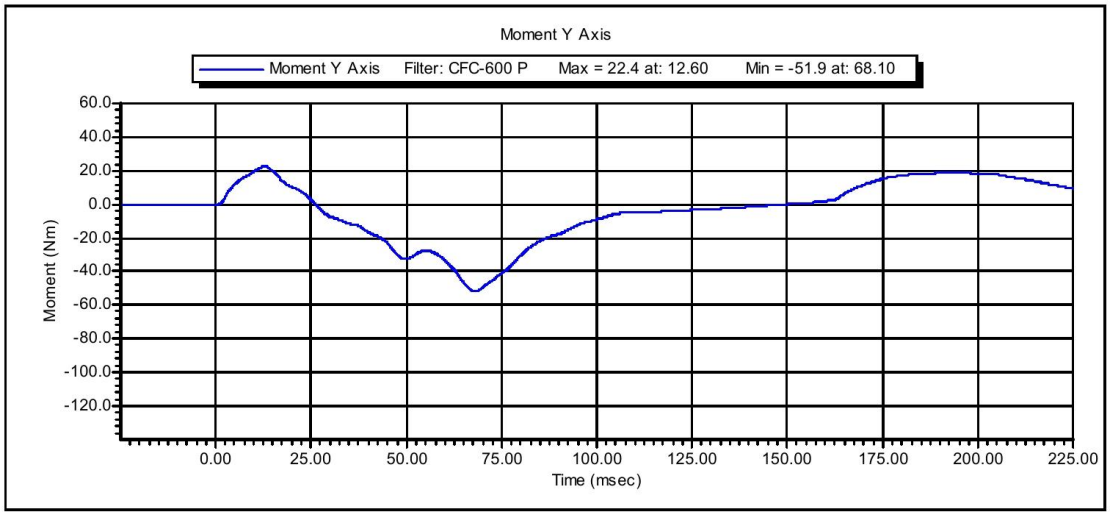
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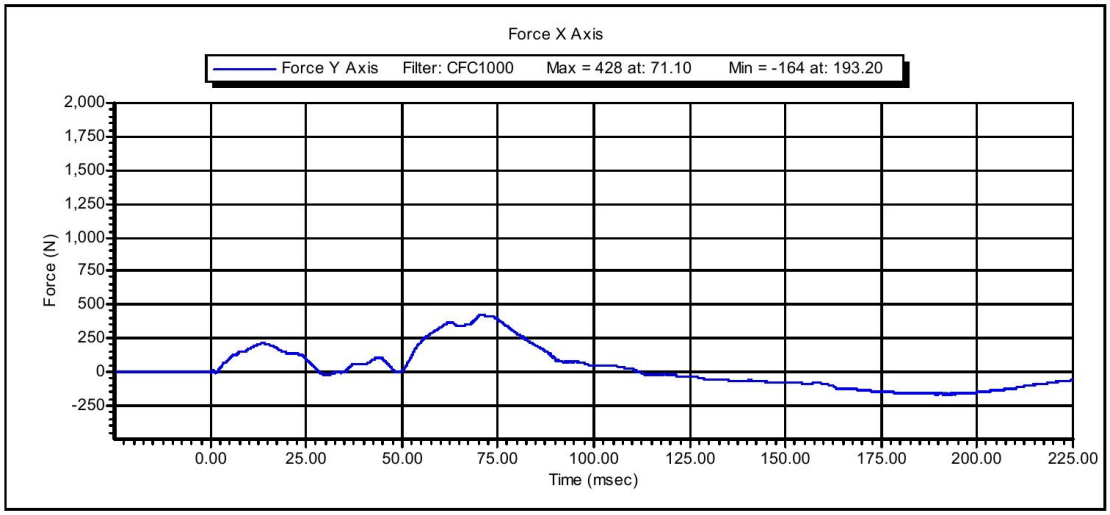


Test Time: **9:25:24 AM** Test Date: **10/2/2012**

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Test Time: **9:25:24 AM** Test Date: **10/2/2012**

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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:	**Thorax Impact**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**9:28:15 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	**21.6**	deg C	P
Humidity	10.0	--	70.0	**41.9**	%RH	P
Velocity	6.59	--	6.83	**6.63**	m/s	P
Sternum Displacement	-58.0	--	-50.0	**-53.7**	mm	P
Force During Displacement Interval	-4400	--	-3900	**-4115**	N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	**-4086**	N	P
Hysteresis	69	--	85	**71**	%	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **9:28:15 AM** Test Date: **10/1/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7231CT**	**C14953**	**5/25/2012**
DentonATD	**78051-342**	**DS-273**	**5/18/2012**

Test Time: **9:28:15 AM** Test Date: **10/1/2012**

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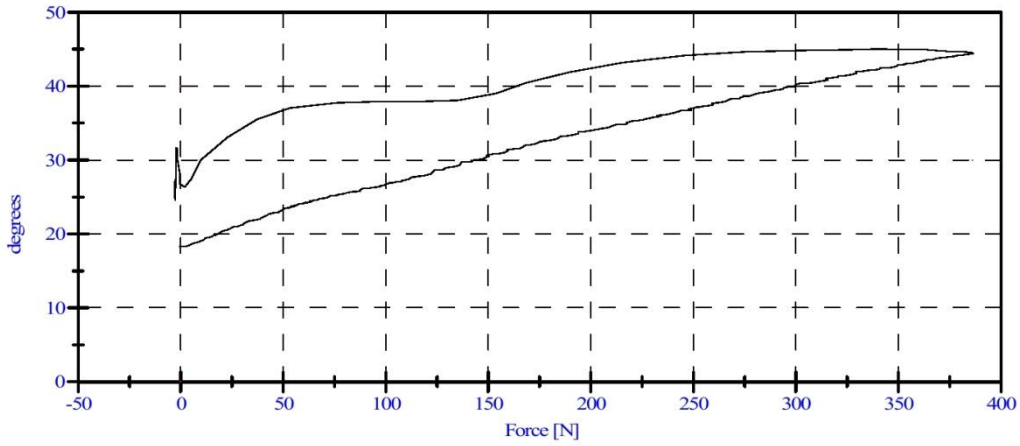
Torso Flexion
Pre-Test

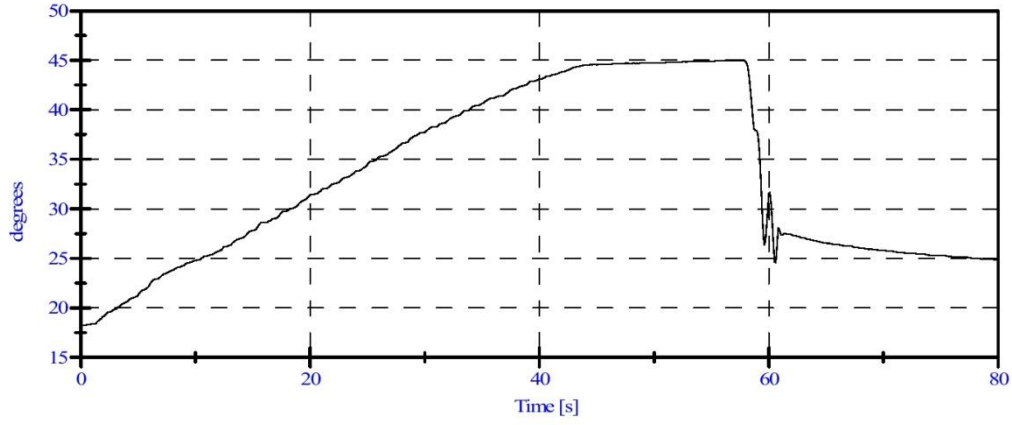
Part 572O HIII 5% Female

ATD Serial No: 273 Laboratory Supervisor D. Travale
Date: 10/2/2012 Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	22.0 C	Passed
Lab Humidity:	10-70 %	48.00 %	Passed
Initial Angle:	0.00-20.00 deg	18.27 deg	Passed
Force at 45 Deg	320.00-390.00 N	386.07 N	Passed
Return Angle	8 Deg Max from Initial	23.58 deg	Passed

LUMBAR SPINE FLEXION TEST





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

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:	**Knee Impact Left**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**12:05:36 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	**36.4** %RH	P
Velocity	2.07 -- 2.13	**2.09** m/s	P
Resistive Force	-4060 -- -3450	**-3895** N	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **12:05:36 PM** Test Date: **10/1/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

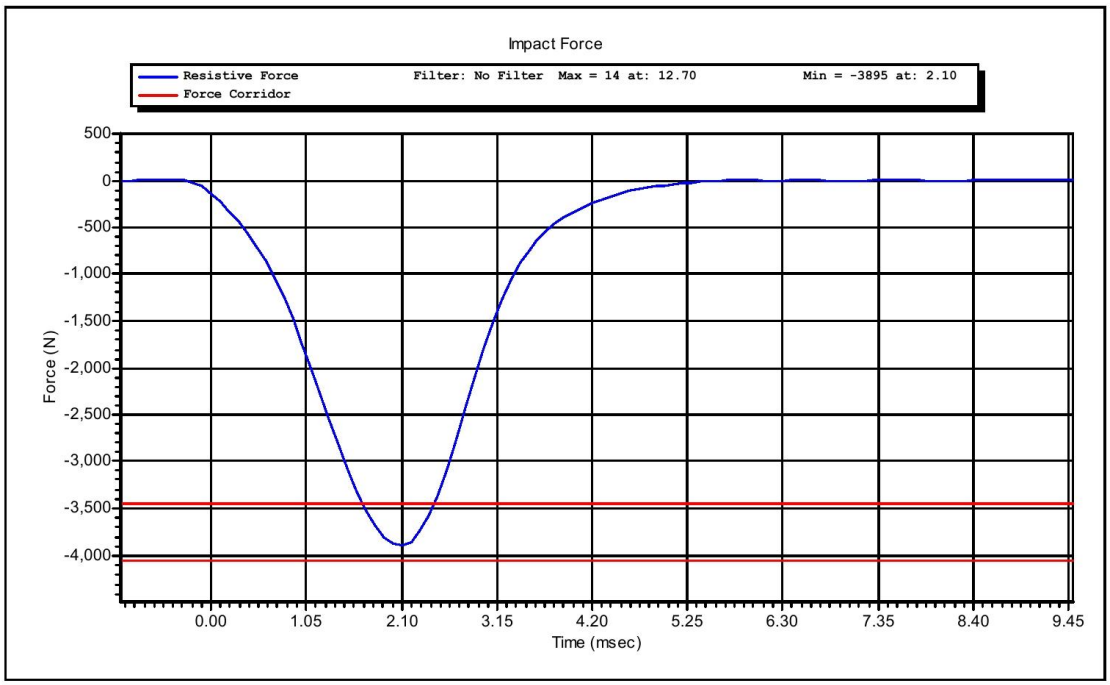
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**6/15/2012**

Test Time: **12:05:36 PM** Test Date: **10/1/2012**

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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:	**Knee Impact Left**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**12:05:36 PM**



Test Time: **12:05:36 PM** Test Date: **10/1/2012**

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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:	**Knee Impact Right**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**12:09:35 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	**36.4** %RH	P
Velocity	2.07 -- 2.13	**2.09** m/s	P
Resistive Force	-4060 -- -3450	**-3944** N	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **D. Travale**

Test Time: **12:09:35 PM** Test Date: **10/1/2012**

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VERIFICATION REPORT

REFERENCE EQUIPMENT

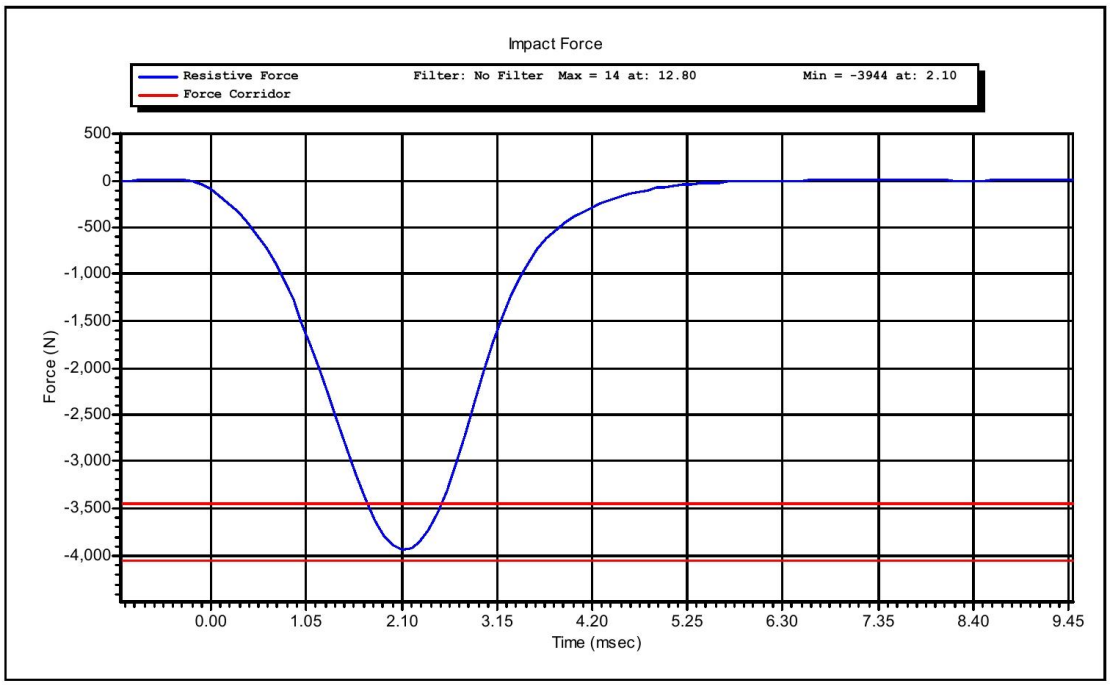
Manufacturer	Model	Serial Number	Calibration Date
DentonATD	**Velocity Trap**	**1**	**1/11/2012**
Endevco	**7264-2000**	**P66927**	**6/15/2012**

Test Time: **12:09:35 PM** Test Date: **10/1/2012**

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

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:	**Knee Impact Right**	Test Date:	**10/1/2012**
Test Number:	**1**	Test Time:	**12:09:35 PM**



Test Time: **12:09:35 PM** Test Date: **10/1/2012**

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Torso Flexion
Pre-Test

Part 572O HIII 5% Female

ATD Serial No: 273 Laboratory Supervisor D. Travale
Date: 10/2/2012 Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	22.0 C	Passed
Lab Humidity:	10-70 %	48.00 %	Passed
Initial Angle:	0.00-20.00 deg	18.27 deg	Passed
Force at 45 Deg	320.00-390.00 N	386.07 N	Passed
Return Angle	8 Deg Max from Initial	23.58 deg	Passed

LUMBAR SPINE FLEXION TEST

