

REPORT NUMBER: SNCAP-CAL-09-02

**VALIDATION
SIDE IMPACT POLE TEST**

**HYUNDAI MOTOR COMPANY
2010 HYUNDAI GENESIS
2-DOOR COUPE**

NHTSA NUMBER: MA0503

**PREPARED BY:
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Test Date: May 4,2009

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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9/16/09

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9/16/09

Technical Report Documentation Page

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16. Abstract A 31.2 km/h (19.5 mph), 75° oblique impact Validation Side Impact Pole Test was conducted on the subject 2010 Hyundai Genesis 2-door Coupe in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on May 4,2009. The impact velocity was 31.4 km/h, and the ambient temperature at the struck (driver's) side of the vehicle was 21°C. The test vehicle post-test maximum crush was 417 mm at level 3. The test vehicle's occupant performance is as follows: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: left;">Units</th> <th style="text-align: left;">Driver ATD (SID-IIs) Threshold</th> <th style="text-align: left;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>216.9</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>44.03</td> </tr> <tr> <td>Combined Ace tabular and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>2800.35</td> </tr> </tbody> </table> The driver door on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite door did not open during the side impact event.				Measurement Description	Units	Driver ATD (SID-IIs) Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	216.9	Resultant Lower Spine Acceleration	Gs	82	44.03	Combined Ace tabular and Iliac Pelvic Force	N	5525	2800.35
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17. Key Words Validation Test Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave. SE Washington, D.C. 20590																	
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side pole impact test was conducted as part of the FY 2010 Validation Side Impact Pole Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-22005. The purpose of this test is to generate comparative side impact performance in a 2010 Hyundai Genesis 2-door Coupe manufactured by Hyundai Motor Company. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated April 2009.

SECTION 2

SUMMARY OF VALIDATION SIDE POLE IMPACT TEST

A rigid pole side impact test was conducted on a 2010 Hyundai Genesis 2-door Coupe. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.4 km/h. The test was conducted by Calspan Corporation Transportation Research Group on May 4, 2009. Pre-test and post test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated April, 2009. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) Dummy was instrumented accordingly:

- Head CG Triaxial Accelerometers
- Upper Neck Load Cells
- Shoulder Load Cell
- Thorax Upper, Middle, and Lower Rib Displacement Transducers
- Abdomen Upper and Lower Rib Displacement Transducers
- Acetabulum Load Cell
- Iliac Load Cell
- Lower Spine Triaxial Accelerometers

Appendix B contains the vehicle and dummy response data. A summary of the side impact configuration and performance verification test data is shown in Appendix C. Dummy and vehicle instrumentation calibration data can be found in Appendix D of this report.

The following table summarizes the results of the test:

Dummy	HIC(38ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)
SID-IIs 5 th percentile female	216.9	44.03	Public Sym. = 1693.6
			Acetabular = 1111.0
			Sum = 2800.35

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	NA	NA
Knee Airbag	NA	NA	NA	NA
Side Torso Airbag	Yes	Yes	NA	NA
Combination Head/Torso Side Airbag	NA	NA	NA	NA
Curtain/Tube Side Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	NA	NA	NA	NA
Seat Belt Load Limiter	Yes	No	No	No

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

TEST VEHICLE INFORMATION AND VEHICLE OPTIONS

NHTSA No.	MA0503	Anti-Lock Brakes	Yes
Model Year	2010	All-Wheel Drive	No
Make	Hyundai	Power Steering	Yes
Model	Genesis	Driver Front Airbag	Yes
Body Style	2-door Coupe	Driver Side Airbag	Yes
VIN	KMHHT6KD2AU005266	Driver Head / Torso Airbag	No
Body Color	White	Driver Curtain Airbag	Yes
Delivery Date	4/10/09	Driver Knee Bag	No
Odometer Reading (km/mi)	126 km/78 miles	Pass. Front Airbag	Yes
Dealer	Towne Hyundai	Pass. Head / Torso Airbag	No
Transmission	Automatic 5 speed	Pass. Side Airbag	Yes
Final Drive	Rear	Pass. Curtain Airbag	Yes
Type/No. Cylinders	4	Pass. Knee Bag	No
Engine Displacement (L)	2.0	Pretensioners	Yes
Engine Placement	Lateral	Load Limiters	Yes
Roof Rack	No	Air Conditioning	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	Yes	Tilting Steering	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	No
Rear Disc	Yes	Other	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Company	GVWR (kg)	1930
Date of Manufacture	1/2009	GAWR Front (kg)	1000
		GAWR Rear (kg)	1050

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	4
Vehicle Capacity Weight (VCW) (kg)	322			
DSC X 68.04 kg	272			
Rated Cargo and Luggage Weight (RCLW) (kg)	50			

(A)

(B)

(A-B)

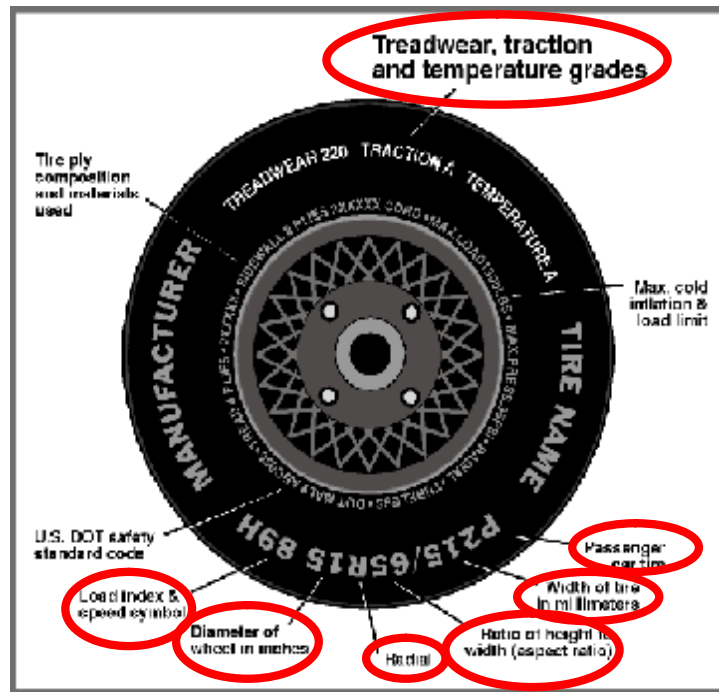
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X	-	-		-	X	-
Rear or Second Row Seat	-	-	X	X	X	-	-
Third row seat	NA	NA	NA	NA	NA	NA	NA

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009



Measured Parameter	Front	Rear
Maximum Tire Pressure	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P225/45R18	P225/45R18
Tire Size on Vehicle	P225/45R18	P225/45R18
Tire Model	Potenza	Potenza
Tire Manufacturer	Bridgestone	Bridgestone
Treadwear	NA	NA
Traction	NA	NA
Temperature Grades	NA	NA
Tire Plies Sidewall	NA	NA
Tire Plies Body	NA	NA
Load Index/Speed Symbol	91V	96V
Tire Material	NA	NA
DOT Safety Code Right	NA	NA
DOT Safety Code Left	NA	NA

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2010 Hyundai Genesis	NHTSA No.	MA0503
Test Program:	NCAP Side Pole Impact	Test Date:	May 4, 2009

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			Fully Loaded (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	429.0	343.0		446.5	381.5		441	384	
Right	kg	419.0	344.0		428.5	372.0		422	381	
Ratio	%	55.2	44.8		53.7	46.3		53.0	47.0	
Totals	kg	848.0	687.0	1535.0	875.0	753.5	1628.5	863.0	765.0	1628.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1535	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	51	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	50	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1636	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.6	-0.6	-0.6
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.6	-0.6	-0.6
Front Bumper Angle (left-to-right)**	Deg.	0.0	+0.1	+0.2
Rear Bumper Angle (left-to-right)**	Deg.	+0.2	+0.2	+0.2
Vehicle CG (Aft of Front Axle)	mm	1262	1326	1305
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	4.7	10.9	13.6

* Front up is positive

** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	13
Weight of Vehicle Components Removed	kg	0

Vehicle parts removed to make Target Vehicle Test Weight:

None

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1408
Actual Impact Point (Aft of Front Axle)	mm	1398
Impact Point Difference	mm	10

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

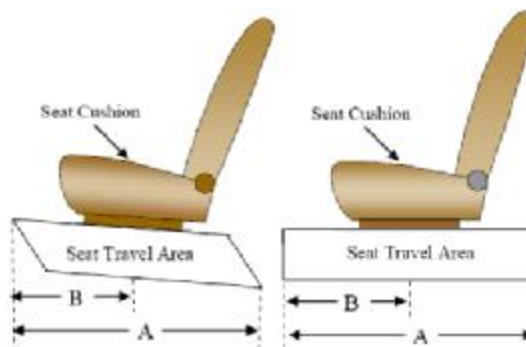
SEAT FORE/AFT POSITIONS

Describe the fore/aft and vertical operation of the driver's seat and explain the method used to determine how the seat was set to the forward-most, mid-height position.

Full forward to full down – placed seat in full forward with seat in mid range height.

Describe the fore/aft and vertical operation of the rear passenger's seat and explain the method used to determine how the seat was set to the rear-most, lowest position.

Full forward to full down – placed mechanical middle



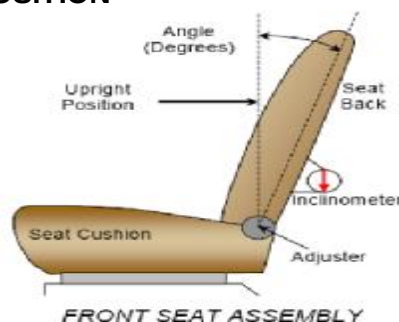
SEAT FORE/AFT POSITION

	Total Fore/Aft Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat	248	0
Front Passenger Seat	220	0
Rear Seat – Struck Side	Fixed	NA
Rear-Seat – Non-Struck Side	Fixed	NA

SEAT BACK ANGLE POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows:

Measured 3.2 degrees from seat head restraint post, with dummy in seat.



SEAT BACK ANGLE

	Degrees	Detent
Driver Seat Back Angle with Seated Dummy	3.2	-
Front Passenger Seat Back Angle	3.2	-
Struck Side Rear Seat Back Angle	NA	NA
Non-Struck Side Rear Passenger Seat Back Angle	NA	NA

SEAT BACK UPPER POSITION

Describe the method of positioning seat belt upper anchorages.
None

SEAT BELT UPPER ANCHORAGE POSITIONING

	Total # of Positions	Placed in Position #
Driver Seat	Fixed	NA
Front Passenger Seat	Fixed	NA

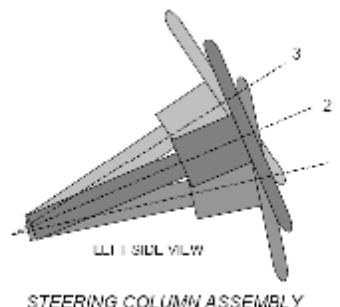
DATA SHEET NO. 2(CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2010 Hyundai Genesis 2-door Coupe NHTSA No. MA0503
 Test Program: Validation Side Impact Pole Impact Test Test Date: May 4, 2009

STEERING COLUMN ADJUSTMENTS

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



Located full up angle, located full down angle and placed in geometric center.

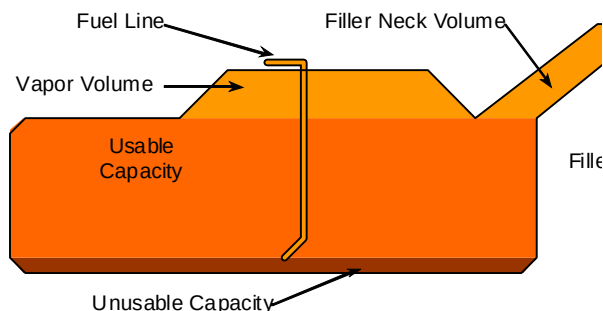
STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost, Position No. 1	71.8	-
Geometric Center, Position No. 2	69.6	-
Uppermost, Position No. 3	67.4	-
Telescoping Steering Wheel Travel	-	NA
Test Position	-	NA

FUEL PUMP

Describe the fuel pump type, details about how it operations, and the location of the fuel filter neck.

Fuel filler on left side centered over rear axle. Fuel tank is centered forward of rear axle. Fuel lines run along left frame rail.



VEHICLE FUEL TANK ASSEMBLY

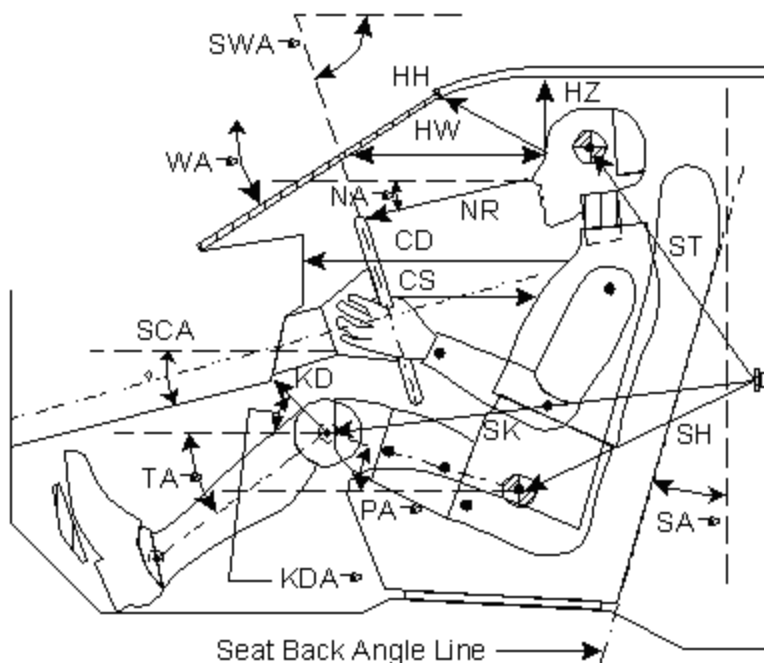
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	64.35
Usable Capacity of "Optional Tank"	NA
Usable Capacity of Standard Tank as Specified in Owner's Manual	64.35
Usable Capacity of Optional Tank as Specified in Owner's Manual	NA
92-94% of Usable Capacity	59.2 – 60.5
Actual Amount of Solvent Used	59.8
1/3 of Usable Capacity	21.45

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009



DUMMY ID# 300

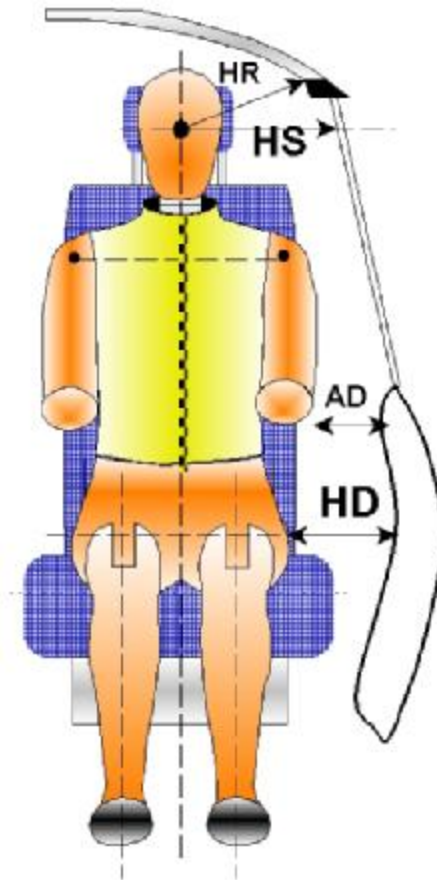
Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	275	
HW	Head to Windshield	556	
HZ	Head to Roof	185	
NR	Nose to Rim	238	
CD	Chest to Dash	411	
CS	Chest to Steering Wheel	182	
KDL/KDAL	Left Knee to Dash	155	27
KDR/KDAR	Right Knee to Dash	122	24
PA~	Pelvic Angle		19.2
PHX	H-Point to Striker (X-Axis)	635	
PHZ	H-Point to Striker (Z-Axis)	282	
SA	Seat Back Angle		3.2 *

* Measured from head restraint post

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009



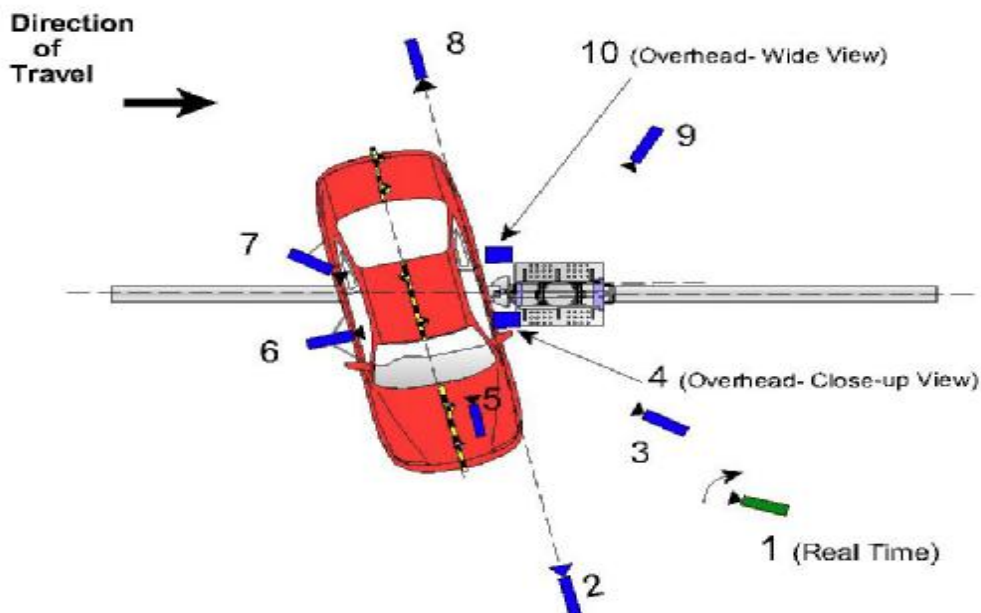
DUMMY ID# 300

Code	Measurement Description	Length (mm)
HR	Head To Side Header	262
HS	Head to Side Window	397
AD	Arm to Door	161
HD	H-Point to Door	181

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009



REFERENCE (from Point of Image for X and Y; ground for Z):
 + X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real time (24 fps) film coverage of test	-	-	-	-	-
2	Front ground level - impact view	7121	0	964	1.7	1000
3	Impact side 45° - forward pole view	1131	1496	1984	27.1	1000
4	Overhead Close-up view of impact	390	180	4375	90	1000
5	Onboard – dummy front view	1381	545	1242	8.5	500
6	Onboard – dummy side view	459	1674	1021	4.7	500
7	Onboard – dummy rear view	393	1867	1126	3.9	500
8	Rear ground level – impact view	7363	409	953	3.4	1000
9	Impact side 45° - rearward pole view	2904	3727	1254	4.1	1000
10	Overhead wide-view of impact	970	180	4375	90	1000

* All measurements accurate to ± 6 mm.

NOTE: Vehicle was at a 15° angle to the rigid pole.

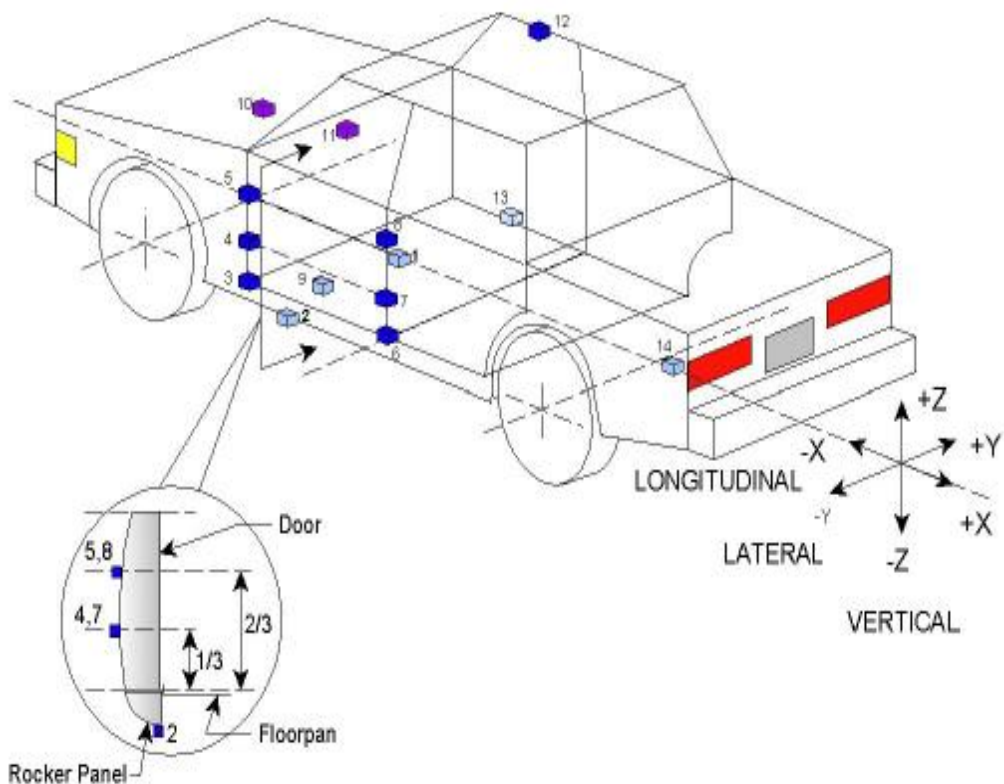
INSTRUMENTATION

	Number of Channels
Driver Dummy	25
Vehicle Structure	14
Pole Load Cells	0
Contact Switches	0
Total No. of Data Channels	21

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

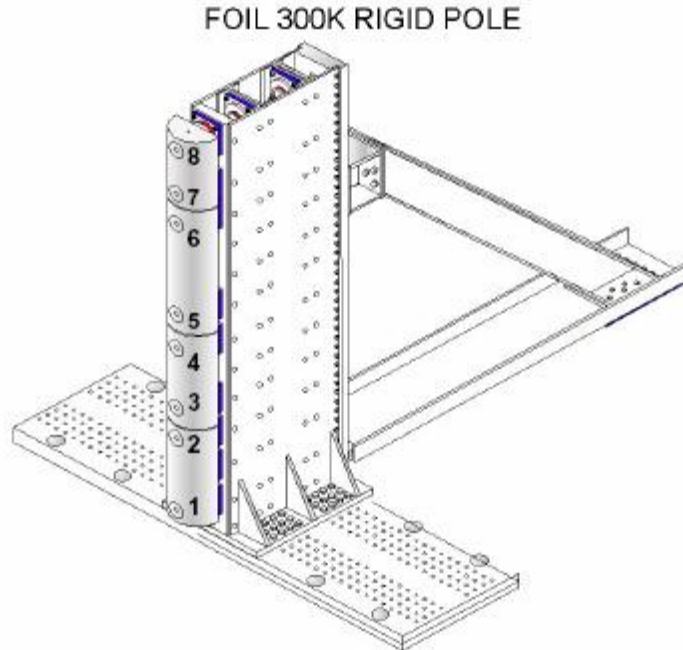


Accelerometer Location				
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG	2425	33	476
B	Left Floor Sill	2714	-691	317
C	A Pillar Sill	3054	-682	326
D	A Pillar Low	3111	-707	463
E	A Pillar Mid	3000	-687	958
F	B Pillar Sill	1848	-689	363
G	B Pillar Low	1843	-690	674
H	B Pillar Mid	1801	-685	960
I	Driver Seat	2327	-563	278
K	Engine Top	4043	-14	798
L	Firewall	3444	-48	720
M	Right Roof	2039	595	1357
N	Right Floor Sill	2105	712	335
O	Rear Floorpan	1170	54	503

DATA SHEET NO. 7

RIGID POLE LOAD DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
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LOAD CELL LOCATIONS

ID	Height from Ground (mm)
1	NA
2	NA
3	NA
4	NA
5	NA
6	NA
7	NA
8	NA

DATA SHEET NO. 8

POST TEST OBSERVATIONS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

TEST DUMMY INFORMATION AND CONTACT

Description	Driver Dummy
Dummy Type/Serial No.	SID IIs / 300
Head Contact	Curtain / Back of the head to head restraint
Upper Torso Contact	Side Airbag
Lower Torso Contact	Door Skin
Left Knee Contact	Door Skin
Right Knee Contact	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Jammed shut	NA
Right Side Door Opening	Closed and operational	NA
Hatch and Other Doors	Closed and operational	
Seat Movement	0	NA
Seat Back Failure	None	NA

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	OK
Sill Separation	None
Windshield Damage	Cracked on driver side only
Window Damage	Shattered upon impact
Other Notable Effects	-

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Installed	Deployed	Installed	Deployed
Front Airbag	YES	NO	NA	NA
Side Torso Airbag	YES	YES	NA	NA
Head Airbag	NA	NA	NA	NA
Head/Torso Side Airbag	NA	NA	NA	NA
Curtain Airbag	YES	YES	YES	YES
Seat Belt Pretensioner	YES	NO	NA	NA
Seat Belt Load Limiter	YES	NO	NA	NA

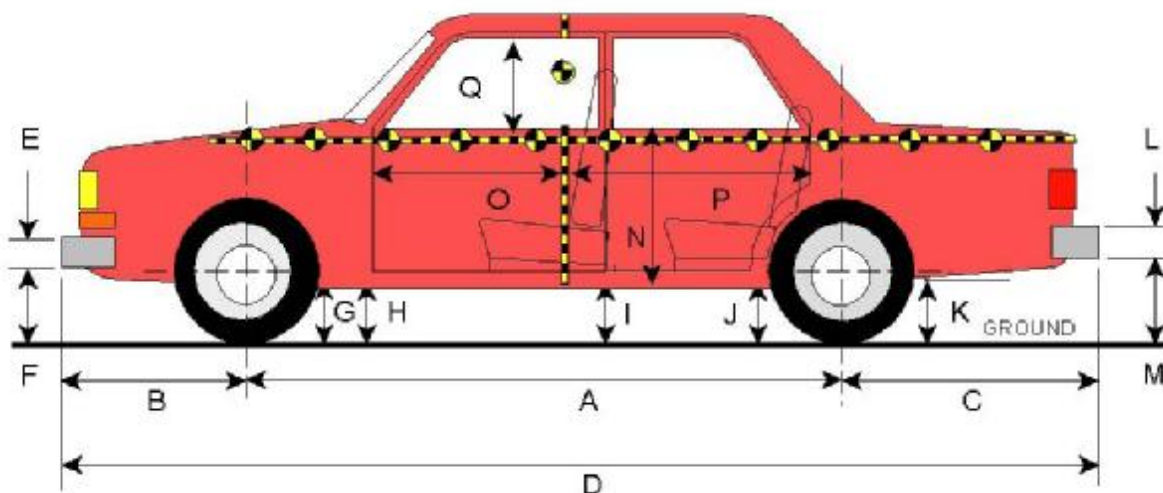
VEHICLE SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset from Vertical Impact Reference Line	mm	+/- 38	10
Trap No. 1 Velocity (Primary)	km/h	30.4 to 32.0	31.25
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 32.0	31.45

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

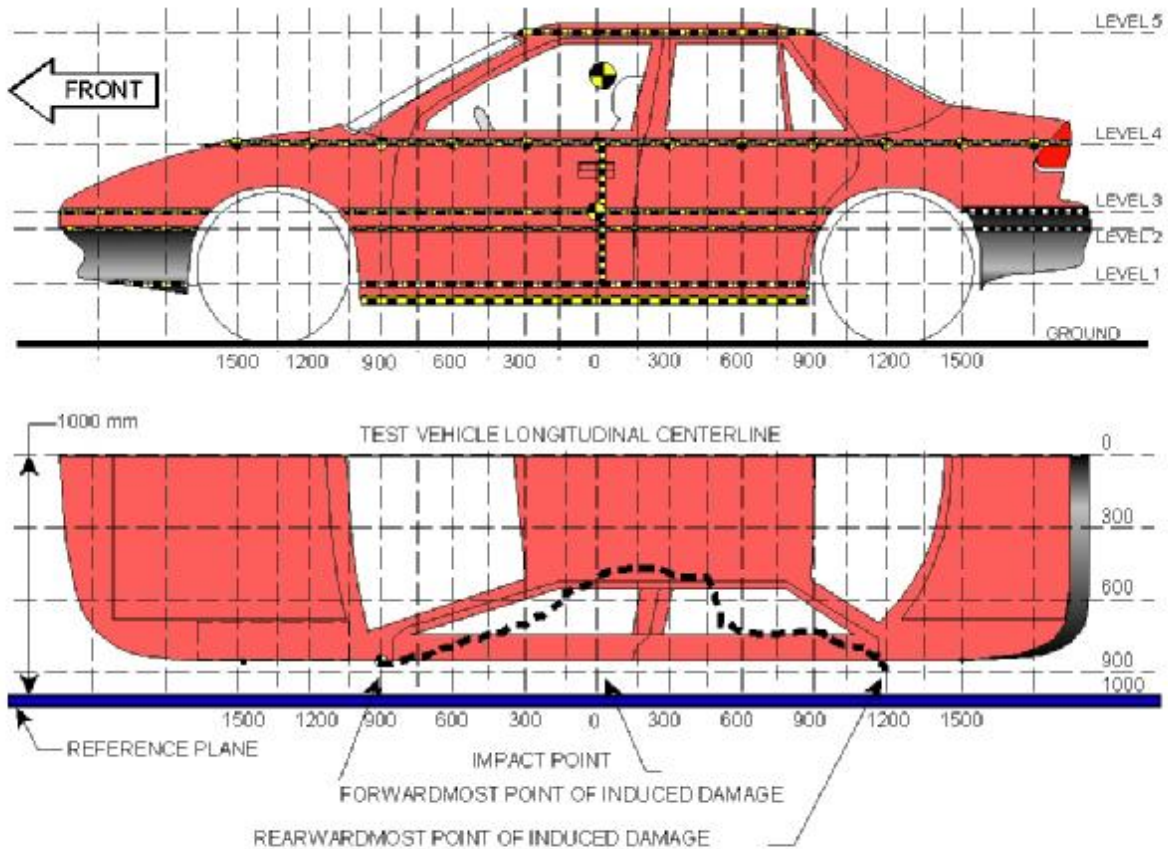


Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2821	2728	93
B	Front Axle to FSOV	833	835	-2
C	Rear Axle to RSOV	964	974	-10
D1	Total Vehicle Length at Left Side	4479	4412	67
D2	Total Vehicle Length at Centerline	4618	4588	30
D3	Total Vehicle Length at Right Side	4491	4482	9
E	Front Bumper Thickness	155	155	0
F	Front Bumper Bottom to Ground	368	367	1
G	Sill Height at Front Wheel Well	152	146	6
H	Sill Height at Front Door Leading Edge	168	151	17
I	Sill Height at B Pillar	188	165	23
J1	Sill Height at Rear Wheel Well	165	191	-26
J2	Pinch Weld Height at Rear Wheel Well	186	175	11
K	Sill Height Aft of Rear Wheel Well	220	215	5
L	Rear Bumper Thickness	210	210	0
M	Rear Bumper Bottom to Ground	501	488	13
N	Sill Height to Window Bottom Sill	566	554	12
O	Front Door Leading Edge to Impact CL	690	668	22
P	Rear Door Trailing Edge to Impact CL	707	686	31
Q	Front Window Opening	378	345	33
R	Right Side Length	4491	4482	9
S	Left Side Length	4479	4412	67
T	Vehicle Width at B Post	1831	1746	85

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009



NOTE: All measurements are in millimeters (mm)

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	243
2	Occupant H-Point	476
3	Mid-Door	629
4	Window Sill	846
5	Window Top	1308

NOTE: The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Hyundai Genesis 2-door Coupe NHTSA No. MA0503
 Test Program: Validation Side Impact Pole Impact Test Test Date: May 4, 2009

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	-	-	908	-	-	-	-	917	-	-	-	-	-9	-	-
-750	865	905	905	871	-	792	856	870	871	-	73	49	35	-	-
-600	858	903	905	876	-	725	779	796	808	-	133	124	109	68	-
-450	856	902	905	879	-	662	702	714	725	-	194	200	191	154	-
-300	854	900	905	878	-	596	620	626	633	-	258	280	279	245	-
-150	854	899	905	872	517	517	531	535	533	433	337	368	370	339	84
0	855	899	905	866	630	492	490	488	492	451	363	409	417	374	179
150	857	899	906	862	637	604	567	576	578	487	253	332	330	284	150
300	859	901	907	864	636	668	665	668	651	521	191	236	239	213	115
450	864	904	910	897	635	734	728	742	743	554	130	176	168	154	81
600	869	909	913	885	627	767	774	810	801	583	102	135	103	84	44
750	873	911	914	888	609	789	760	802	818	594	84	151	112	70	15
900	882	918	919	888	-	835	821	815	818	-	47	97	104	70	-
1050	896	926	924	889	-	883	880	843	835	-	13	46	81	54	-
1200	-	-	933	889	-	-	-	896	861	-	-	-	37	28	-
1350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2550	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2850	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MAXIMUM CRUSH DATA

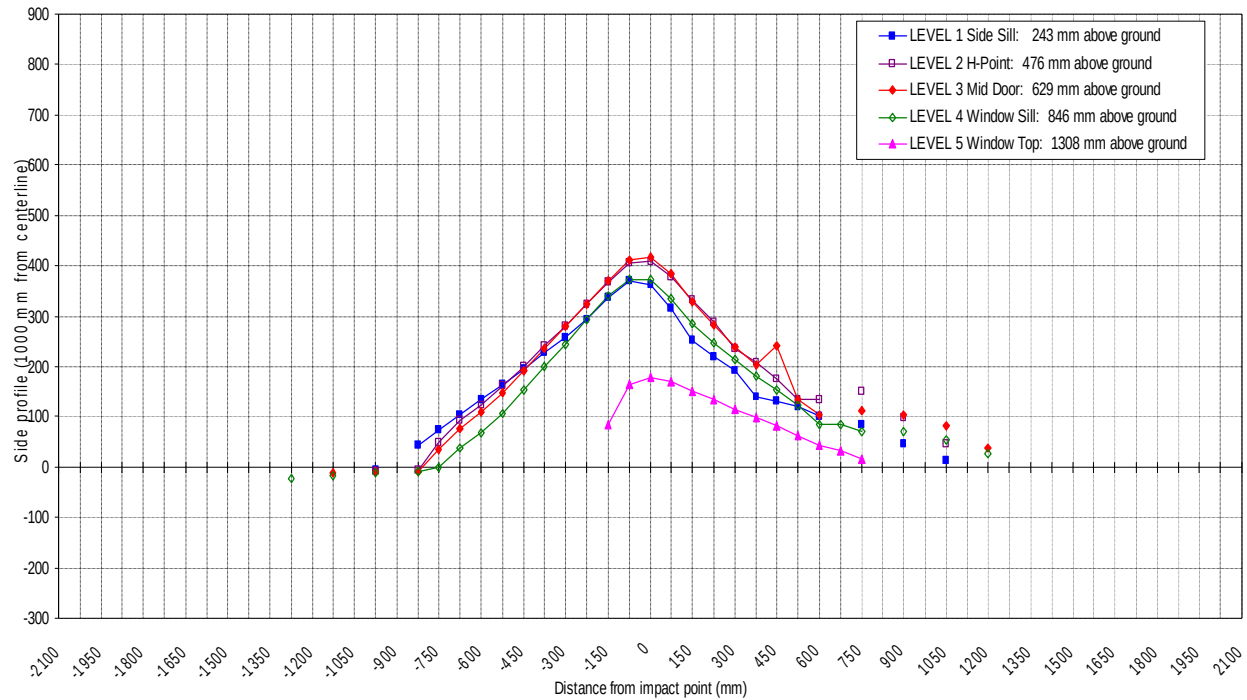
	Level1	Level2	Level3	Level4	Level5
Maximum Crush (mm)	370	409	417	374	179
Distance From Impact (mm)	-75	0	0	-75	0

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to test based on an estimated impact point. The final distance to impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

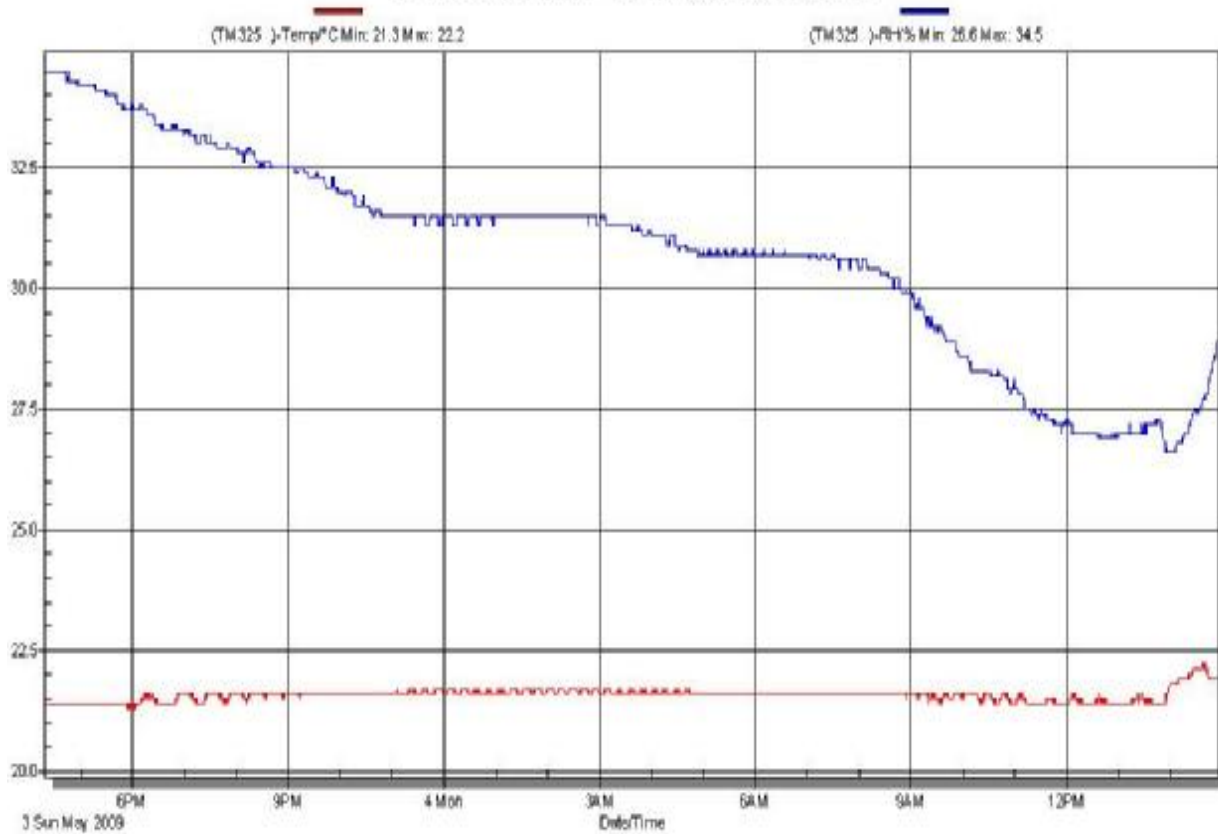


DATA SHEET NO. 11

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle:	2010 Hyundai Genesis 2-door Coupe	NHTSA No.	MA0503
Test Program:	Validation Side Impact Pole Impact Test	Test Date:	May 4, 2009

Downloaded Data - Tuesday, May 05, 2009



APPENDIX A
PHOTOGRAPHS

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A-28	Pre-Test Close-Up Left Side View of Dummy with Door Closed	A-14
A-29	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-15
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A-31	Pre-Test Close-Up Left Side View of Seat Track Showing Seat Positioning	A-16
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Figure A-1: As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle



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



Figure A-5: Pre-Test Left $\frac{3}{4}$ Front View of Vehicle with Pole in Position



Figure A-6: Post-Test Left $\frac{3}{4}$ Front View of Impact Zone



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



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



Figure A-9: Pre-Test Left $\frac{3}{4}$ Rear View of Vehicle with Pole in Position



Figure A-10: Post-Test Left $\frac{3}{4}$ Rear View of Impact Zone



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



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



Figure A-13: Pre-Test Right Side View of Test Vehicle



Figure A-14: Post-Test Right Side View of Test Vehicle



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

Photo Not Available

Figure A-16: Post-Test Overhead View of Test Vehicle and Pole



Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point



Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location



Figure A-21: Pre-Test Front Close-Up View of Dummy (Through Front Window)



Figure A-22: Post-Test Front Close-Up View of Dummy (Through Front Window)



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



Figure A-24. Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View

PHOTO NOT AVAILABLE

Figure A-26: Pre-Test Frontal View of Seat Back (Including Head Restraint) Prior to Dummy Positioning (should show centerline)



Figure A-27: Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint

PHOTO NOT AVAILABLE

Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning (should show centerline)

PHOTO NOT AVAILABLE

Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan

PHOTO NOT AVAILABLE

Figure A-30: Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket

PHOTO NOT AVAILABLE

Figure A-31: Pre-Test View of Dummy's Head Showing Dummy's Head is Level (level should be shown in photo)

PHOTO NOT AVAILABLE

Figure A-31: Pre-Test Placement of Dummy's Feet

PHOTO NOT AVAILABLE

Figure A-32: Pre-Test View of Belt Anchorage for Dummy to Show Position (should include detent or millimeter markings, if applicable)

PHOTO NOT AVAILABLE

Figure A-33: Pre-Test Left Side View of Steering Wheel to Show Position

PHOTO NOT AVAILABLE

Figure A-34: Pre-Test View of Parking Brake



Figure A-35: Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position (should include detent or millimeter markings)



Figure A-36: Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position (should include detent or degree markings)

PHOTO NOT AVAILABLE

Figure A-37: Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Figure A-39: Pre-Test Dummy and Door Clearance View



Figure A-40: Post-Test Dummy and Door Clearance View



Figure A-41: Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment (Through Vehicle with Door Open)



Figure A-42: Post-Test Right Side View of Dummy and Front Seat Occupant Compartment (Through Vehicle with Door Open)



Figure A-43: Pre-Test Inner Door Panel View



Figure A-44: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-45: Post-Test Dummy Close-Up Head Contact with Vehicle View, If Applicable

PHOTO NOT AVAILABLE

Figure A-46: Post-Test Dummy Close-Up Head Contact with Side Airbag View, If Applicable

PHOTO NOT AVAILABLE

Figure A-45: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View, If Applicable

PHOTO NOT AVAILABLE

Figure A-46: Post-Test Dummy Close-Up Torso Contact with Side Airbag View, If Applicable

PHOTO NOT AVAILABLE

Figure A-45: Post-Test Dummy Close-Up Pelvis Contact View, If Applicable

PHOTO NOT AVAILABLE

Figure A-46: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View, If Applicable



Figure A-45: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-46: Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-45: Close-Up View of Vehicle's Certification Label

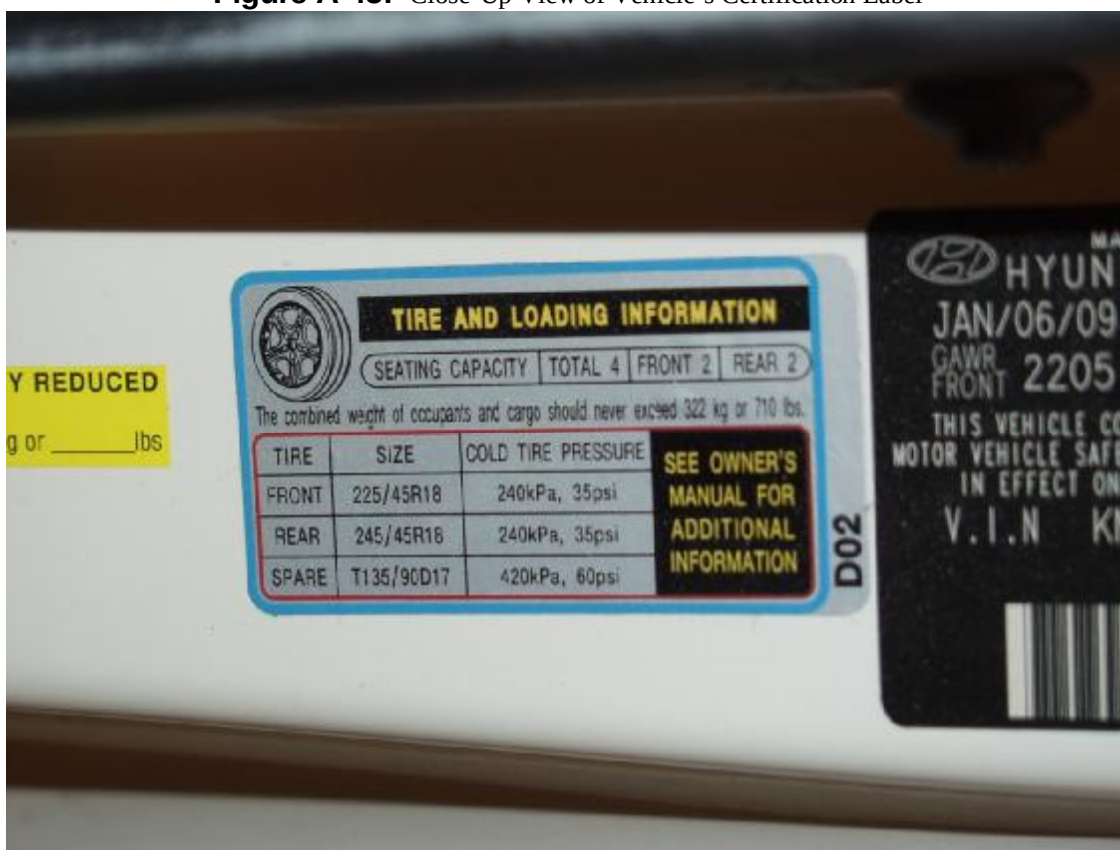


Figure A-46: Close-Up View of Vehicle's Tire Information Placard or Label



Figure A-45: Pre-Test Pole Barrier Front View



Figure A-46: Post-Test Pole Barrier Front View



Figure A-45: Pre-Test Pole Barrier Side View



Figure A-46: Post-Test Pole Barrier Side View

PHOTO NOT AVAILABLE

Figure A-45: Pre-Test Ballast View



Figure A-46: Post-Test Primary and Redundant Speed Trap Read-



Figure A-45: FMVSS No. 301/305 Rollover 0°



Figure A-46: FMVSS No. 301/305 Rollover 90°



Figure A-45: FMVSS No. 301/305 Rollover 180°



Figure A-46: FMVSS No. 301/305 Rollover 270°



Figure A-45: FMVSS No. 301/305 Rollover 360°



Figure A-46: Impact Event (Impact Side)

PHOTO NOT AVAILABLE

Figure A-45: Monroney Label

PHOTO NOT AVAILABLE

Figure A-46: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

The following table and respective vehicle and dummy (filtered) data plots should be included in Appendix B:

TABLE OF DATA PLOTS		
No.	Driver Dummy Instrumentation Plots	Page
1	Driver Head (X) Acceleration vs. Time Primary	B-3
2	Driver Head (Y) Acceleration vs. Time Primary	B-3
3	Driver Head (Z) Acceleration vs. Time Primary	B-3
4	Driver Head Injury Criterion (HIC 36) vs. Time Primary	B-3
5	Driver Lower Spine (X) Acceleration vs. Time Primary	B-4
6	Driver Lower Spine (Y) Acceleration vs. Time Primary	B-4
7	Driver Lower Spine (Z) Acceleration vs. Time Primary	B-4
8	Driver Lower Spine Resultant Acceleration vs. Time Primary	B-4
9	Driver Left Iliac Wing (Y) Force vs. Time	B-5
10	Driver Left Acetabulum (Y) Force vs. Time	B-5
11	Driver Pelvis Summation vs. Time	B-6

The following information should also be provided: The following additional data plots for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at

www.NHTSA.dot.gov.

Additional Driver Dummy Instrumentation Plots

Driver Head (X) Acceleration Redundant

Driver Head (Y) Acceleration Redundant

Driver Head (Z) Acceleration Redundant

Driver Upper Neck (X) Force

Driver Upper Neck (Y) Force

Driver Upper Neck (Z) Force

Driver Upper Neck Moment About X

Driver Upper Neck Moment About Y

Driver Upper Neck Moment About Z

Driver Shoulder (Y) Displacement

Driver Left Thorax Rib 1 (Y) Displacement

Driver Left Thorax Rib 2 (Y) Displacement

Driver Left Thorax Rib 3 (Y) Displacement

Driver Left Abdomen Rib 1 (Y) Displacement

Driver Left Abdomen Rib 2 (Y) Displacement

Driver Head Contact Switch

Driver Shoulder Contact Switch

Driver Torso Contact Switch

Driver Leg Contact Switch

Vehicle Instrumentation Plots

Vehicle Center of Gravity (X) Acceleration

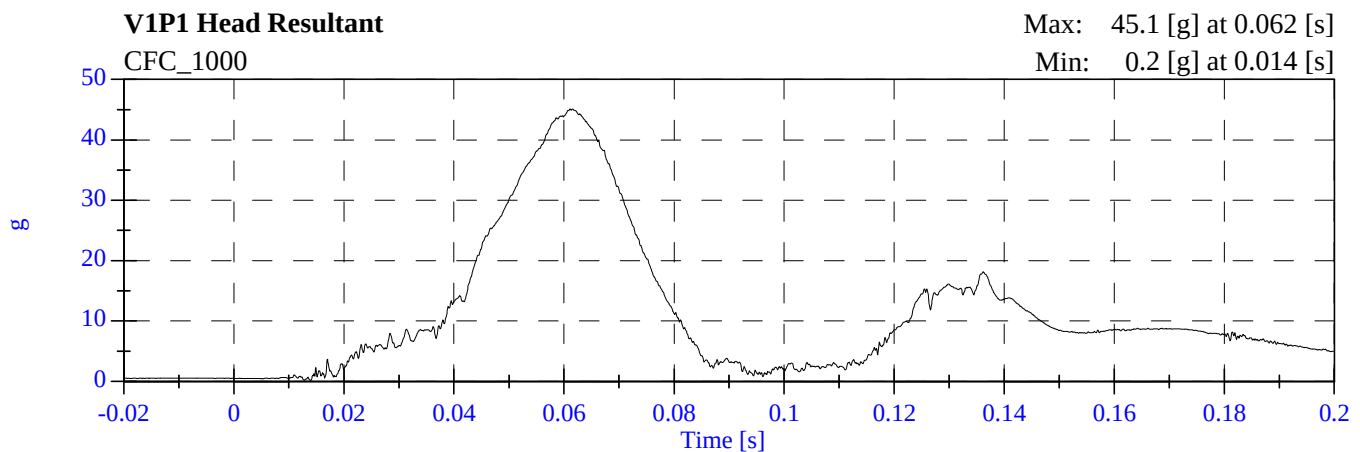
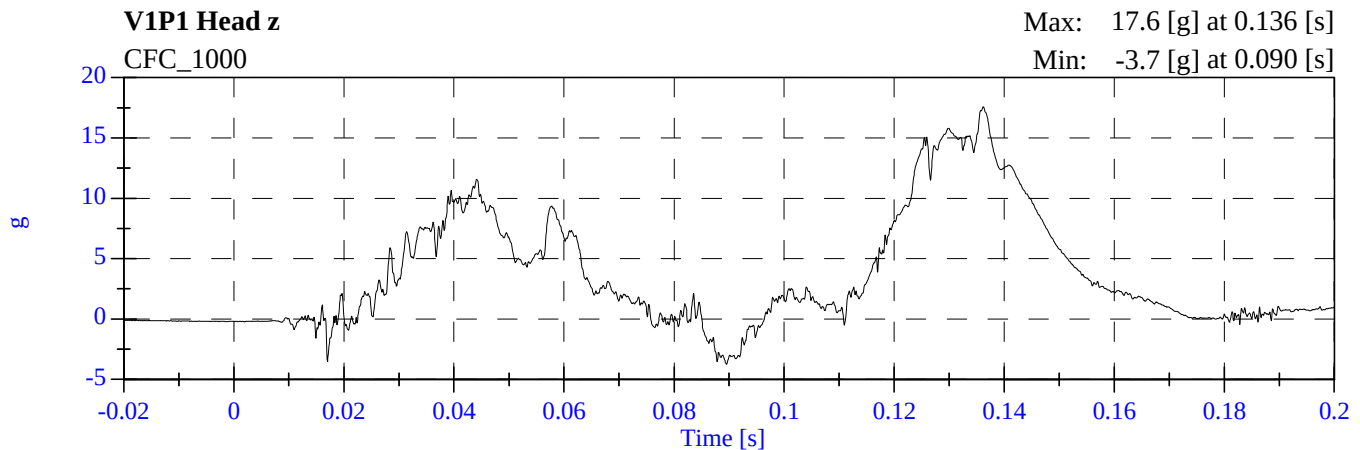
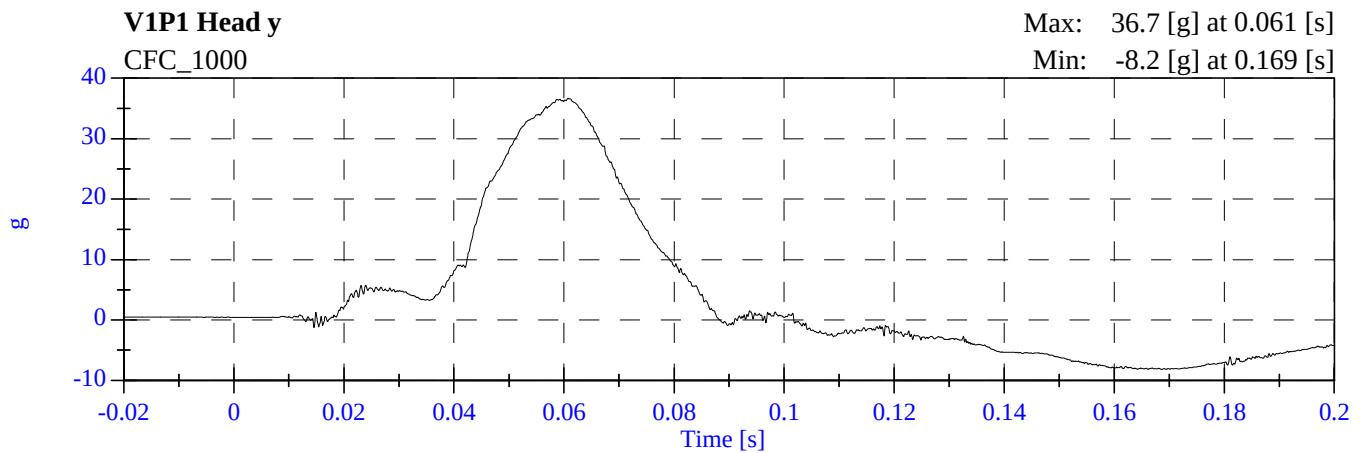
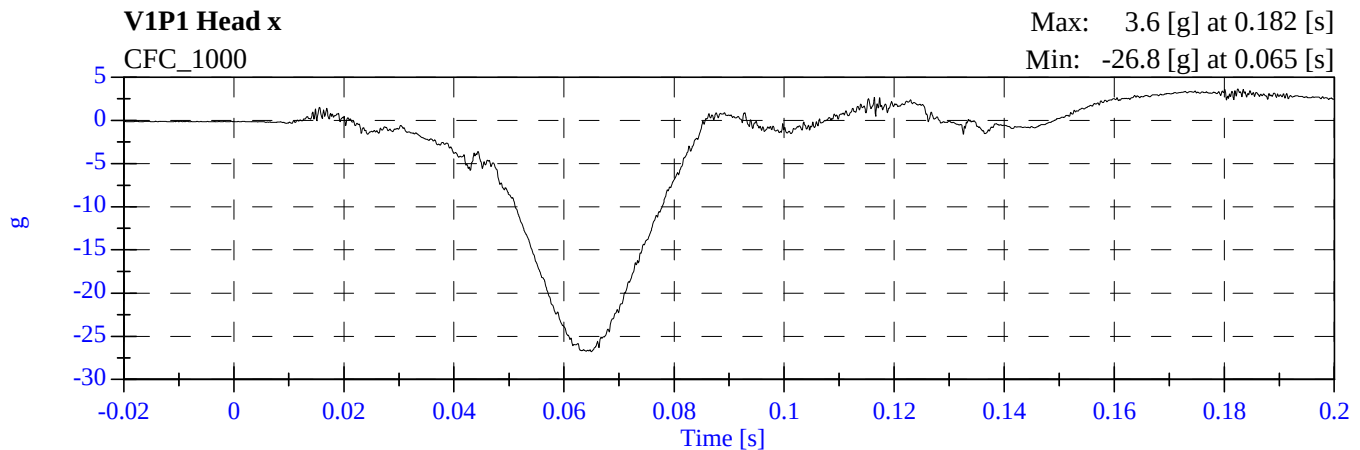
Vehicle Center of Gravity (Y) Acceleration

Vehicle Center of Gravity (Z) Acceleration
 Left Floor Sill (Y) Acceleration
 Left A-Pillar Sill (Y) Acceleration
 Left Lower A-Pillar (Y) Acceleration
 Left Mid A-Pillar (Y) Acceleration
 Left B-Pillar Sill (Y) Acceleration
 Left Lower B-Pillar (Y) Acceleration
 Left Mid B-Pillar (Y) Acceleration
 Driver Seat Track at Dummy H-Point (Y) Acceleration
 Engine Top (X) Acceleration
 Engine Top (Y) Acceleration
 Firewall Center (Y) Acceleration
 Right Roof at Vertical Impact Reference Line (Y) Acceleration
 Right Sill at Vertical Impact Reference Line (Y) Acceleration
 Rear Floorpan Behind Rear Axle at Centerline (X) Acceleration
 Rear Floorpan Behind Rear Axle at Centerline (Y) Acceleration
 Driver Side Airbag Voltage
 Driver Side Curtain Airbag Voltage

Pole Instrumentation Plots

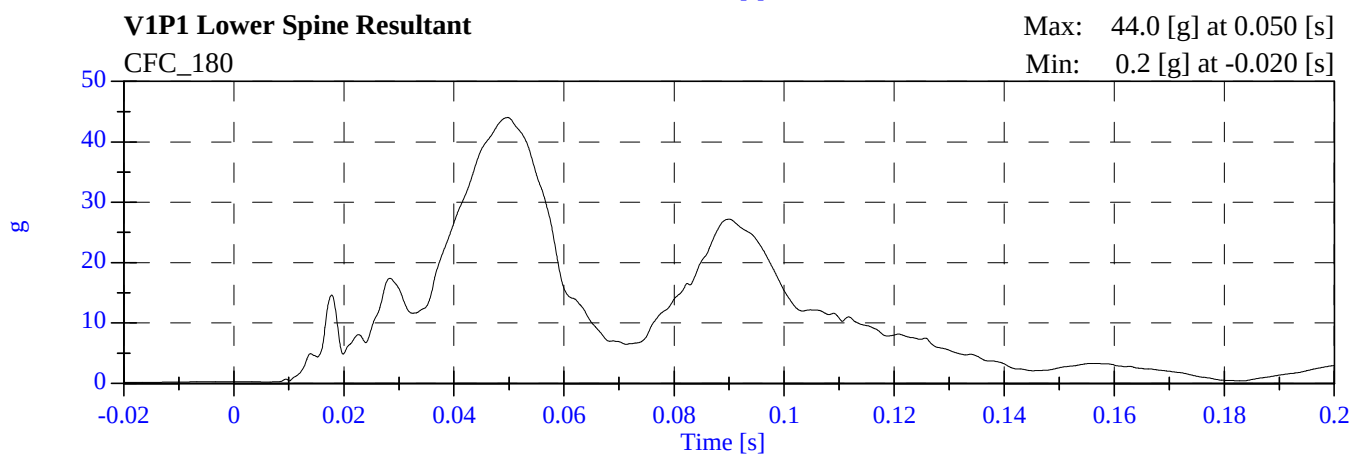
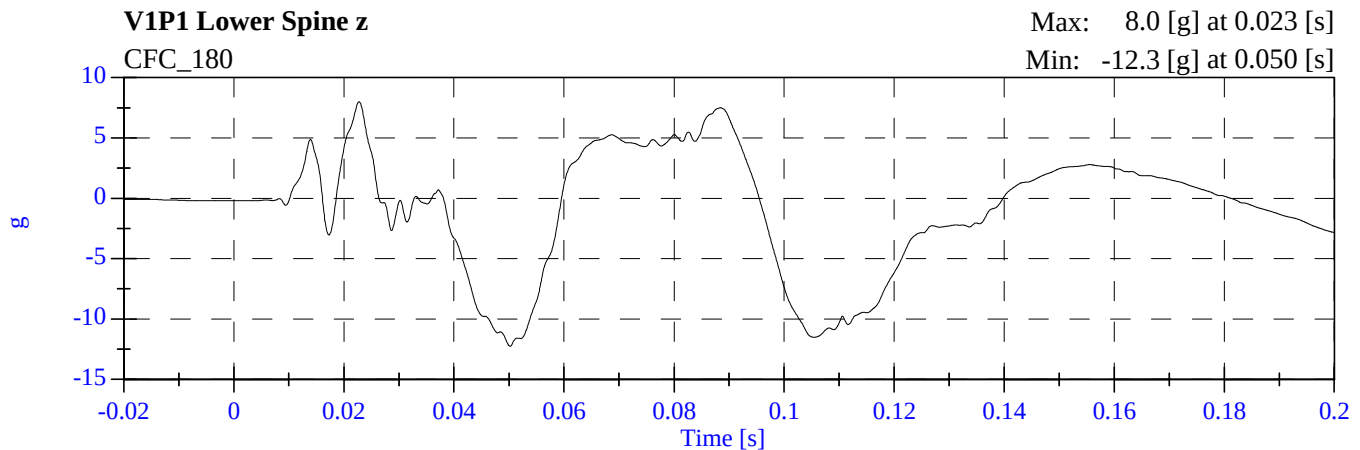
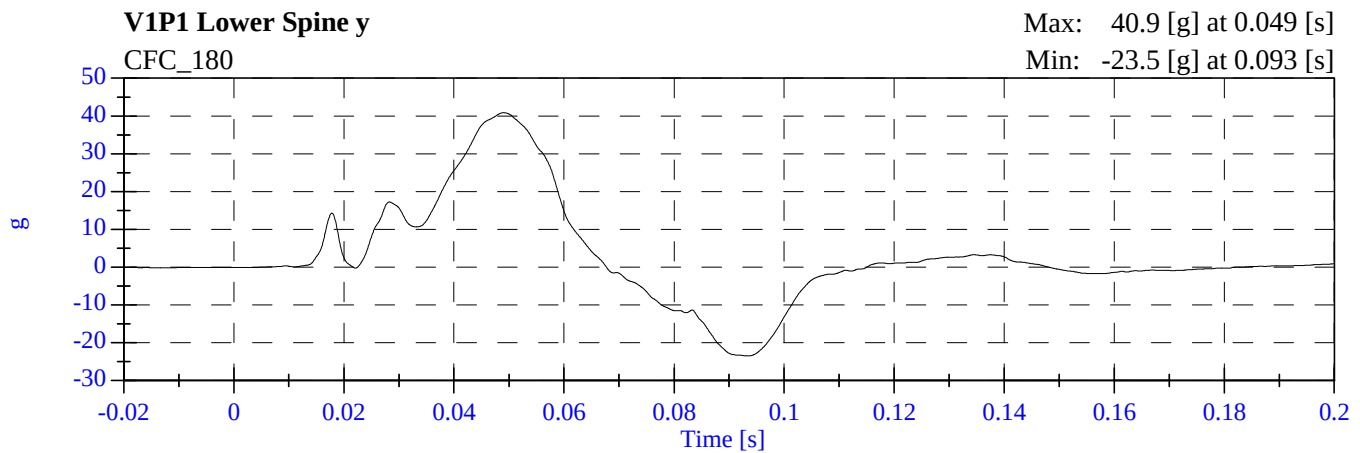
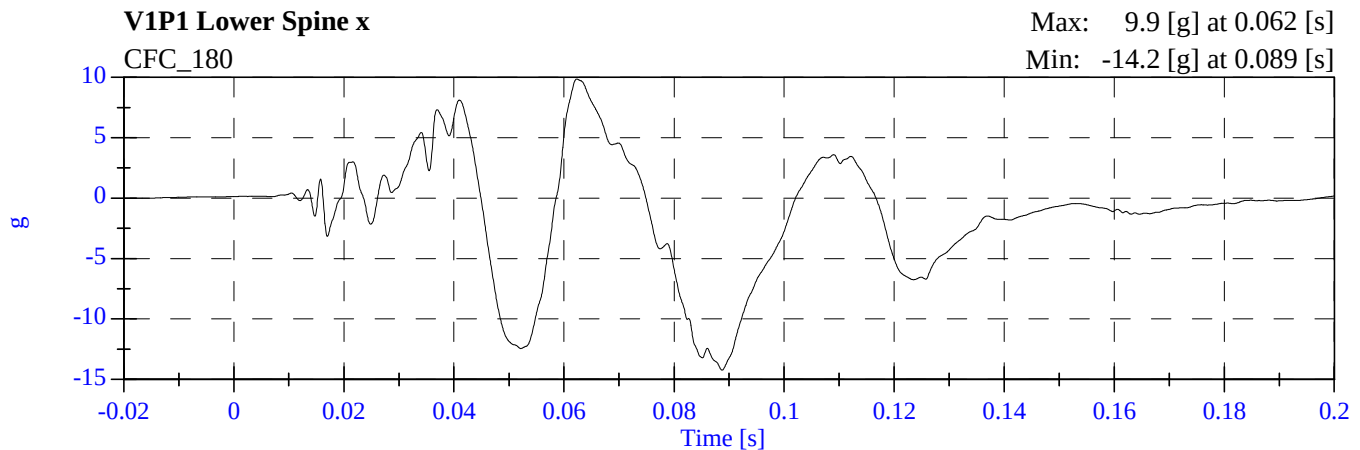
[Load Cell Pole Barrier #1 Force](#)
[Load Cell Pole Barrier #2 Force](#)
[Load Cell Pole Barrier #3 Force](#)
[Load Cell Pole Barrier #4 Force](#)
[Load Cell Pole Barrier #5 Force](#)
[Load Cell Pole Barrier #6 Force](#)
[Load Cell Pole Barrier #7 Force](#)
[Load Cell Pole Barrier #8 Force](#)

SNCAP POLE Test 1 2010 Hyundai Genesis MA0503 - May 04, 2009



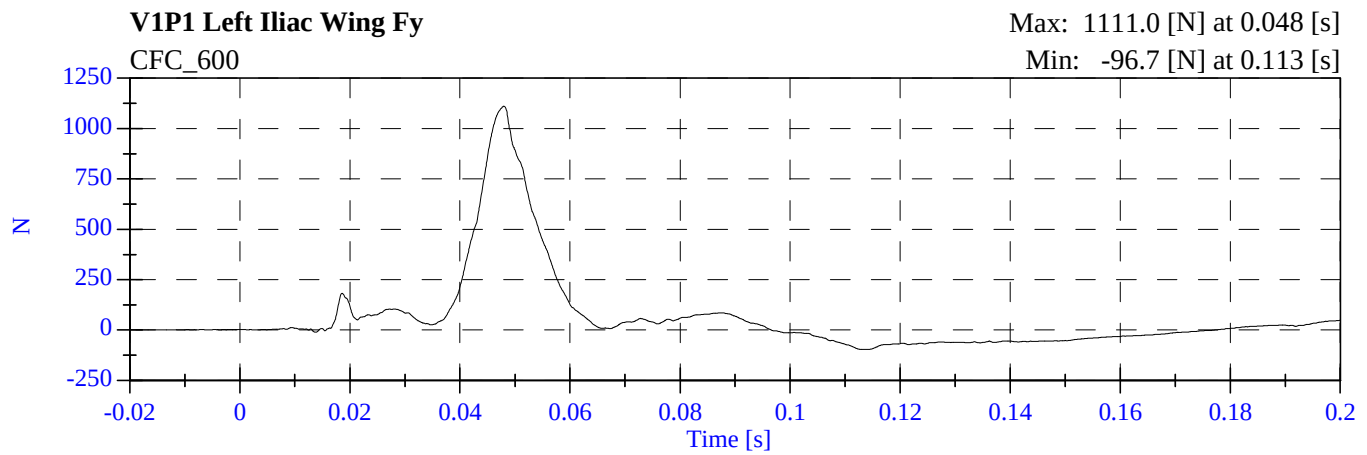
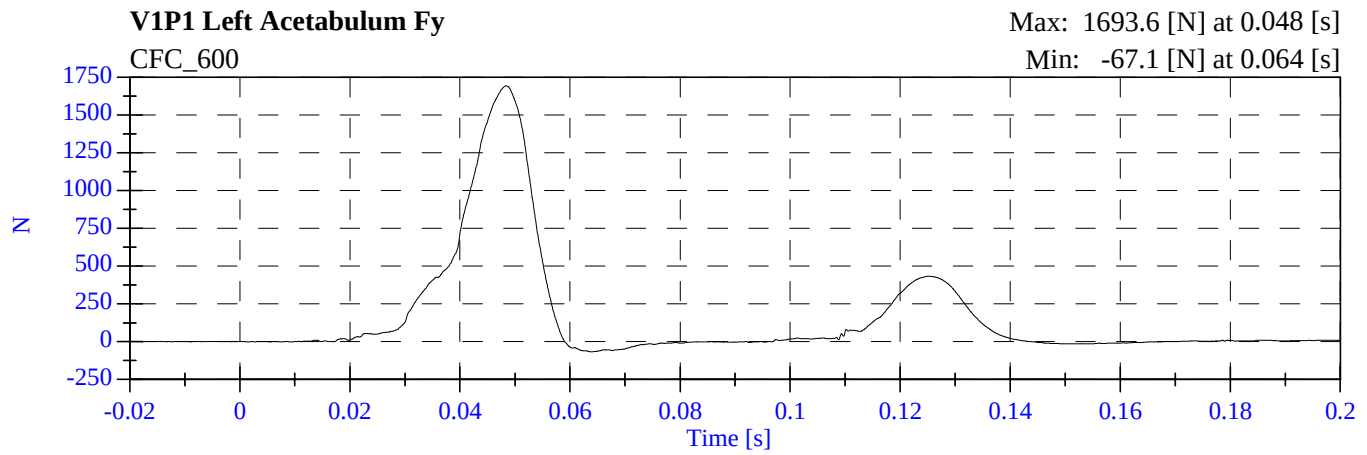
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MA0503 - May 04, 2009



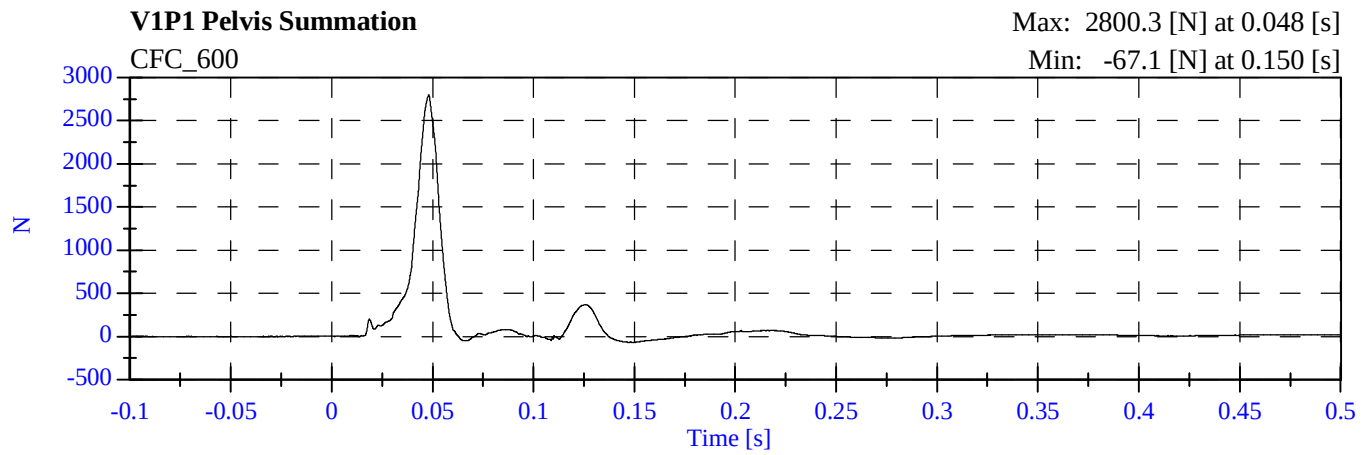
SNCAP POLE Test 1 2010 Hyundai Genesis

MA0503 - May 04, 2009



SNCAP POLE Test 1 2010 Hyundai Genesis

MA0503 - May 04, 2009



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA



Denton Technical Center

1965 Larchwood Troy, Michigan 48083, Phone: (248) 528-9889, Fax: (248) 528-8494

CALSPAN

4455 Genesee Street
Buffalo, New York 14225

SID-IIs ATD Serial No. 0300 Certification Report

Testing Complete on: 04/29/2009

**Per Specifications of the Code of Federal Regulations:
Number 49, Part 572, SID-IIs**

Creating the New Standard in ATD Service

Denton Corporate Offices: 2967 Waterview Dr., Rochester Hills, MI 48309-4600

Tel (248) 852-5100 • Fax (248) 852-6060 • email: info@radenton.com • www.radenton.com



DENTON TECHNICAL CENTER

1965 Larchwood, Troy, Michigan 48083

Tel:(248) 528-9889 Fax:(248) 528-8494

Document Number: DTC-TLF012

Revision Date: 3/10/2009

Revision Level: 5

DTC Form (IAW ISO-17025)

RMA Summary Report

Quote SO No.: 23013

Customer Name: Calspan

☐ In Process 4/14/2009

Customer Contact: David Travale

☒ Final Report

Phone: (716) 713-5556

☐ Outgoing Lease

DTC RMA No.: 14023

☐ Lease Return

RDI RMA No.: NA

0 Potentiometers / Other

Date Received: 4/15/2009

MRT Time (hrs)

Date Started: 4/22/2009

Date Finished: 4/29/2009

Date Shipped: 4/29/2009

Priority: **Standard**

Special Instructions: No Sensor cals. VRTC to supply replacement parts if needed. Parts replaced - Neck = 787 & Left Arm S/N = 822

Type of ATD	QTY	Certification/Service	S/N	Service Time (hrs)
SID-IIs-BLD	1	Certification	300	

Parts	Billable	Part No.	QTY	Model No.	Serial No.
Neck	No	180-2001	1		787
Left Arm	No	180-6011-1	1		822

Service Time Explanation:

--

The Denton Technical Center values all feedback we receive from customers. Please visit our corporate website at <http://www.dentoninc.com> or send emails to webmaster@radenton.com.

Report Date: 4/29/2009 11:44 AM

**DENTON TECHNICAL CENTER****DTC Form (IAW ISO-17025)****RMA Evaluation Report**

1965 Larchwood, Troy, Michigan 48083

Tel: (248) 528-9889 Fax: (248) 528-8494

Document Number: DTC-TLF012

Revision Date: 1/30/09

Revision Level: 5

Customer: Calspan**Certificate No.: 42909300****DTC RMA#: 14023****RDI RMA#:****Dummy Type: SID-IIs-BLD****Serial Number: 300****Mechanical Status:****Condition as Received:**☐ In Tolerance ☒ Out of Tolerance**Condition as Returned:**☒ In Tolerance ☐ Out of Tolerance**Electrical Status (MUX):** ☒ Not Applicable**Condition as Received:**☐ In Tolerance ☐ Out of Tolerance**Condition as Returned:**☐ In Tolerance ☐ Out of Tolerance**Testing Requirements IAW: CFR 49, 572, V**

	Test Description	S/N	Status
1	Lateral Head Drop	1355	Passed
2	Lateral Neck Bending	705	Failed
3	Thorax Impact w/ Arm	490	Passed
4	Thorax Impact w/o Arm	490	Passed
5	Shoulder Impact	490	Passed
6	Abdominal Impact	490	Passed
7	Pelvis Impact, Acet.	875	Passed
8	Pelvis Impact, Iliac	875	Passed
9	Lateral Neck Bending	787	Passed
10			
11			

Torque Wrench: 0103600305**Comments:**

Left side impact.

Failed Cert

New Arm Sn 822

New Arm Sn 822

New Neck Installed S/N = 787 4/28/09

Incoming Appearance:**Head Assembly** ☒ Good ☐ Damaged**Neck Assembly** ☐ Good ☒ Damaged**Upper Torso Assembly** ☒ Good ☐ Damaged**Lower Torso Assembly** ☒ Good ☐ Damaged**Left Arm Assembly** ☐ Good ☒ Damaged**Right Arm Assembly** ☐ Good ☐ Damaged**Left Leg Assembly** ☒ Good ☐ Damaged**Right Leg Assembly** ☒ Good ☐ Damaged**Comments:**

Failed Certification - Failed Neck S/N = 705

(Customer Supplied) New Neck S/N = 787

Failed Certification Failed Arm S/N = 943

Installed New Left Arm S/N = 822 (Cust. Supplied)

N/A

Comments:

No Sensor cals. VRTC to supply replacement parts if needed. Parts replaced - Neck = 787 & Left Arm S/N = 822

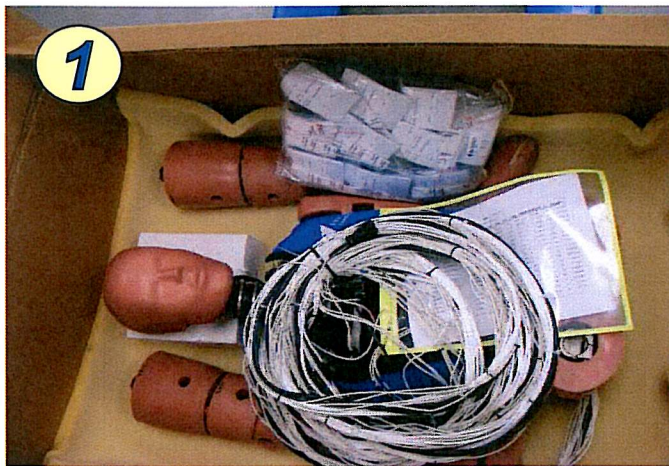
Action Items
Certificate No.: 42909300

Action #1	
Resolution #1	☐ Complete
Action #2	
Resolution #2	☐ Complete
Action #3	
Resolution #3	☐ Complete
Action #4	
Resolution #4	☐ Complete
Comments	

Observations and Recommendations:

Certificate No.: 42909300

Below are inspection photos and observations of parts that may require repair or replacement.



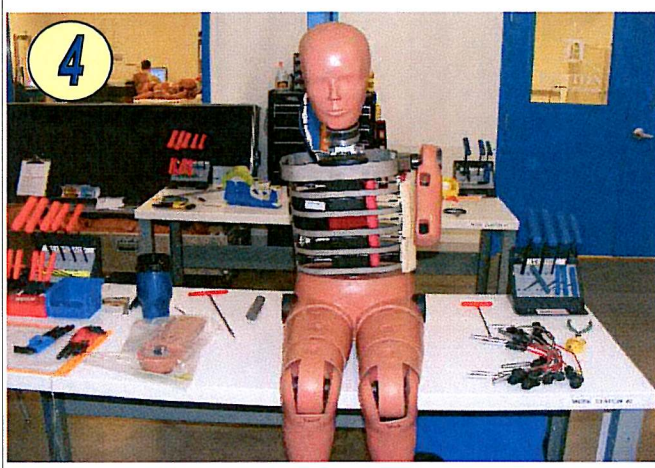
Arrival Photos S/N = 300



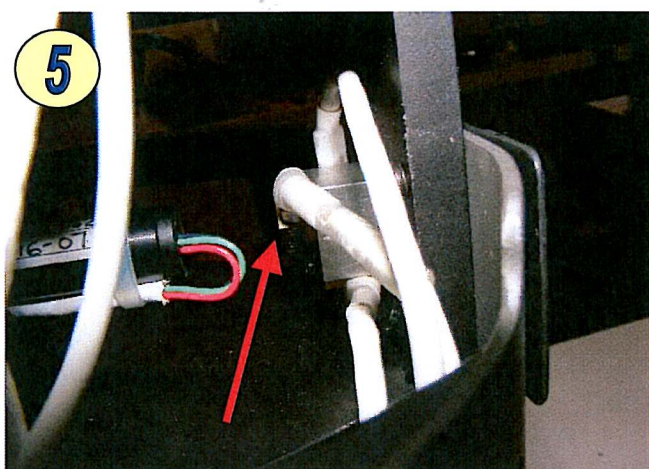
Failed Certification - Neck S/N = 705



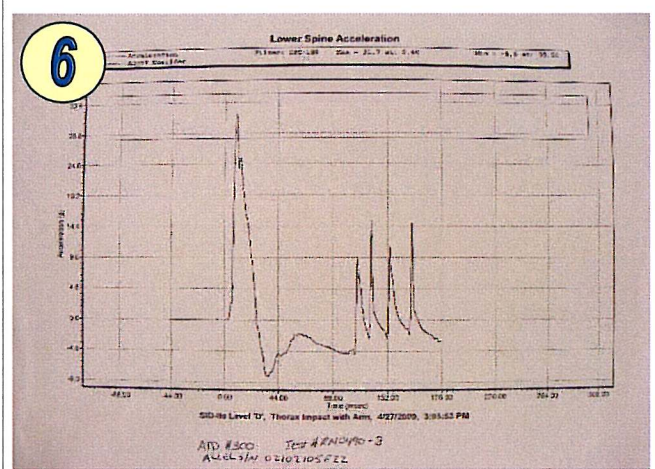
Left Arm - Failed Certification - S/N = 943



Sid II's Standard build level D S/N = 300



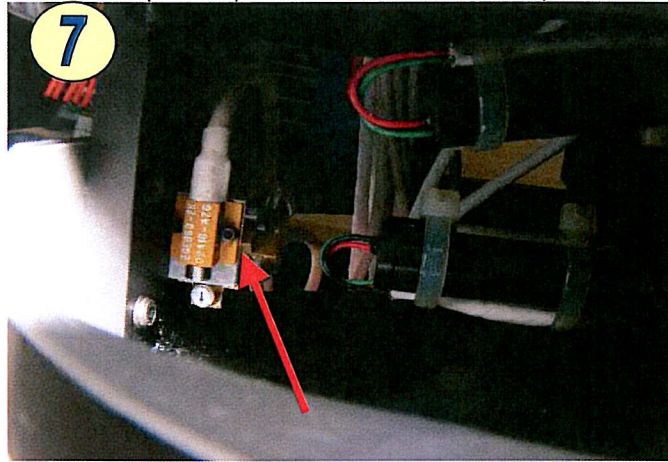
T-12 (Y) Accelerometer Cable suspect



Data Trace - T-12 (Y)

Certificate No.: 42909300

Below are inspection photos and observations of parts that may require repair or replacement.



Report	NAME	TYPE	STANDARD
DISCRIPTION	S/N		
LOCATION	NAME	SENSITIVITY	MIN MAX UNIT DIR MODE ST CALDATE
Head Rx	AC-PH180	0.21631	-500 500 S 0.7294CT OK 10/26/04
HEGIC Rx	AC-PH180	0.02142	-500 500 S 0.7294CT OK 10/26/04
HEGIC AC	PH180	0.02381	-500 500 S 0.7294CT OK 10/26/04
HEGIC MR	AC-PH180	0.02358	-500 500 S 0.7294CT OK 10/26/04
HEGIC Rx	Head Rx	0.02719	-500 500 S 0.7294CT OK 10/26/04
HEGIC Rx	Head Rx	0.02194	-500 500 S 0.7294CT OK 10/26/04
112 Rx	Lower Spine	0.01872	-500 500 S 0.7294CT OK 10/26/04
112 Rx	Lower Spine	0.00125	-500 500 S 0.7294CT OK 10/26/04
112 Rx	Lower Spine	0.00000	-500 500 S 0.7294CT OK 10/26/04
112 Rx	Lower Spine	0.00000	-500 500 S 0.7294CT OK 10/26/04
PH180 Rx	Head Rx	0.02229	-500 500 S 0.7294CT OK 10/26/04
PH180 Rx	Head Rx	0.02229	-500 500 S 0.7294CT OK 10/26/04
HEGIC Rx	Upper Neck Rx	0.000120266	-5000 5000 N 0.7164C OK 12/26/2004
HEGIC Rx	Upper Neck Rx	0.000118851	-5000 5000 N 0.7164C OK 12/26/2004
HEGIC Rx	Upper Neck Rx	0.000101747	-10000 10000 N 0.7164C OK 12/26/2004
HEGIC Rx	Upper Neck Rx	0.000000021	-500 500 N 0.7164C OK 12/26/2004
HEGIC Rx	Upper Neck Rx	0.000120081	-500 500 N 0.7164C OK 12/26/2004
HEGIC Rx	Upper Neck Rx	0.000000040	-500 500 N 0.7164C OK 12/26/2004
LAC Rx	Left Ankle Rx	0.000000000	-5000 5000 S 0.7264C OK 12/26/2004

Conclusions (parts needed):**Certificate No.: 42909300**

QTY	Description	Part No.	Reason	Approval
1	Neck	180-2001	Failed Cert	Yes
1	Left Arm	180-6011-1	Failed Cert	Yes

Indicates that parts are required for certification.

Comments:

Final Inspection:

Checked By:

Comments:

Instrumentation Installed



JR

Connectors Checked



N/A

Sensor Function Checked (MUX)



N/A

Neck & Spine Cables Checked



Joints Adjusted 1-2 g's



Fasteners Tightened



Targets Installed



N/A

Clothing



N/A

Shoes



N/A

Cal./Cert. Documents



Denton Technical Center
1965 Larchwood Drive
Troy, Michigan
48083 USA
248-528-9889

Report Finalized By: Mark Smilnak

TESTING CERT #2421.02

This certification report pertains only to the items detailed herein.



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RD1355	Test Date:	4/22/2009
Test Number:	1	Test Time:	10:14:05 AM

Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

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

Comments:
LEFT

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.7 deg C P
Humidity	10 -- 70	42 %RH P
Resultant Acceleration	115.0 -- 137.0	129.0 g P
Oscillation	0.0 -- 15.0	0.0 % P
Lateral Acceleration	-15.0 -- 15.0	-1.9 g P

All test parameters are within specifications

Technician: JR Signature: [Signature]
Supervisor: MS Signature: [Signature]

Test ID: **RD1355**

Test Time: **10:14:05 AM**

Test Date: **4/22/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	12/16/2008
Endevco	7264D-2000	11558	8/12/2008
Endevco	7264D-2000	11553	8/12/2008
Endevco	7264D-2000	11569	8/18/2008

Test ID: **RD1355**

Test Time: **10:14:05 AM**

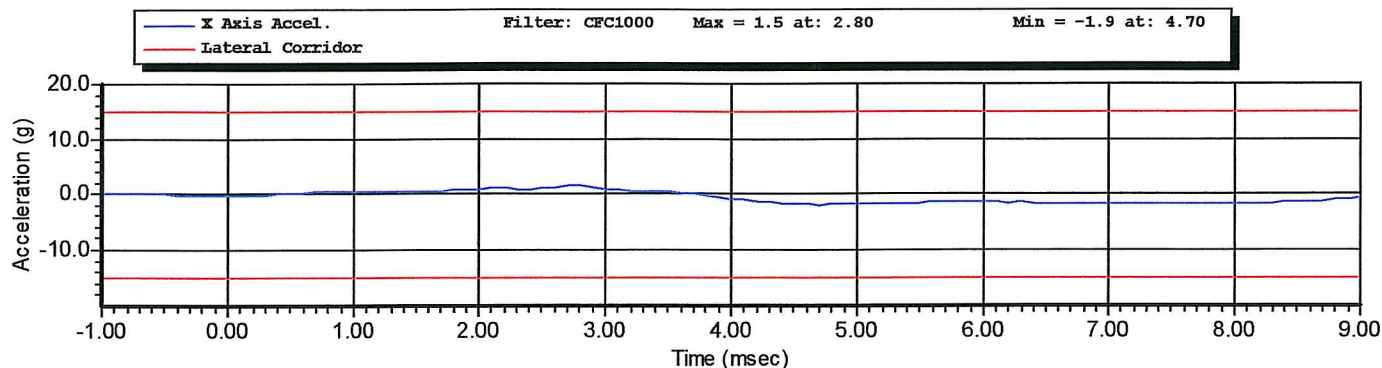
Test Date: **4/22/2009**



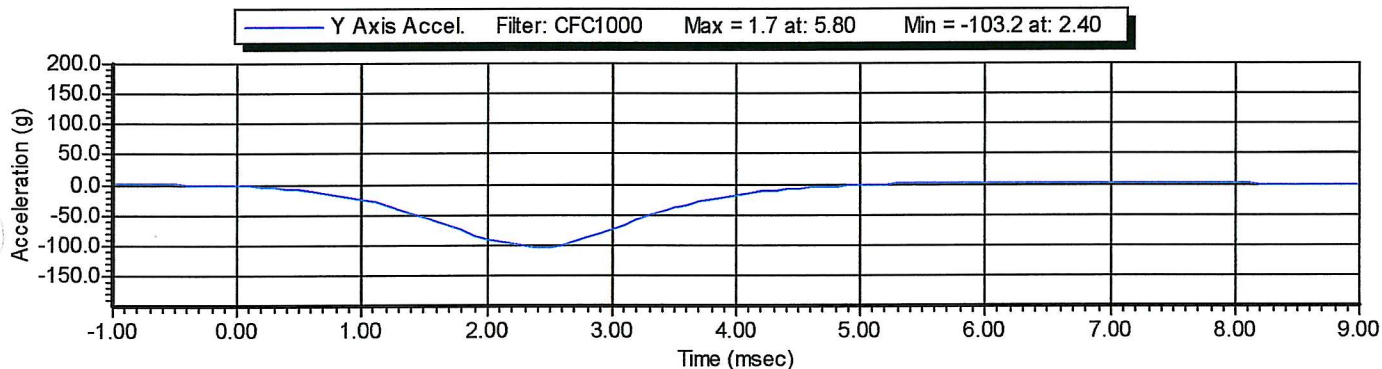
Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

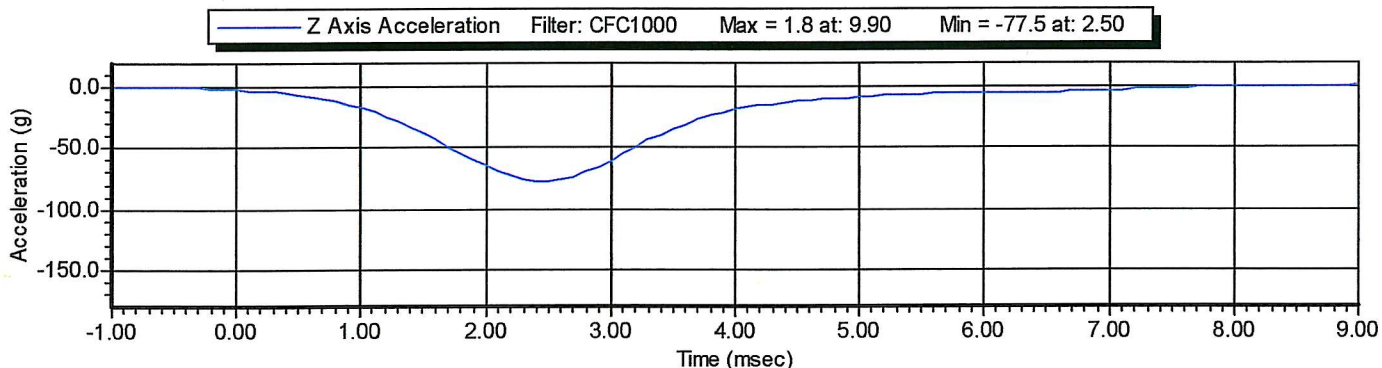
X Axis Acceleration



Y Axis Acceleration



Z Axis Acceleration





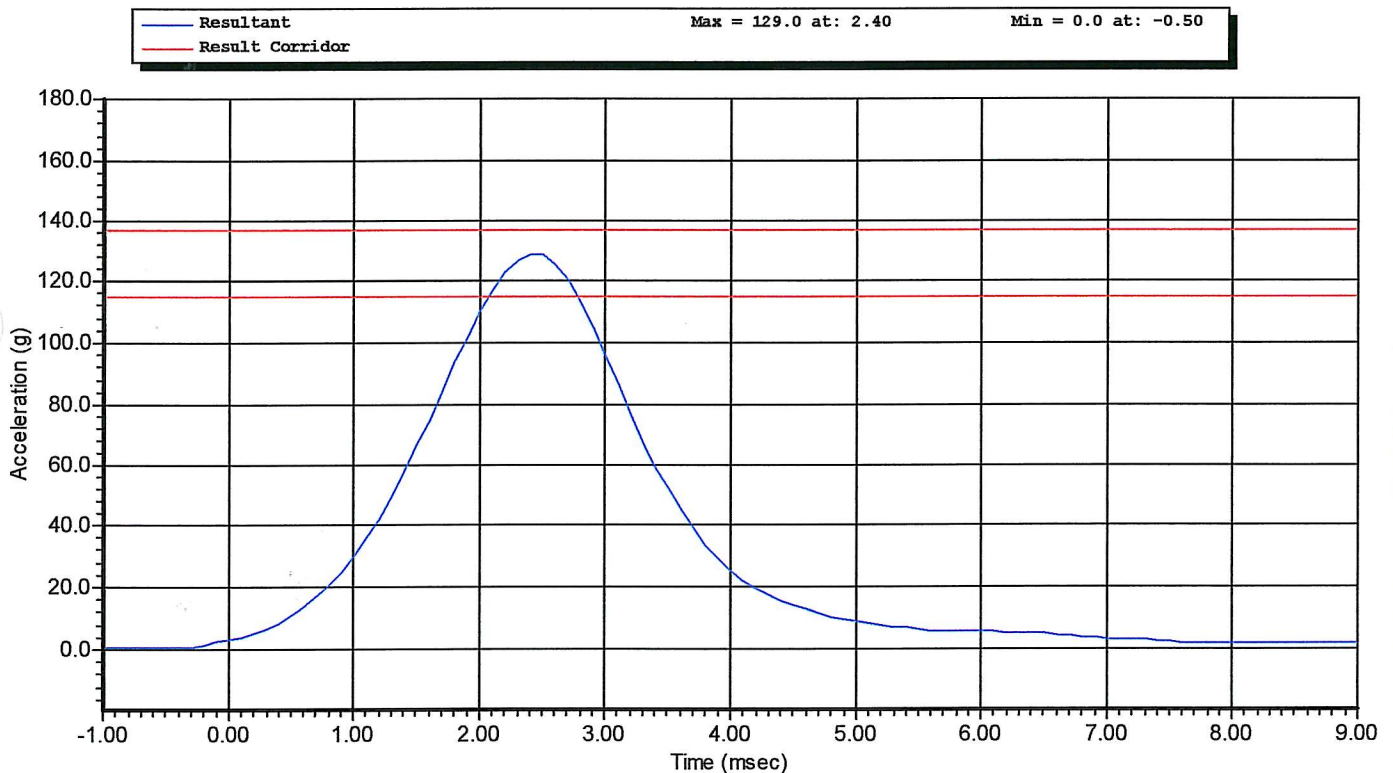
Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

Test Name:	Head Drop	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	1	Test Date:	4/22/2009
		Test Time:	10:14:05 AM

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

Resultant Acceleration



Test ID: **RD1355**

Test Time: **10:14:05 AM**

Test Date: **4/22/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48083, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Name:	Neck Pendulum	Revision:	12/14/2006
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RA0787	Test Date:	4/28/2009
Test Number:	6	Test Time:	11:25:09 AM

Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Neck - 180-2000	
Torque Wrench s/n: 0106800459	

Comments:
NEW NECK
8X7 @ 84°

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.5 deg C	P
Humidity		10	-- 70	47 %RH	P
Velocity		5.51	-- 5.63	5.61 m/s	P
Pendulum Impulse at	10 ms	2.20	-- 2.80	2.37 m/s	P
Pendulum Impulse at	15 ms	3.30	-- 4.10	3.59 m/s	P
Pendulum Impulse at	20 ms	4.40	-- 5.40	4.84 m/s	P
Pendulum Impulse at	25 ms	5.40	-- 6.10	5.83 m/s	P
Pendulum Impulse between 25 and	100 ms	5.50	-- 6.20	5.89 m/s	P

Test ID: RA0787

Test Time: 11:25:09 AM

Test Date: 4/28/2009



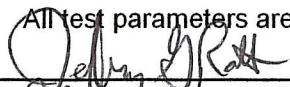
Denton Technical Center

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VERIFICATION REPORT

Test Parameters	Test Specifications	Test Results
Max D Plane Rotation	71.0 -- 81.0	79.3 degrees P
Time at Max Rotation	50.0 -- 70.0	64.0 ms P
Moment about OC	-44.0 -- -36.0	-36.1 Nm P
Moment Decay to Zero	102.0 -- 126.0	118.6 ms P

All test parameters are within specifications

Technician: **JR** Signature: 
Supervisor: **MS** Signature: 

Test ID: **RA0787**

Test Time: **11:25:09 AM**

Test Date: **4/28/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48083, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021724	10/14/2008
Denton	1716A	1999	11/14/2008
Denton	1716A	1999	11/14/2008
DentonATD	78051-342	114	10/28/2008
DentonATD	78051-342	113	10/28/2008
DentonATD	78051-342	112	10/28/2008

Test ID: **RA0787**

Test Time: **11:25:09 AM**

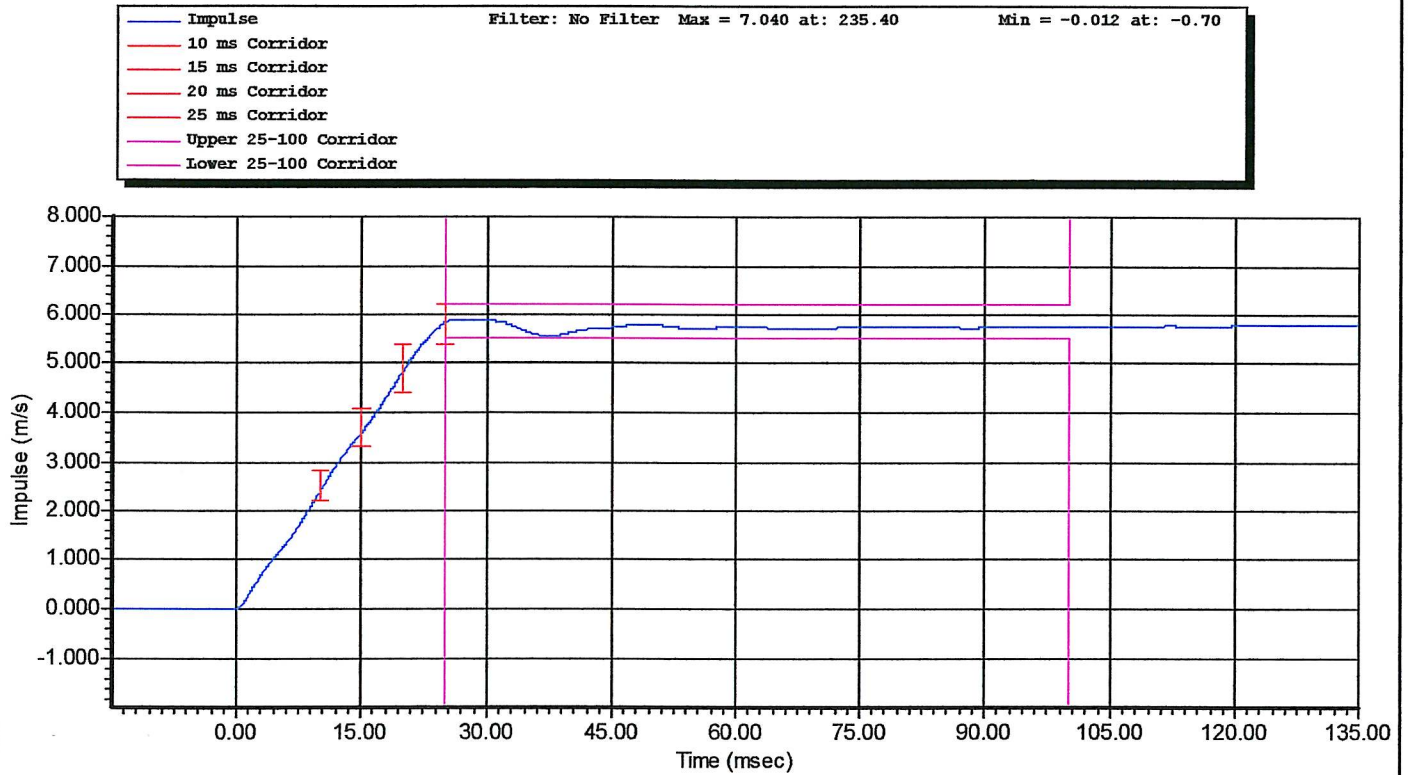
Test Date: **4/28/2009**



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Pendulum Impulse



Test ID: RA0787

Test Time: 11:25:09 AM

Test Date: 4/28/2009



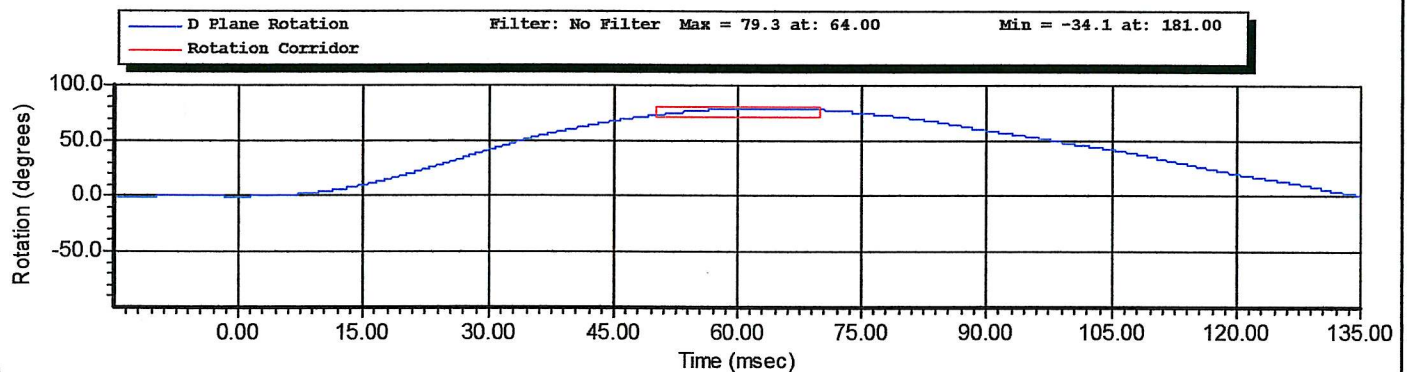
Denton Technical Center

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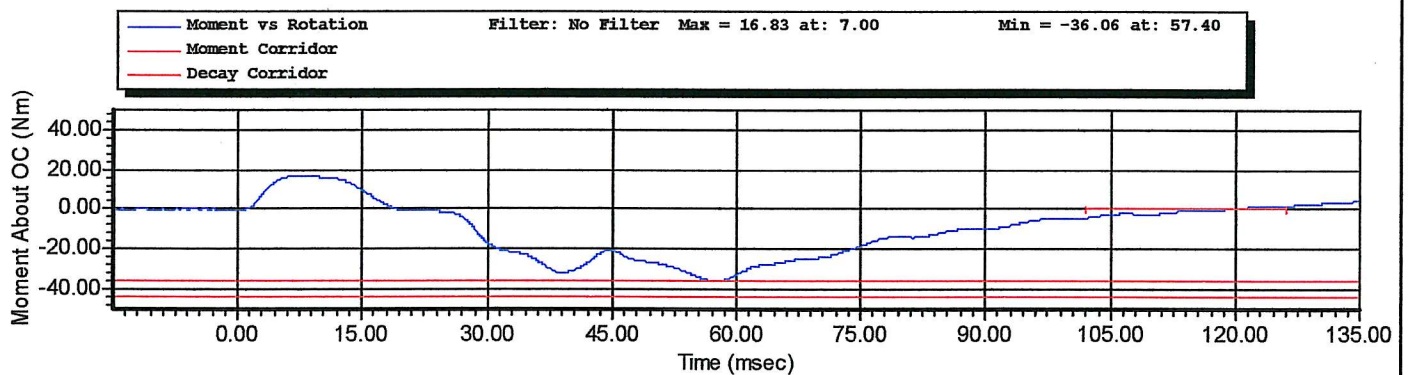
Test Name:	Neck Pendulum	Revision:	12/14/2006
Sub Test Name:	Left Side	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	6	Test Date:	4/28/2009
		Test Time:	11:25:09 AM

Component Part Number	Component Serial Number
Neck - 180-2000	

D Plane Rotation



Moment About Occipital Condyle



Test ID: RA0787

Test Time: 11:25:09 AM

Test Date: 4/28/2009



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RM0490	Test Date:	4/28/2009
Test Number:	1	Test Time:	9:44:49 AM

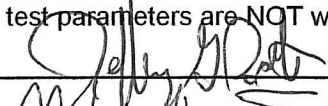
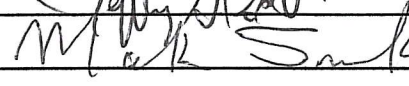
Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Shoulder Rib - 180-3355	274

Comments:
LEFT NEW ARM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	46.1 %RH P
Velocity	4.30 -- 4.50	4.45 m/s P
Probe Acceleration	14.0 -- 18.0	17.0 g P
Shoulder Deflection	30.0 -- 37.0	32.9 mm P
Upper Spine Acceleration	17.0 -- 19.0	19.3 g F
FTSS Proposed Upper Spine Acceleration	17.0 -- 21.0	19.3 g P

All test parameters are NOT within specifications

Technician:	JR	Signature:	
Supervisor:	MS	Signature:	

Test ID: **RM0490**

Test Time: **9:44:49 AM**

Test Date: **4/28/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Denton	180-3881	386	12/4/2008
Endevco	7264-2000	p51680	3/9/2009

Test ID: **RM0490**

Test Time: **9:44:49 AM**

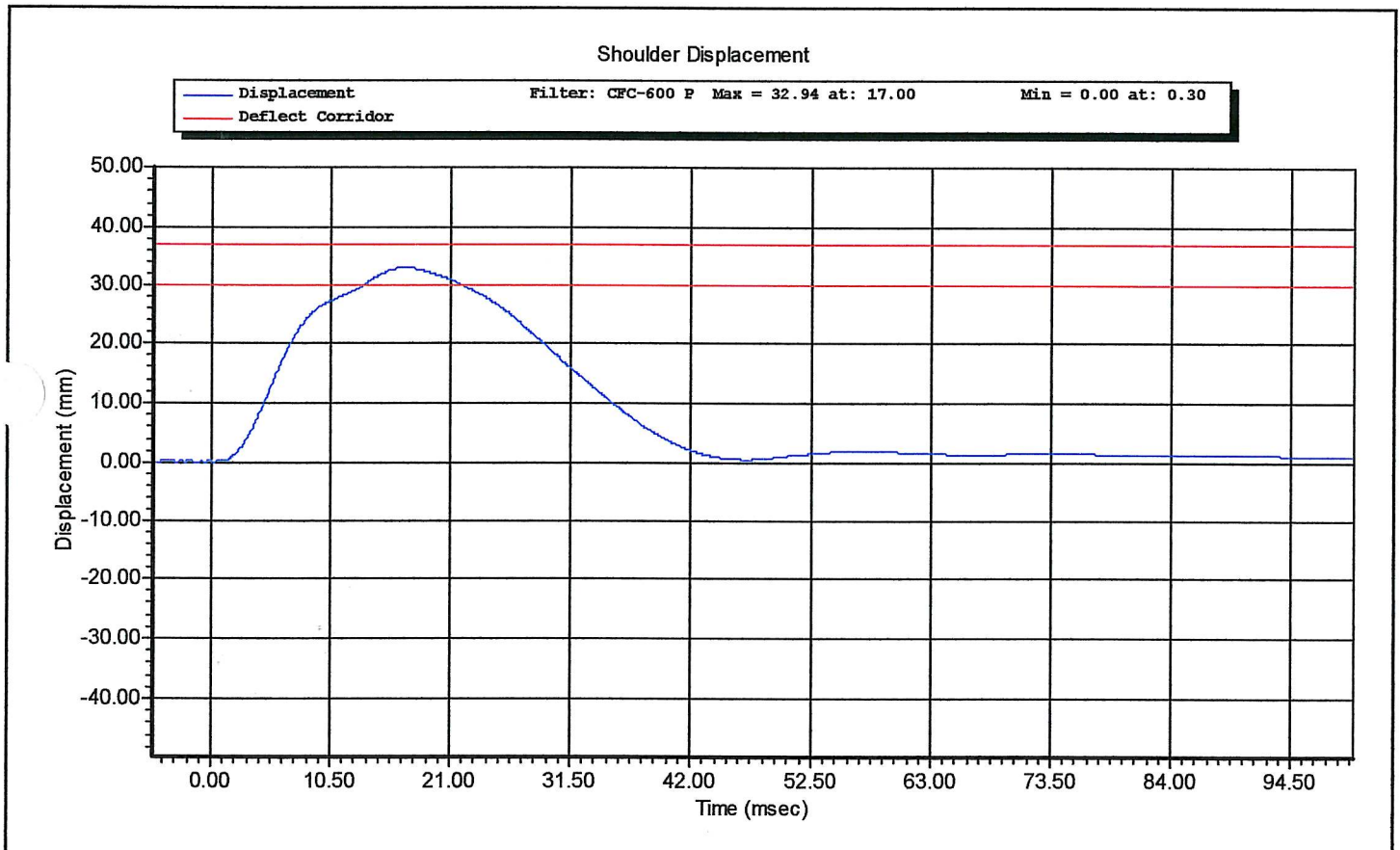
Test Date: **4/28/2009**



Denton Technical Center

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Test Name:	Shoulder Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	1	Test Date:	4/28/2009
		Test Time:	9:44:49 AM
Component Part Number	Component Serial Number		
Shoulder Rib - 180-3355	274		



Test ID: **RM0490**

Test Time: **9:44:49 AM**

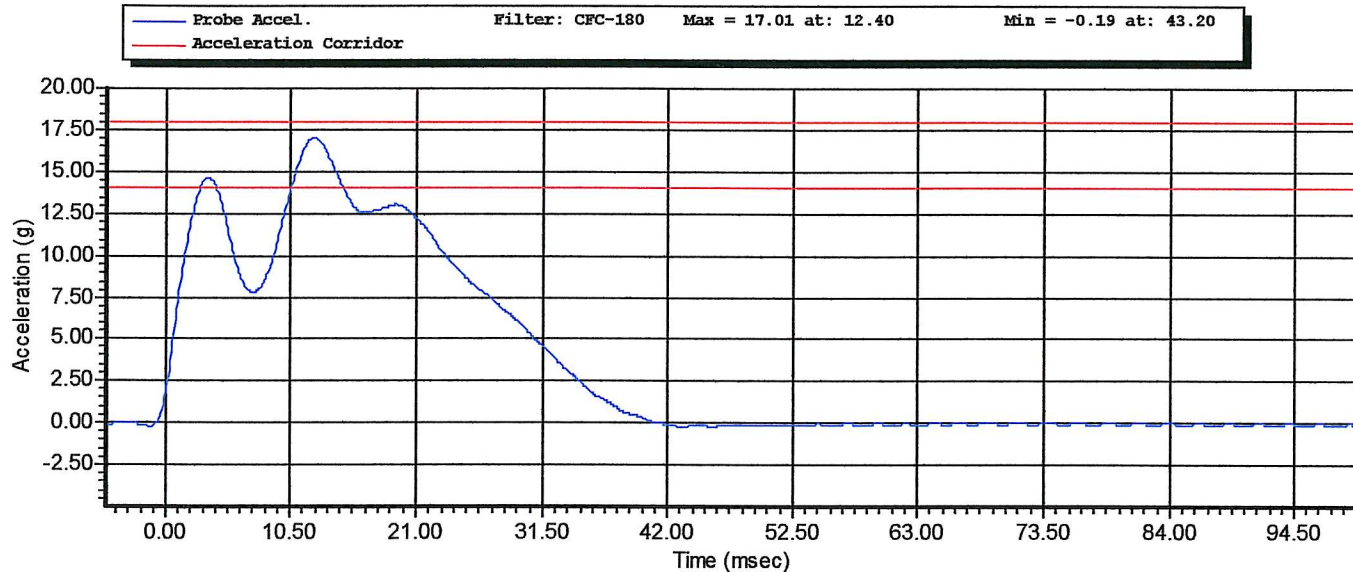
Test Date: **4/28/2009**



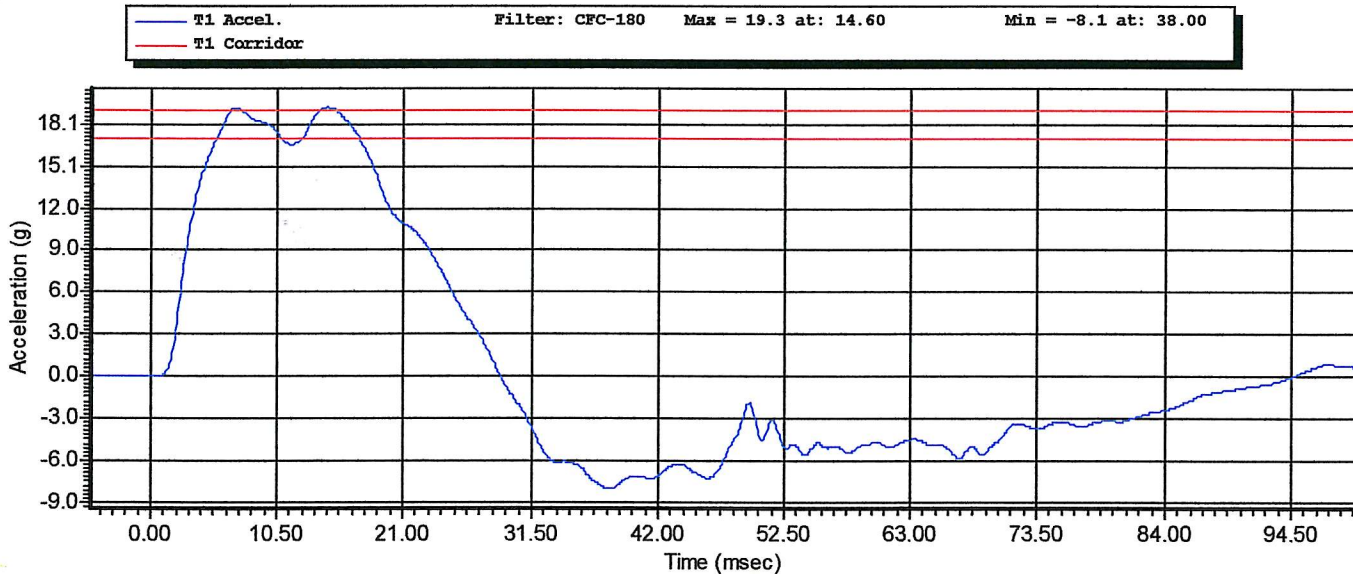
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Probe Accelerometer



T1 Accelerometer





Denton Technical Center

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VERIFICATION REPORT

Test Name:	Thorax Impact with Arm	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RN0490	Test Date:	4/28/2009
Test Number:	4	Test Time:	9:06:21 AM

Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Thorax Rib #1 - 180-3362	2024
Thorax Rib #2 - 180-3362	2061
Thorax Rib #3 - 180-3362	2062
Shoulder Rib - 180-3355	274
Arm - 180-6011	822

Comments:
FT
W ARM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	46 %RH P
Velocity	6.60 -- 6.80	6.71 m/s P
Probe Acceleration	31.0 -- 36.0	36.0 g P
Upper Thorax Rib Deflection	26.0 -- 32.0	27.2 mm P
Mid Thorax Rib Deflection	30.0 -- 36.0	32.4 mm P

Test ID: RN0490

Test Time: 9:06:21 AM

Test Date: 4/28/2009



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Parameters	Test Specifications	Test Results
Lower Thorax Rib Deflection	32.0 -- 38.0	34.6 mm P
Upper Spine Acceleration	34.0 -- 43.0	39.5 g P
Lower Spine Acceleration	28.0 -- 35.0	33.8 g P
Shoulder Deflection	31.0 -- 40.0	35.5 mm P

All test parameters are within specifications

Technician: **JSR**

Signature:

Supervisor: **MS**

Signature:

Test ID: **RN0490**

Test Time: **9:06:21 AM**

Test Date: **4/28/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Denton	180-3885	420	12/5/2008
Denton	180-3885	409	12/5/2008
Denton	180-3885	25	4/15/2009
Endevco	7264-2000	p51680	3/9/2009
Entran	7264-2000	02102105F22	3/9/2009
Denton	180-3881	386	12/4/2008

Test ID: **RN0490**

Test Time: **9:06:21 AM**

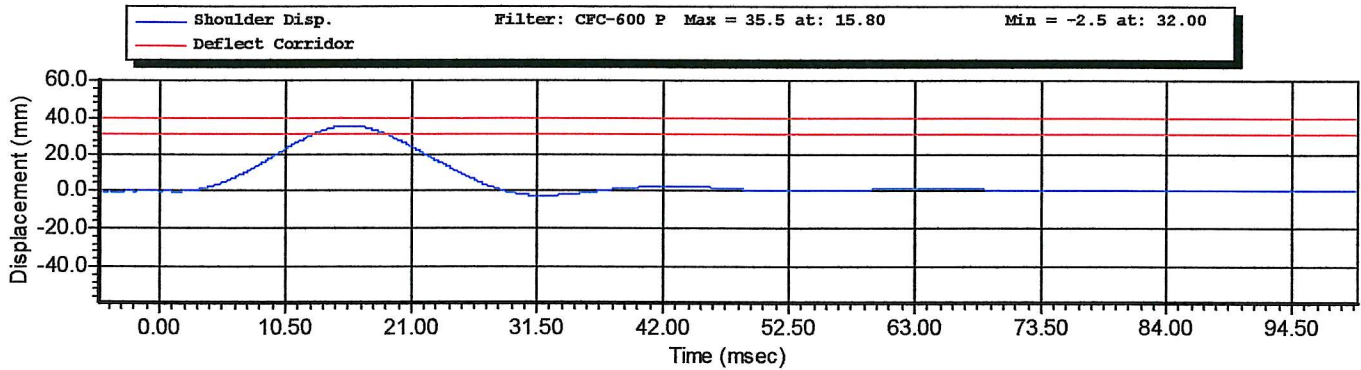
Test Date: **4/28/2009**



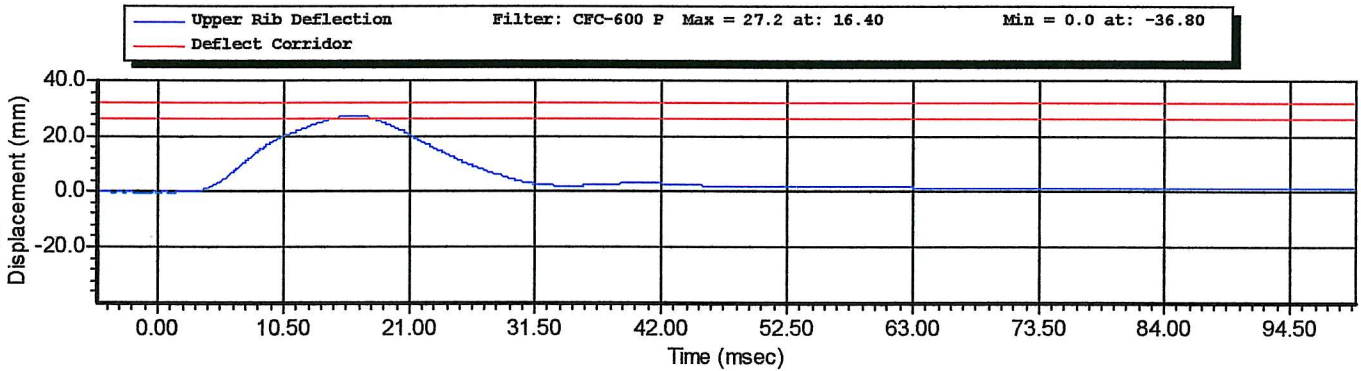
Denton Technical Center

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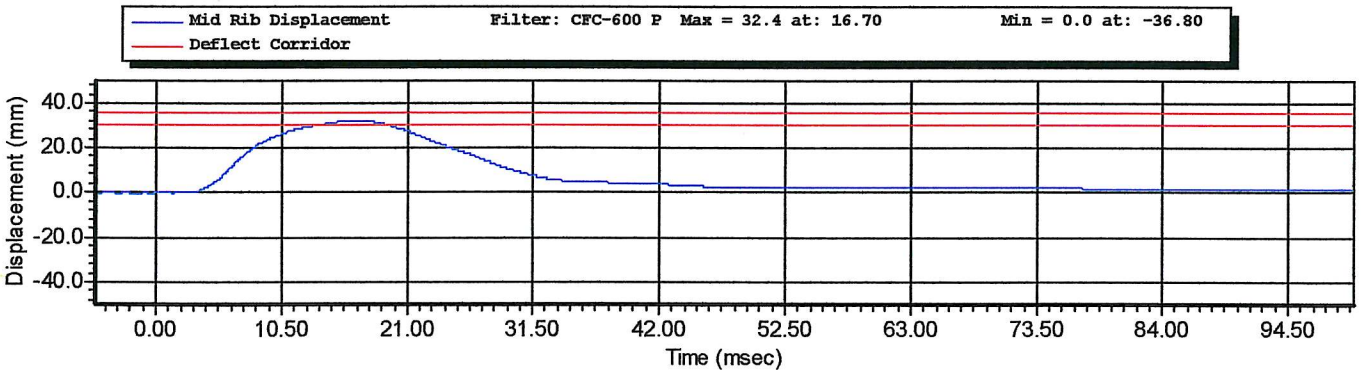
Shoulder Displacement



Upper Thorax Displacement



Mid Thorax Displacement



Test ID: RN0490

Test Time: 9:06:21 AM

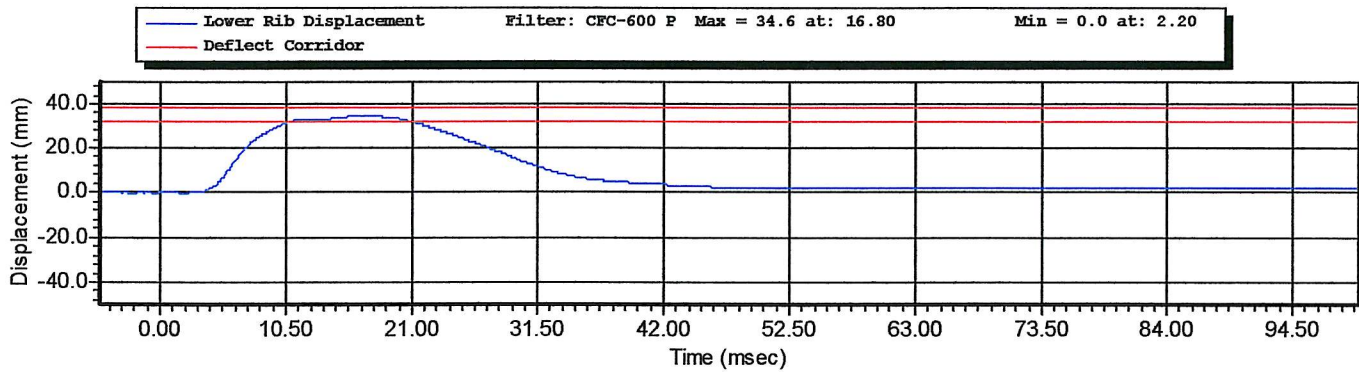
Test Date: 4/28/2009



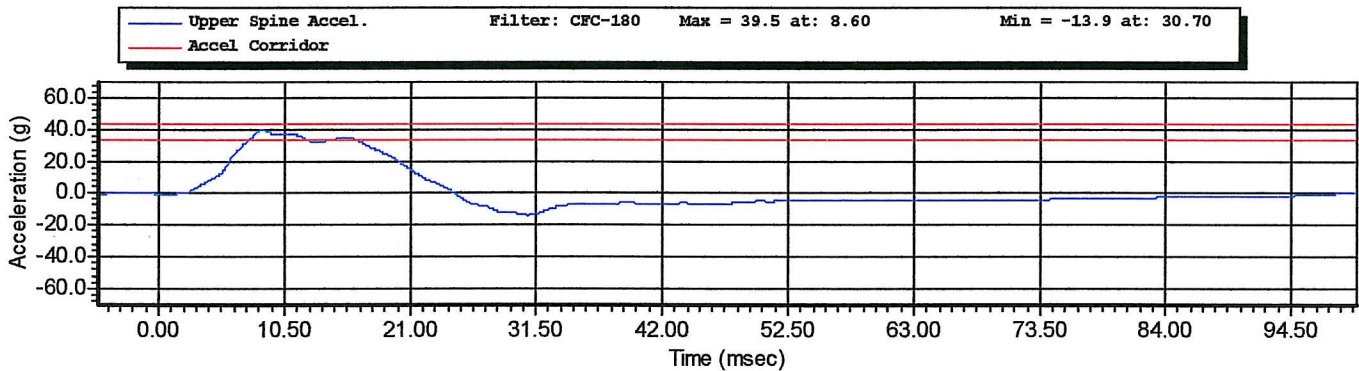
Denton Technical Center

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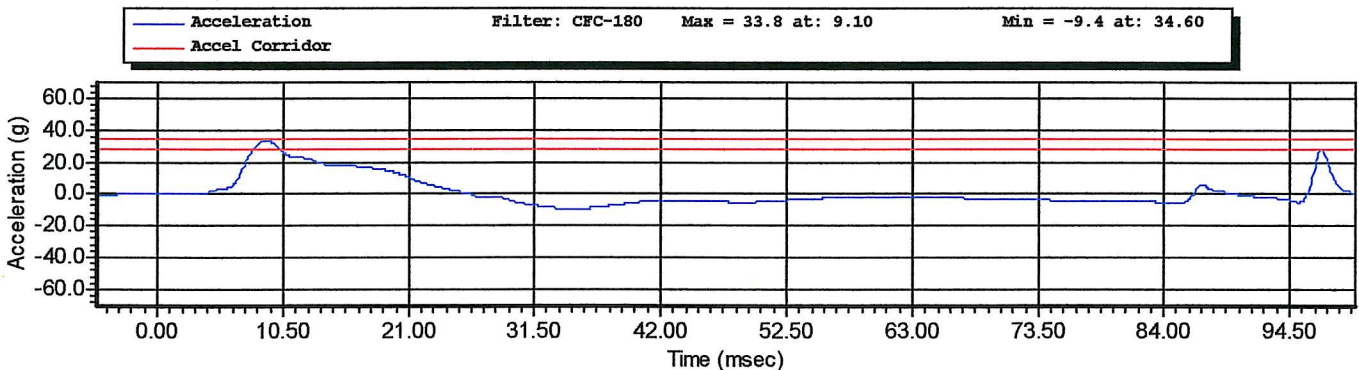
Lower Thorax Displacement



Upper Spine Acceleration



Lower Spine Acceleration

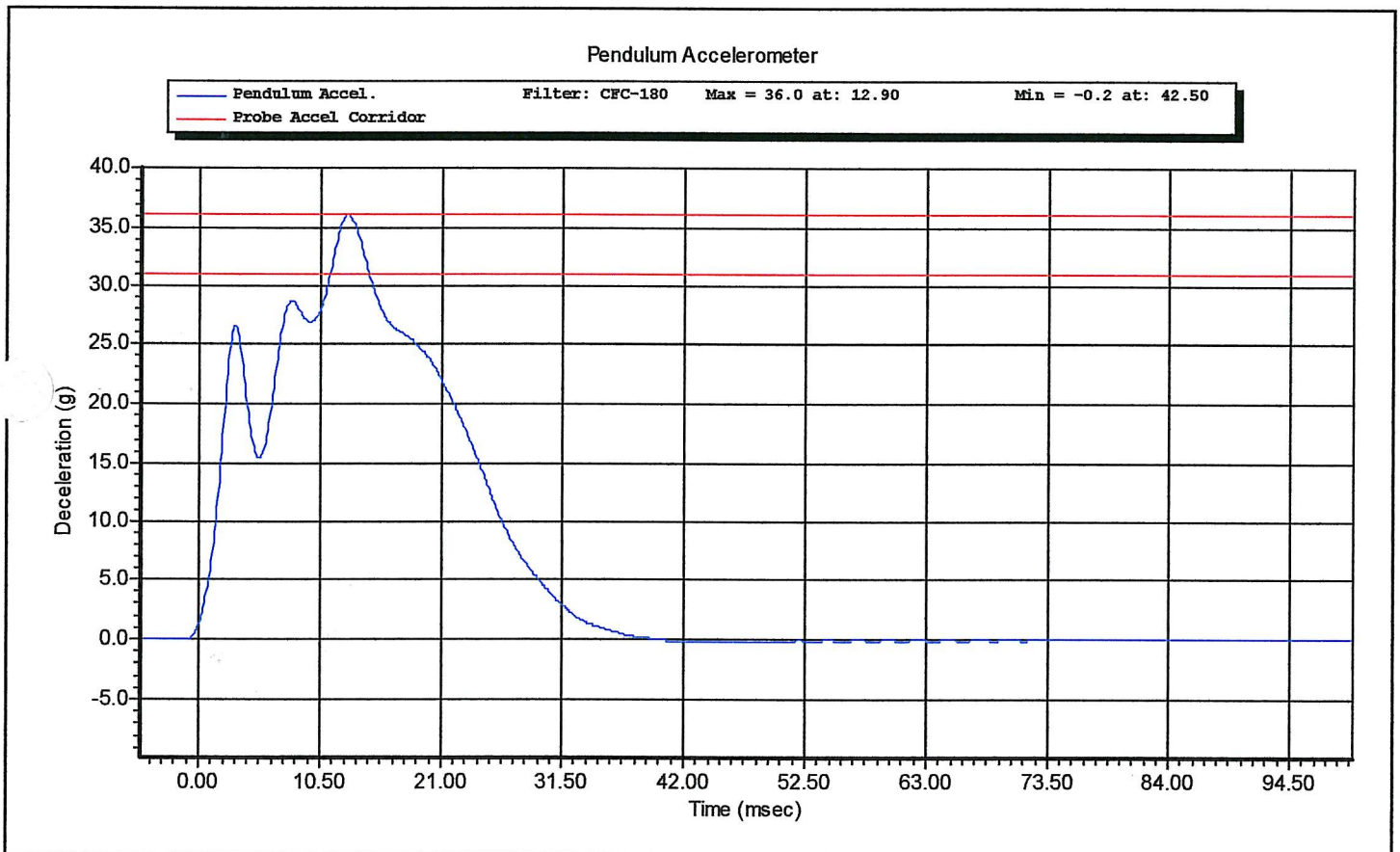




Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

Test Name:	Thorax Impact with Arm	Revision:	12/14/2006
o Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	4	Test Date:	4/28/2009
		Test Time:	9:06:21 AM
Component Part Number	Component Serial Number		
Thorax Rib #1 - 180-3362	2024		



Test ID: RN0490

Test Time: 9:06:21 AM

Test Date: 4/28/2009



Denton Technical Center

1965 Larchwood Troy, Michigan 48083, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Name:	Thorax Impact without Arm	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RO0490	Test Date:	4/27/2009
Test Number:	1	Test Time:	10:11:36 AM

Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Thorax Rib #1 - 180-3362	2024
Thorax Rib #2 - 180-3362	2061
Thorax Rib #3 - 180-3362	2062

Comments:
LEFT

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.0 deg C	P
Humidity	10	--	70	53 %RH	P
Velocity	4.20	--	4.40	4.31 m/s	P
Probe Acceleration	14.0	--	18.0	16.4 g	P
Upper Thorax Rib Deflection	33.0	--	40.0	35.2 mm	P
Mid Thorax Rib Deflection	39.0	--	45.0	40.9 mm	P
Lower Thorax Rib Deflection	36.0	--	43.0	37.5 mm	P
Upper Spine Acceleration	14.0	--	17.0	15.4 g	P
Lower Spine Acceleration	7.0	--	10.0	9.5 g	P

Test ID: **RO0490**

Test Time: **10:11:36 AM**

Test Date: **4/27/2009**



Denton Technical Center

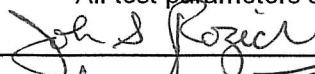
1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Parameters	Test Specifications	Test Results
FTSS Proposed Lower Spine Acceleration	7.0 -- 11.0	9.5 g P

All test parameters are within specifications

Technician: **JSR**

Signature: 

Supervisor: **MS**

Signature: 

Test ID: **RO0490**

Test Time: **10:11:36 AM**

Test Date: **4/27/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Denton	180-3885	420	12/5/2008
Denton	180-3885	409	12/5/2008
Denton	180-3885	25	4/15/2009
Endevco	7264-2000	p51680	3/9/2009
Entran	7264-2000	02102105F22	3/9/2009

Test ID: **RO0490**

Test Time: **10:11:36 AM**

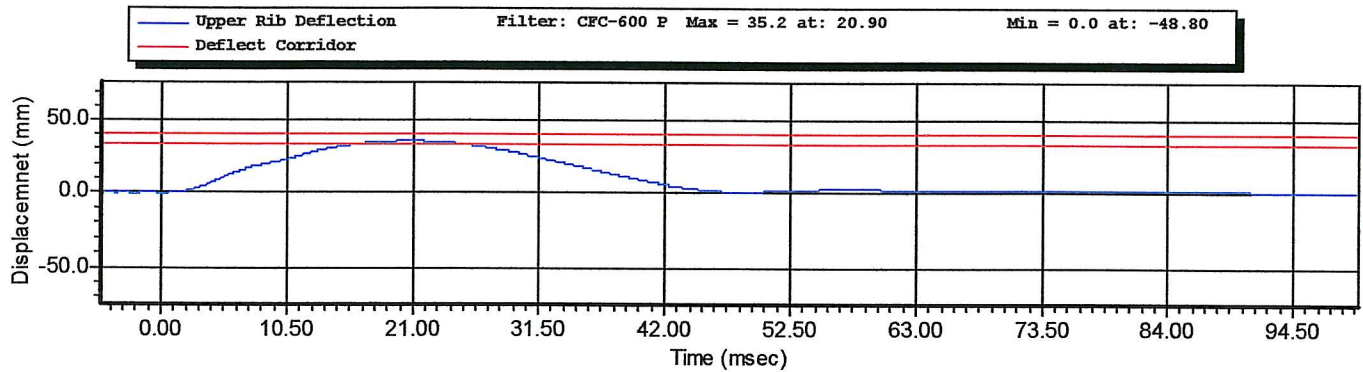
Test Date: **4/27/2009**



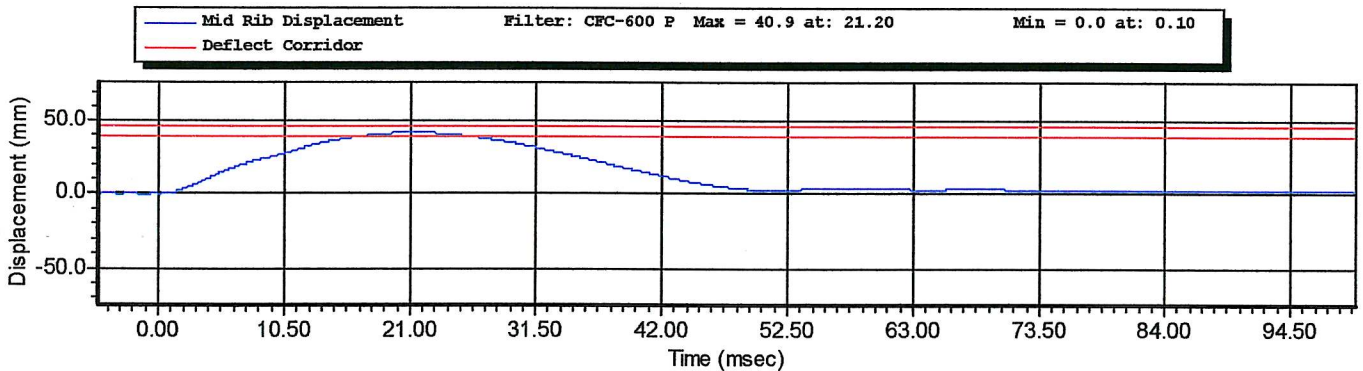
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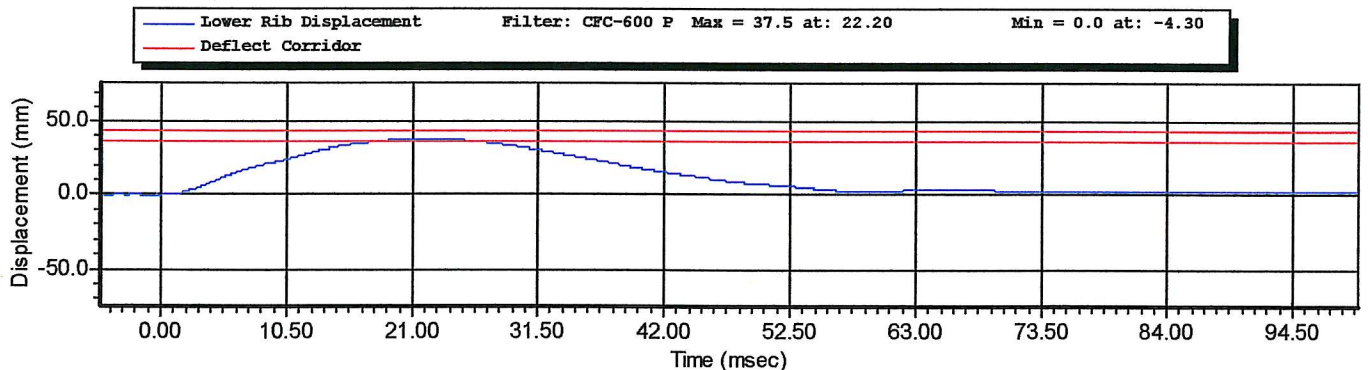
Upper Thorax Displacement



Mid Thorax Displacement



Lower Thorax Displacement

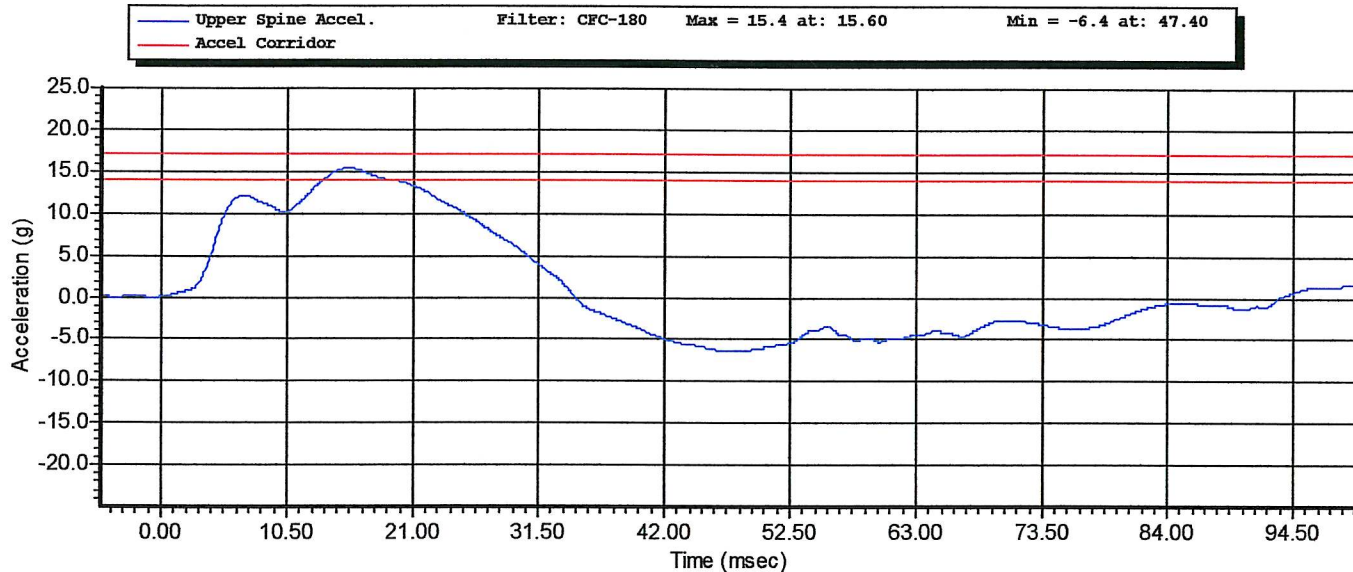




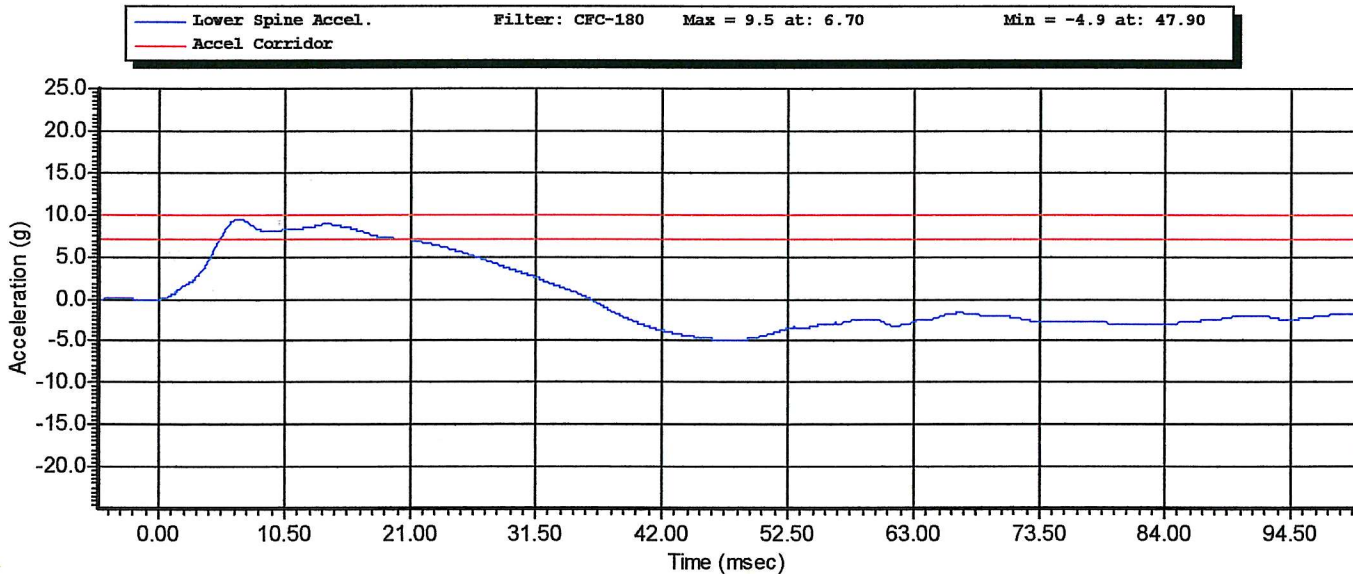
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Upper Spine Acceleration



Lower Spine Acceleration

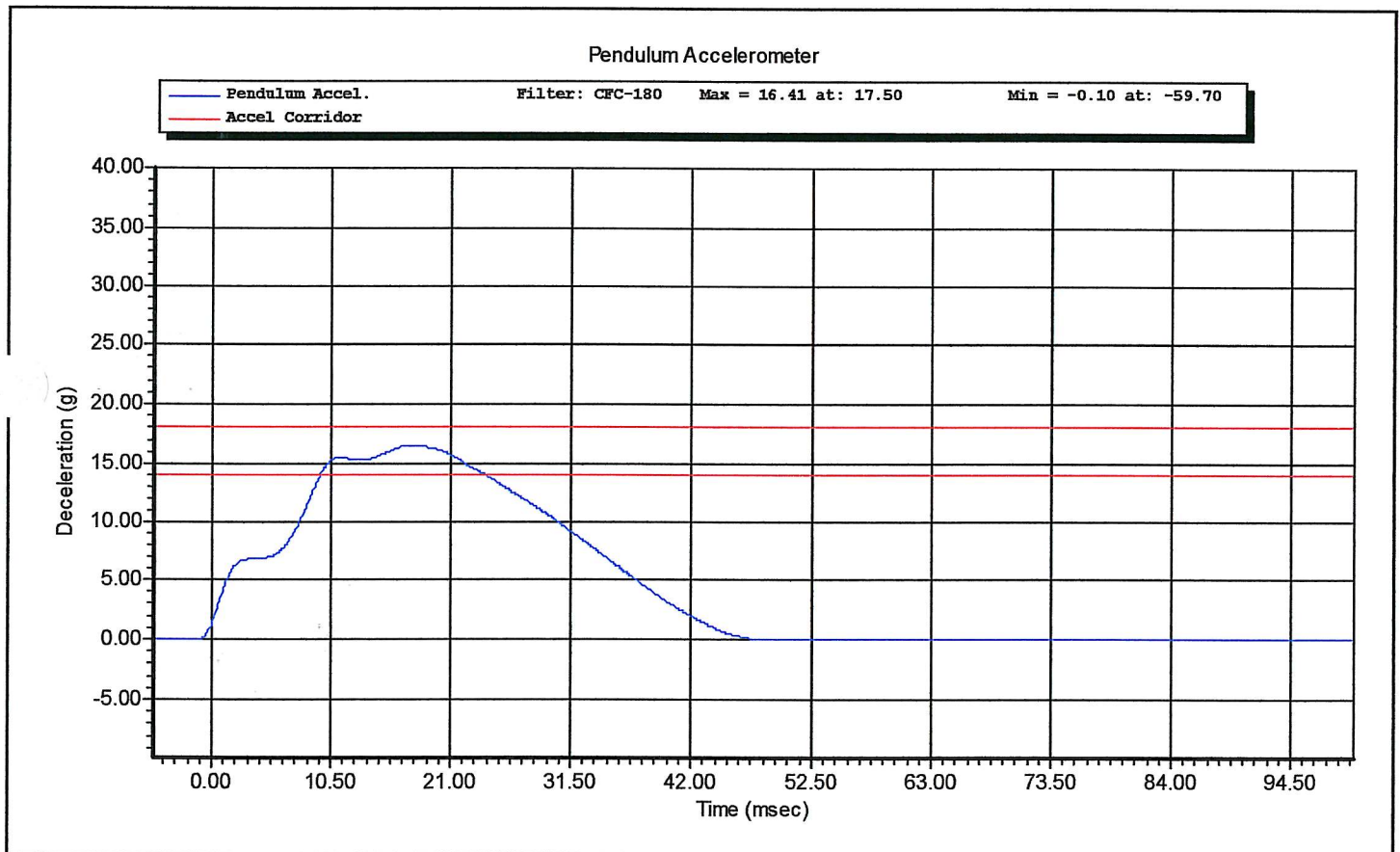




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Test Name:	Thorax Impact without Arm	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	1	Test Date:	4/27/2009
		Test Time:	10:11:36 AM
Component Part Number	Component Serial Number		
Thorax Rib #1 - 180-3362	2024		



Test ID: RO0490

Test Time: 10:11:36 AM

Test Date: 4/27/2009



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VERIFICATION REPORT

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RF0490	Test Date:	4/27/2009
Test Number:	2	Test Time:	9:55:00 AM

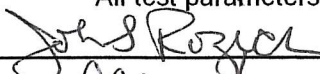
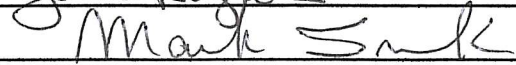
Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Abdo Rib #1 - 180-3362	1761
Abdo Rib #2 - 180-3362	1762

Comments:
LEFT

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.9 deg C	P
Humidity	10	--	70	53 %RH	P
Velocity	4.30	--	4.50	4.32 m/s	P
Probe Acceleration	12.0	--	16.0	16.0 g	P
Upper Abdominal Rib Deflection	39.0	--	47.0	39.6 mm	P
Lower Abdominal Rib Deflection	37.0	--	46.0	37.4 mm	P
Lower Spine Acceleration	11.0	--	14.0	12.4 g	P
FTSS Proposed Lower Spine Acceleration	9.0	--	14.0	12.4 g	P

All test parameters are within specifications

Technician:	JSR	Signature:	
Supervisor:	MS	Signature:	

Test ID: **RF0490**

Test Time: **9:55:00 AM**

Test Date: **4/27/2009**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Denton	180-3885	404	12/5/2008
Denton	180-3881	305	10/21/2008
Entran	7264-2000	02102105F22	3/9/2009

Test ID: **RF0490**

Test Time: **9:55:00 AM**

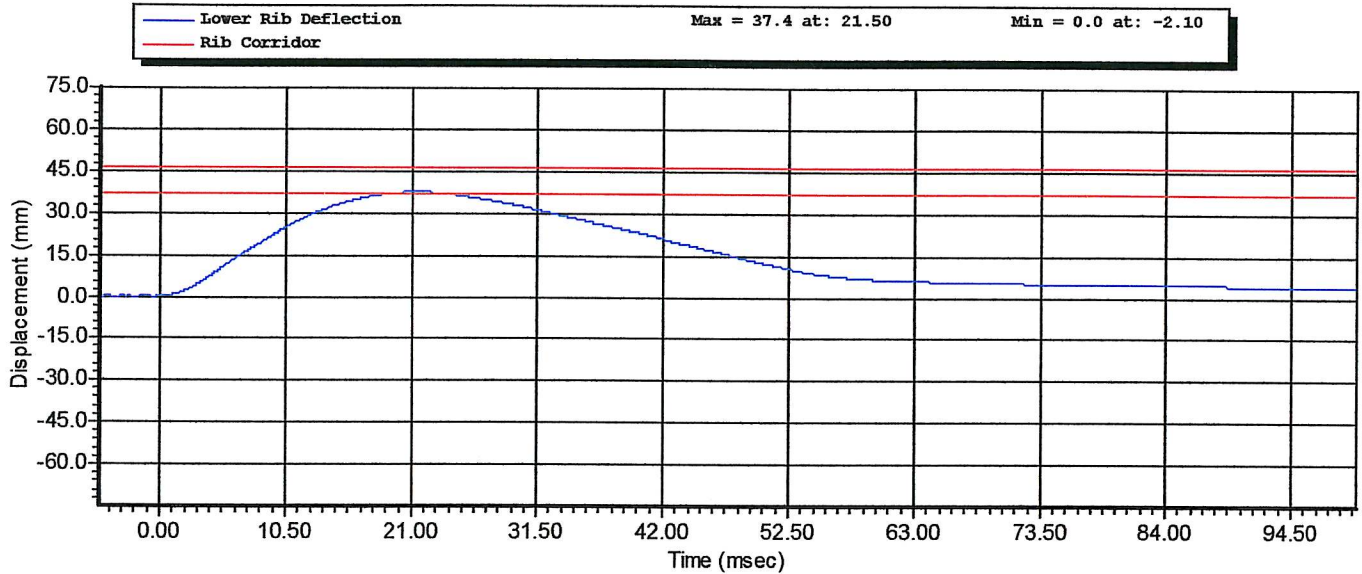
Test Date: **4/27/2009**



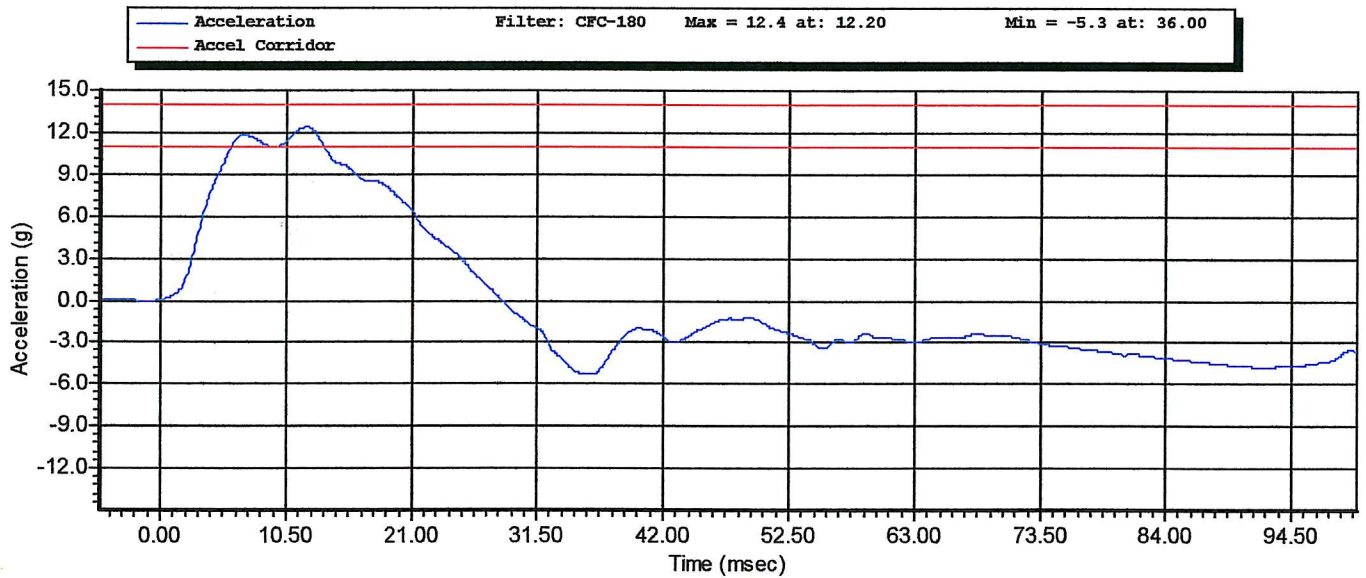
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Lower Abdominal Rib Deflection



Lower Spine Acceleration

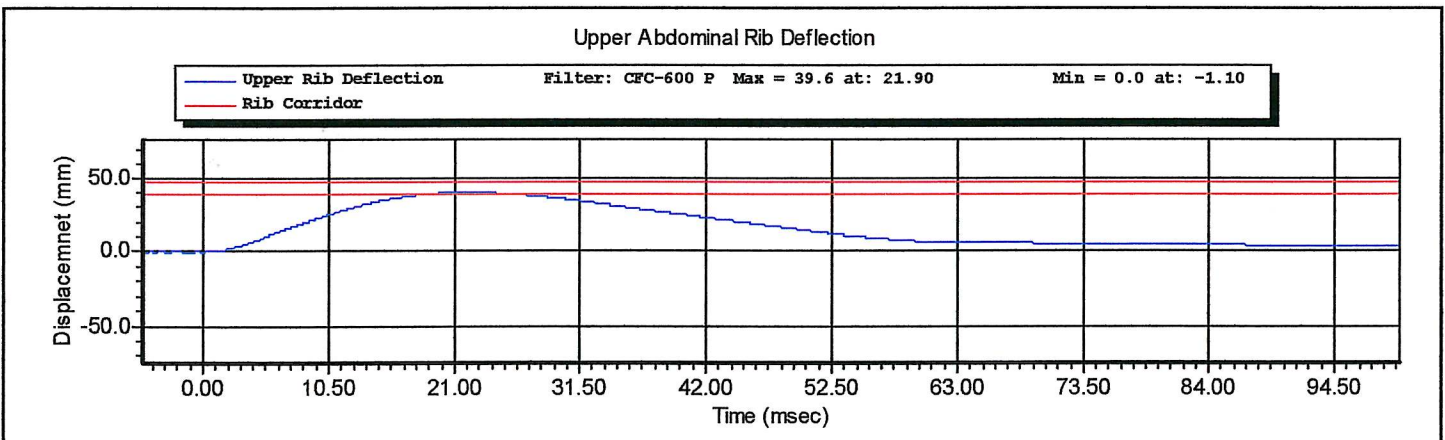
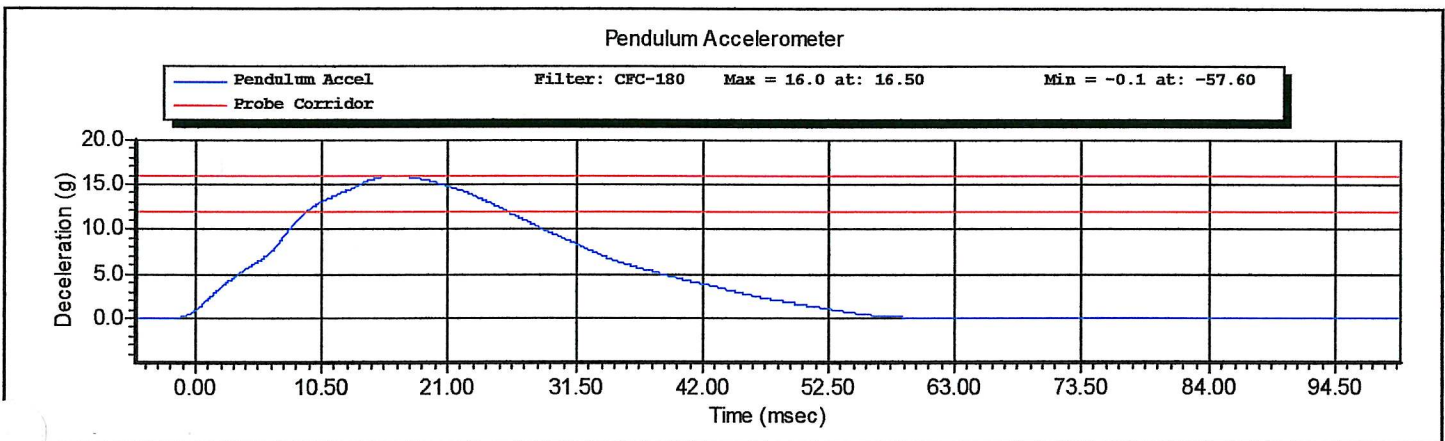




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1965 Larchwood Troy, Michigan 48083, Phone: (248) 528-9889, Fax: (248) 528-8494

Test Name:	Abdominal Impact	Revision:	12/14/2006
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	2	Test Date:	4/27/2009
		Test Time:	9:55:00 AM
Component Part Number	Component Serial Number		
Abdo Rib #1 - 180-3362	1761		



Test ID: RF0490

Test Time: 9:55:00 AM

Test Date: 4/27/2009



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

Test Name:	Pelvis	Revision:	12/14/2006
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	RJ0875	Test Date:	4/27/2009
Test Number:	3	Test Time:	8:52:48 AM

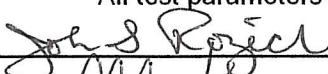
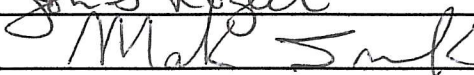
Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Pelvis Flesh - 180-4343	875
Pelvis Plug - 180-4450	9803

Comments:
LEFT

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10 -- 70	52 %RH P
Velocity	6.60 -- 6.80	6.64 m/s P
Peak Probe Acceleration	38.0 -- 47.0	45.1 g P
Peak Pelvis Acceleration	41.0 -- 50.0	49.2 g P
FTSS Proposed Peak Pelvis Accel after 5	34.0 -- 42.0	39.2 g P
Peak Acetabulum Force	3.80 -- 4.60	4.11 kN P
FTSS Proposed Peak Acetabulum Force	3.60 -- 4.40	4.11 kN P

All test parameters are within specifications

Technician:	JSR	Signature:	
Supervisor:	MS	Signature:	

Test ID: **RJ0875**

Test Time: **8:52:48 AM**

Test Date: **4/27/2009**



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Endevco	7264-2000	P51671	3/9/2009
Denton	3249J	275	3/6/2009

Test ID: **RJ0875**

Test Time: **8:52:48 AM**

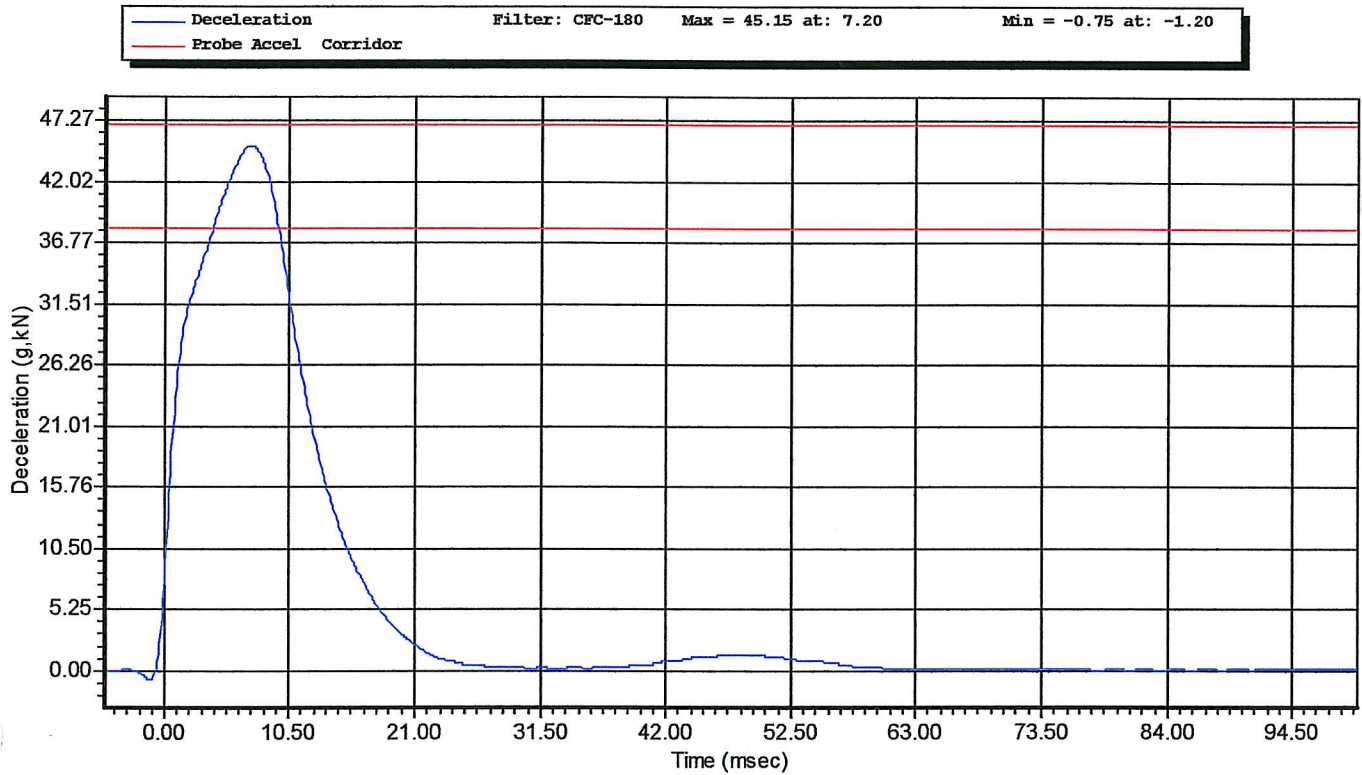
Test Date: **4/27/2009**



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Probe Accelerometer



Test ID: RJ0875

Test Time: 8:52:48 AM

Test Date: 4/27/2009



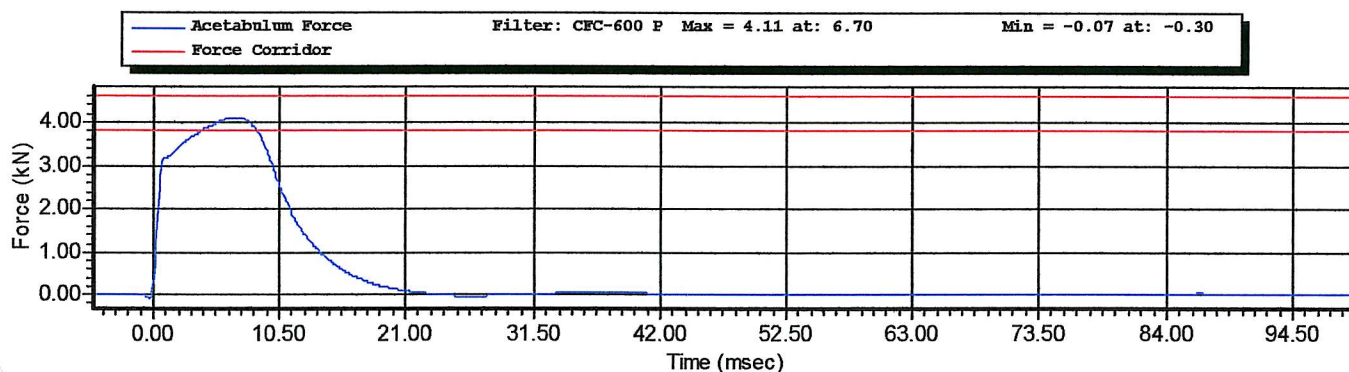
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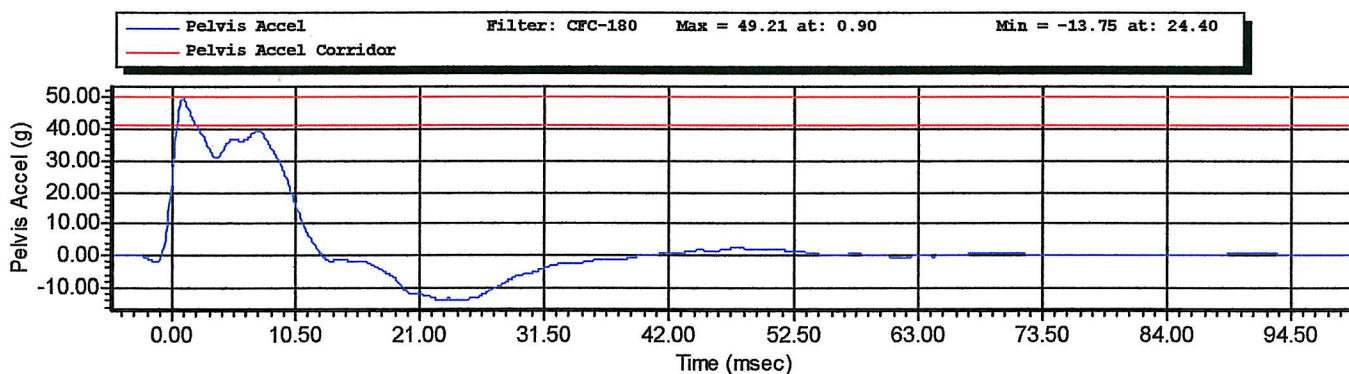
Test Name:	Pelvis	Revision:	12/14/2006
Sub Test Name:	Acetabulum Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	3	Test Date:	4/27/2009
		Test Time:	8:52:48 AM

Component Part Number	Component Serial Number
Pelvis Flesh - 180-4343	875

Acetabulum Force



Pelvis Accelerometer



Test ID: RJ0875

Test Time: 8:52:48 AM

Test Date: 4/27/2009



Denton Technical Center

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VERIFICATION REPORT

Test Name:	Pelvis	Revision:	12/14/2006
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test ID:	R60875	Test Date:	4/27/2009
Test Number:	1	Test Time:	7:22:05 AM

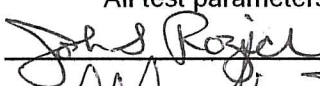
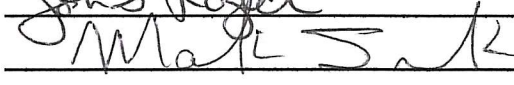
Condition As Received:	CALSPAN
User Field 2:	
User Field 3:	

Component Part Number	Component Serial Number
Pelvis Flesh - 180-4343	875

Comments:
LEFT

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.1 deg C P
Humidity	10 -- 70	51 %RH P
Velocity	4.20 -- 4.40	4.21 m/s P
Peak Probe Acceleration	34.0 -- 40.0	39.9 g P
Peak Pelvis Acceleration	27.0 -- 33.0	32.0 g P
Peak Iliac Force	3.70 -- 4.50	4.24 kN P
FTSS Proposed Peak Iliac Force	3.60 -- 4.40	4.24 kN P

All test parameters are within specifications

Technician:	JSR	Signature:	
Supervisor:	MS	Signature:	

Test ID: **R60875**

Test Time: **7:22:05 AM**

Test Date: **4/27/2009**



Denton Technical Center

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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	99999999	12/16/2008
MSI	61A-750-10-360-XY	A021717	4/3/2009
Endevco	7264-2000	P51671	3/9/2009
Denton	3228J	279	3/6/2009

Test ID: **R60875**

Test Time: **7:22:05 AM**

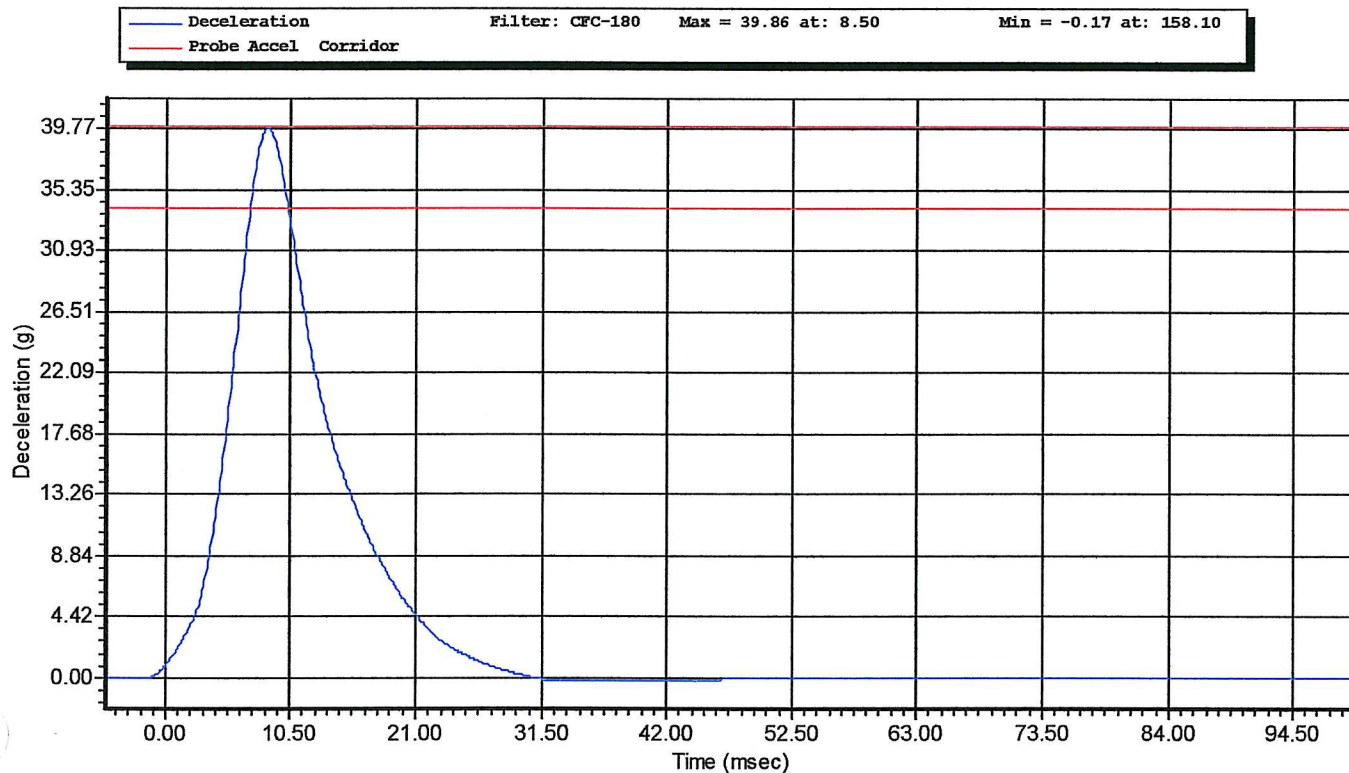
Test Date: **4/27/2009**



Denton Technical Center

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Probe Accelerometer



Test ID: R60875

Test Time: 7:22:05 AM

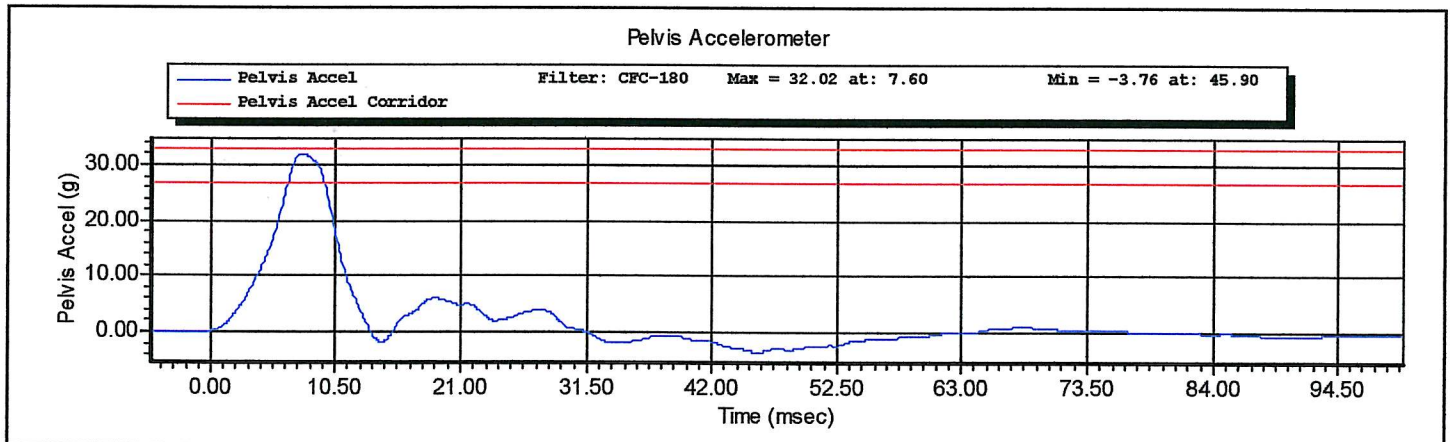
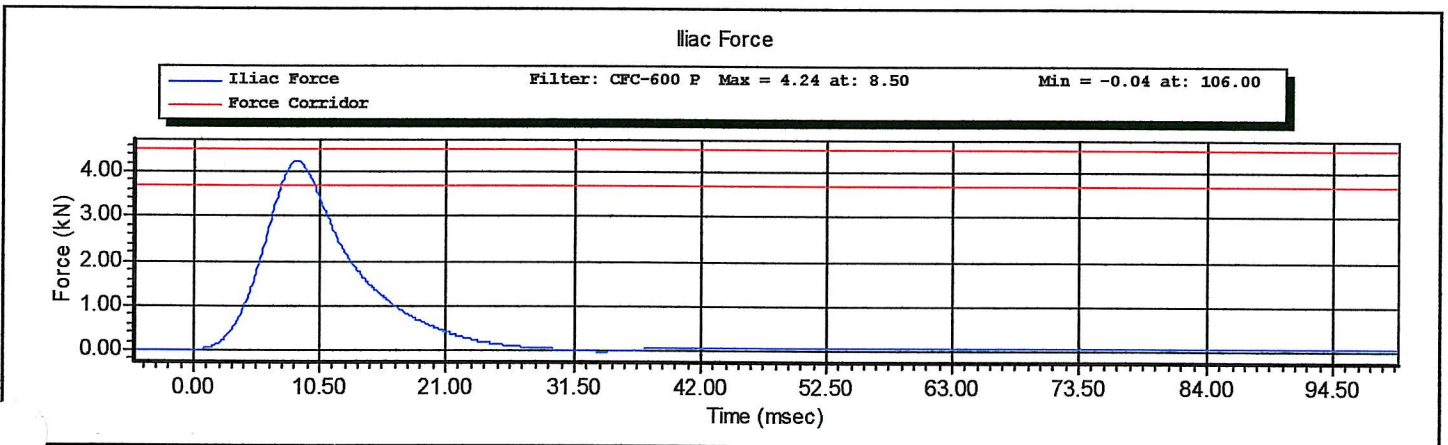
Test Date: 4/27/2009



Denton Technical Center

1965 Larchwood Troy, Michigan 48063, Phone: (248) 528-9889, Fax: (248) 528-8494

Test Name:	Pelvis	Revision:	12/14/2006
Sub Test Name:	Iliac Impact	Spec Type:	NHTSA
ATD Type:	SID-IIs Level 'D'		
ATD Serial Number:	300		
Test Number:	1	Test Date:	4/27/2009
		Test Time:	7:22:05 AM
Component Part Number	Component Serial Number		
Pelvis Flesh - 180-4343	875		



Test ID: R60875

Test Time: 7:22:05 AM

Test Date: 4/27/2009

APPENDIX D

DUMMY AND VEHICLE INSTRUMENTATION CALIBRATION DATA

INSTRUMENTATION	MANUFACTURER AND SERIAL NUMBER	CALIBRATION DATE
V1P1 HDCG Ax	MFG: ENDEVCO S/N: P51685	03/09/09
V1P1 HDCG Ay	MFG: ENDEVCO S/N: 51682	03/09/09
V1P1 HDCG Az	MFG: ENDEVCO S/N: P51699	03/09/09
V1P1 HDCG RAx	MFG: ENDEVCO S/N: P51701	03/09/09
V1P1 HDCG RAy	MFG: ENDEVCO S/N: P45019	03/09/09
V1P1 HDCG RAz	MFG: ENDEVCO S/N: P51690	03/09/09
V1P1 T01 Ay	MFG: ENDEVCO S/N: P51680	03/09/09
V1P1 T12 Ax	MFG: ENTRAN S/N: 02A16-A26	03/09/09
V1P1 T12 Ay	MFG: ENTRAN S/N: 02I02I05-F22	03/09/09
V1P1 T12 Az	MFG: ENTRAN S/N: 02I02I05-F16	03/09/09
V1P1 PVCN Ay	MFG: ENDEVCO S/N: P51671	03/09/09
V1P1 NEKU Fx	MFG: DENTON S/N: 1591Fx	12/29/08
V1P1 NEKU Fy	MFG: DENTON S/N: 1591Fy	12/29/08
V1P1 NEKU Fz	MFG: DENTON S/N: 1591Fz	12/29/08
V1P1 NEKU Mx	MFG: DENTON S/N: 1591Mx	12/29/08
V1P1 NEKU My	MFG: DENTON S/N: 1591My	12/29/08
V1P1 NEKU Mz	MFG: DENTON S/N: 1591Mz	12/29/08
V1P1 LAC Fy	MFG: DENTON S/N: 275	03/06/09
V1P1 LIW Fy	MFG: DENTON S/N: 279	03/06/09
V1P1 SHL Dy	MFG: FTSS S/N: 1063	01/26/09
V1P1 RB1 Dy	MFG: FTSS S/N: 1121	01/26/09
V1P1 RB2 Dy	MFG: FTSS S/N: 1151	01/26/09
V1P1 RB3 Dy	MFG: FTSS S/N: 1156	01/26/09
V1P1 RB4 Dy	MFG: FTSS S/N: 1162	01/26/09
V1P1 RB5 Dy	MFG: FTSS S/N: 1232	01/26/09
V1 VECG01 Ax	MFG: ENDEVCO S/N: P23885	03/02/09
V1 VECG01 Ay	MFG: ENDEVCO S/N: P16671	03/02/09
V1 VECG01 Az	MFG: ENDEVCO S/N: P32288	03/02/09
V1 VECG02 AVx	MFG: ATA S/N: 0323	10/05/08
V1 VECG02 AVy	MFG: ATA S/N: 0336	10/05/08
V1 VECG02 AVz	MFG: ATA S/N: 0321	10/05/08
V1 DSLF03 Ay	MFG: ENDEVCO S/N: P18531	03/03/09
V1 APLL04 Ay	MFG: ENDEVCO S/N: P23139	03/02/09
V1 APLL05 Ay	MFG: ENDEVCO S/N: P17283	03/03/09
V1 APLL06 Ay	MFG: ENDEVCO S/N: P38132	11/21/08
V1 BPLL07 Ay	MFG: ENDEVCO S/N: P32197	11/19/08
V1 BPLL08 Ay	MFG: ENDEVCO S/N: P21516	11/21/08
V1 BPLL09 Ay	MFG: ENDEVCO S/N: P17539	03/03/09
V1 SERF10 Ay	MFG: ENDEVCO S/N: P23788	03/03/09
V1 ENGN11 Ax	MFG: ENDEVCO S/N: P21399	03/03/09
V1 ENGN11 Ay	MFG: ENDEVCO S/N: P35757	03/02/09
V1 FWLL12 Ay	MFG: ENDEVCO S/N: P26259	03/25/09
V1 ROFR13 Ay	MFG: ENDEVCO S/N: P24145	03/03/09
V1 DSRF14 Ay	MFG: ENDEVCO S/N: J38127	03/03/09
V1 REDK15 Ax	MFG: ENDEVCO S/N: P23993	03/03/09
V1 REDK15 Ay	MFG: ENDEVCO S/N: P23164	03/24/09