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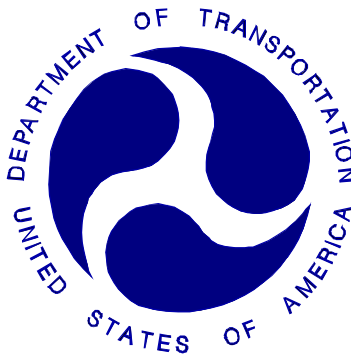
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

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

NHTSA NUMBER: MA0501

CALSPAN TEST NUMBER: 8865-NCAP-09

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July 22, 2009

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
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16. Abstract A frontal load cell barrier test of a 2010 Hyundai Genesis 2-door Coupe was performed at Calspan Corporation's crash test facility in Buffalo, New York, on July 22, 2009. The impact velocity was 56.5 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 380 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements. The occupant injury criteria summary is as follows:					
Measurement Description		Units	Threshold	Driver (064)	Passenger (061)
Head Injury Criteria (HIC - 36 ms)		-	1000	523.7	355.5
Maximum Thorax Acceleration (3 ms Clip)		g's	60 g's	43.7	50.6
Chest Displacement		mm	-76 mm	23.9	26.0
Left Femur Force		Newtons	-10000 N	-1405.0	-1902.6
Right Femur Force		Newtons	-10000 N	-3590.6	-735.7
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.5 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.5 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.5 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

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 this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No.061) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 129 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2010 Hyundai Genesis 2-door Coupe at a velocity of 56.5 kph. The test was performed at Calspan on July 22, 2009. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

ATD	HIC	T ₁	T ₂	Clip (g)	T ₁	T ₂	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	523.7	51.4	87.4	43.7	76.2	79.2	23.9	-1405.0	-3590.6
Passenger	355.5	57.8	93.8	50.6	64.0	67.0	26.0	-1902.6	-735.7

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

TEST NOTES	
Data Channel	Anomalies
V1P1 PELVIC X	DATA HAS SPIKES

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: MA0501 Test Mode: 56.3 kph Frontal Barrier
 Test Date: July 22, 2009 Time: 11:20 Temperature: 21 °C
 Vehicle Make/Model/Body Style: 2010 Hyundai Genesis 2-door Coupe
 Vehicle Test Weight: 1744 kg Impact Velocity: 56.5 kph (55.5 – 57.1 kph)
 Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 380 mm

ATD INFORMATION AND VISIBLE CONTACT POINTS

	DRIVER	PASSENGER
ATD Type:	Part 572E	Part 572E
Restraint System:	Seatbelt, Airbag, Knee Bolster	Seatbelt, Airbag, Knee Bolster
Head Contact:	Airbag, Back of head to head restraint and top of head to roof	Airbag, Back of head to head restraint and top of head to roof
Abdomen Contact:	None	None
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee Bolster	Knee Bolster
Right Knee Contact:	Knee Bolster	Knee Bolster

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed / Operable	Closed / Operable
Rear Door Opening	NA	NA
Hatch/Other Door Opening	Closed / Operable	
Front Seat Track Shift (mm)	0	0
Front Seat Back Failure	None	None
Glazing Damage	None	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	576	545	524	548

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	1035	1045
Lap belt length as measured on ATD	mm	728	730
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	-	-

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2010 Hyundai Genesis 2-door Coupe

NHTSA No. : MA0501 ; VIN: KMHHT6KD8AU011170 ; Color: Gray

Engine Data: 4 cylinders; - CID; 2.0 Liters; - cc

Placement: x Longitudinal or In-Line; - Transverse or Lateral

Transmission Data: 5 speeds; - Manual; x Automatic; - Overdrive

Final Drive: - Rear Wheel Drive; x Front Wheel Drive; - Four Wheel Drive

AUTOMATIC DOOR LOCKS:

Is test vehicle equipped with Automatic Door Locks (ADLs)? - Yes; x No;

Does vehicle owner's manual describe how to deactivate ADLs? - Yes; x No; - N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 7/12/09 ; Odometer Reading 31 km

Selling Dealer: Northtowne Hyundai

Dealer Address: 3675 Sheridan Drive Amherst NY 14226

TEST VEHICLE OPTIONS:

x AC; - Power Steering; x Power Brakes; x Power Locks; x Power Seats

x ABS; - Tilt Wheel; x Stability Control - Traction Control x Anti-Theft

SAFETY BELT FEATURES:

Driver: x Pretensioner (Shoulder); x Load Limiter; x Adjustable Anchorage

Passenger: x Pretensioner (Shoulder); x Load Limiter; x Adjustable Anchorage

AIRBAG FEATURES:

Position	Frontal	Knee Bolster	Side Torso	Side Head/Torso Combination	Side Curtain
Driver:	x	-	x	-	x
Passenger:	x	-	x	-	x
Rear Passenger:	-	-	-	-	-

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Hyundai Motor Company

Date of Manufacture April 20, 2009

GVWR: 1930 kg; GAWR: 1000 kg FRONT; 1050 kg REAR

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; x Bucket; - Split Bench

Number of Occupants: 2 Front; 2 Rear; 4 Total

Vehicle Capacity Weight (VCW) = 322.0 kg

No. of Occupants x 68.04 kg = 272.2 kg

Rated Cargo/Luggage Weight (RCLW) = 49.8 kg

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	427.0	422.0	54.7	849.0
Rear =	350.5	351.5	45.3	702.0
Total Delivered Weight (UDW) =				1551.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	1551.0	kg
Rated Cargo/Luggage Weight (RCLW)	=	49.8	kg
Weight of 2 p.572 Dummies @ 76 each	=	152	kg
TARGET TEST WEIGHT	=	1752.8	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 41.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	463.0	454.0	52.6	917.0
Rear =	408.0	419.0	47.4	827.0
Total Vehicle Test Weight (ATW) =				1744.0

Weight of Ballast Secured in Vehicle Trunk Area¹ = 5 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG ²
AS DELIVERED:	708	710	739	739	1278.2
FULLY LOADED:	698	702	724	726	-
AS TESTED:	701	702	726	727	1339.1

Vehicle's Wheel Base: 2824 mm

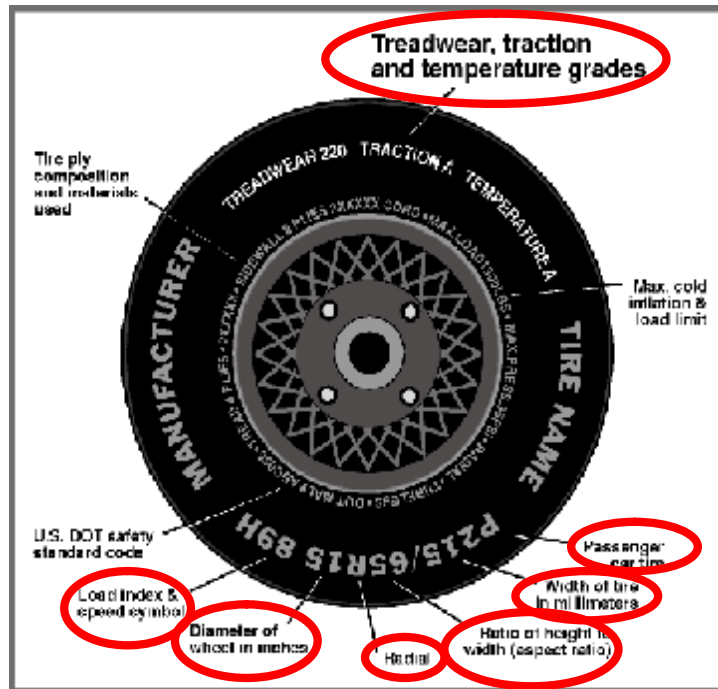
¹Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

²Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2010 Hyundai Genesis 2-door Coupe

NHTSA Test No.: MA0501 Test Date: July 22, 2009



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	350	350
Cold Pressure (from tire placard - kPa)*	240	240
Recommended Tire Size (from tire placard)	P245/45R18	P245/45R18
Tire size on Vehicle	P245/45R18	P245/45R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Potenza	Potenza
Tire Type	Passenger	Passenger
Tire Width (mm)	245	245
Ratio of Height to Width (aspect ratio)	45	45
Radial	Radial	Radial
Wheel Diameter	18	18
Load Index & Speed Symbol	96V	96V
Treadwear	260	260
Traction Grade	A	A
Temperature Grade	A	A

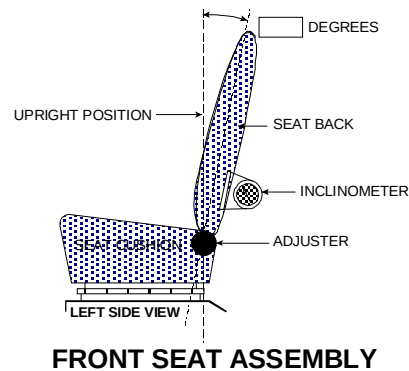
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2010 Vehicle Model: Hyundai Genesis Body Style : 2-door Coupe

1. NOMINAL DESIGN RIDING POSITION:
for adjustable driver and passenger seat backs.
Please describe how to position the inclinometer to
measure the seat back angle. Include description of
the location of the adjustment latch detent, if
applicable.



Seat back angle for driver's seat: 26

Measurement instructions: Seat back was reclined 12 degrees from initial upright position.

12 degrees on head restraint post for final position.

Seat back angle for passenger's seat: 26

Measurement instructions: Seat back was reclined 12 degrees from initial upright position.

12 degrees on head restraint post for final position.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Full forward to full rearward = 266 mm - Seat was set at 133 mm
on face of cushion with vertical adjustment full down

Positioning of the passenger's seat: Mechanical adjustment had 22 detents – placed in detent 11 which
is mechanical middle (starting detent is 0)

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 64.35 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification
testing to requirements of FMVSS 301 = 59.2 to 60.5 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 59.8 liters

3.3 One-Third of Useable Capacity = 21.5 liters

3.4 Is vehicle equipped with electric fuel pump? Yes- x ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

With ignition turned "ON"

DATA SHEET NO. 4
TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Tilt wheel was positioned at center of loci. Test position was
20.7 degrees on face of wheel.

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: No adjustment

6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? - Yes; x No;

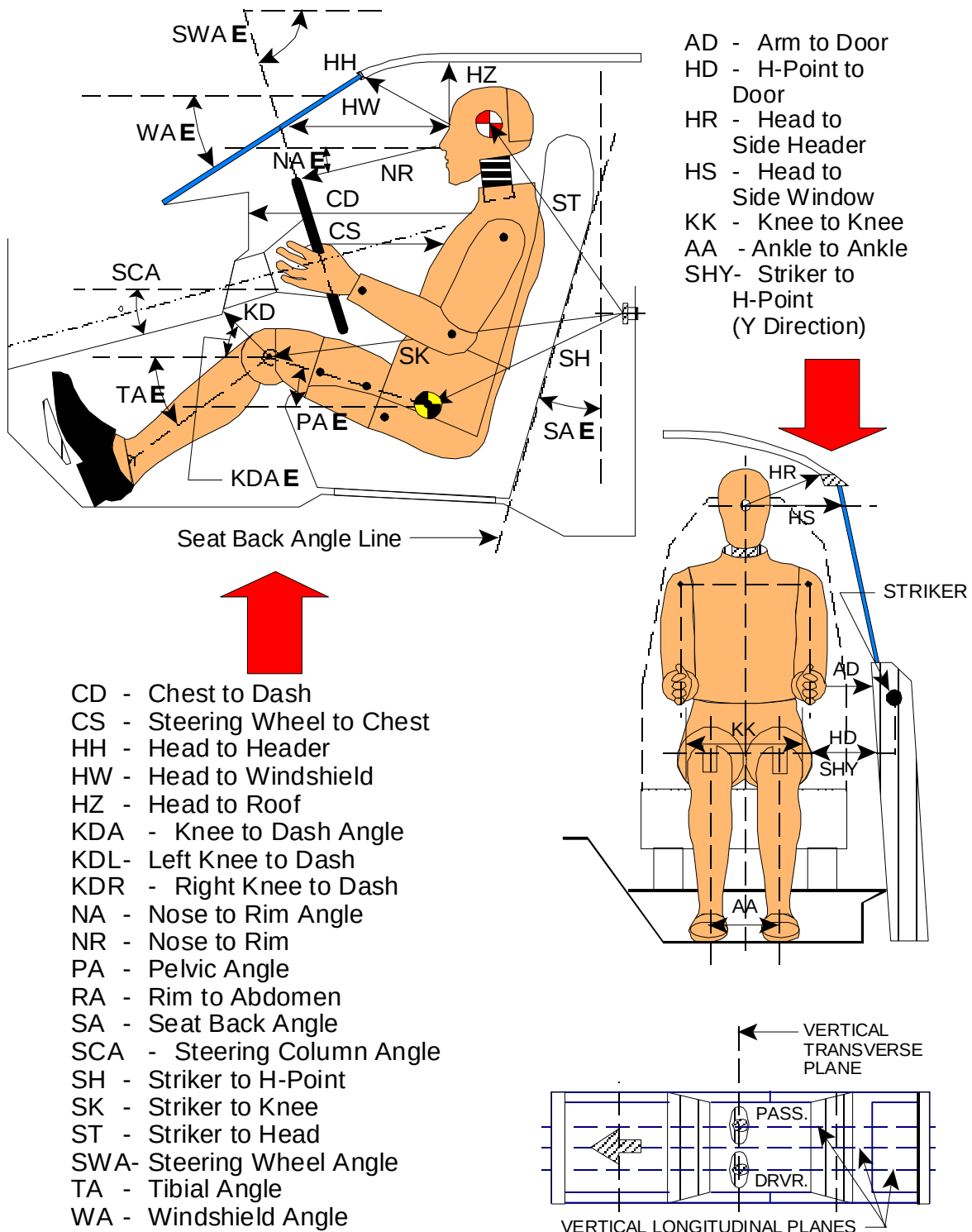
Does vehicle owner's manual describe how to deactivate ADLs? - Yes; x No; - N/A

Comments: None

DATA SHEET NO. 5

FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



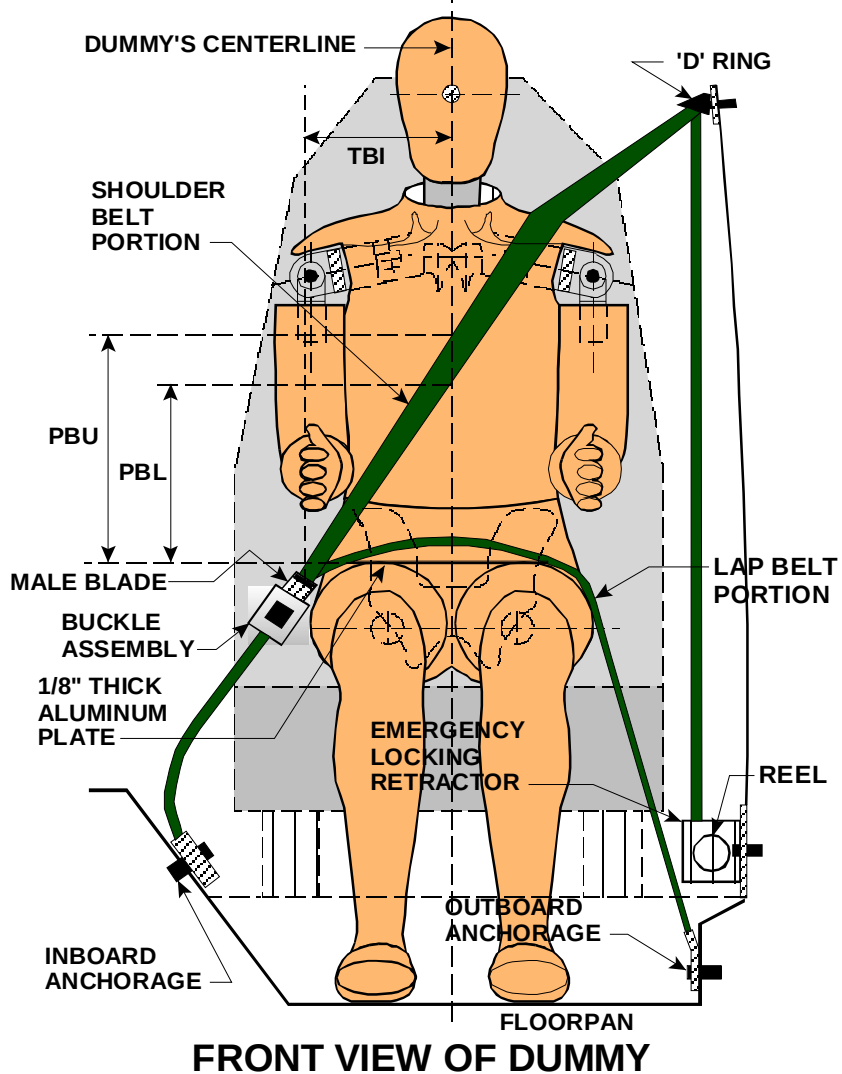
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #064)			PASS. (Serial #061)		
WA ^o	27.8 deg.			N/A		
SWA ^o	69.0 deg.			N/A		
SCA ^o	21.0 deg.			N/A		
SA ^o	26 deg.			26 deg.		
HZ	178			161		
HH	383			381		
HW	631			619		
HR	232			231		
NR	395	Angle	8 deg.	N/A		
CD	551			605		
CS	316			N/A		
RA	220			N/A		
KDL	239	Angle (KDA)	31.0 deg.	212		
KDR	199			245	Angle (KDA)	29.6 deg.
PA ^o	24.6 deg.			21.3 deg.		
TA ^o	37.0 deg.			34.6 deg.		
KK	315			270		
AA	334			242		
ST	484	Angle	40 deg.	491	Angle	41 deg.
SK	905	Angle	104 deg.	895	Angle	105 deg.
SH	588	Angle	124 deg.	581	Angle	124 deg.
SHY	228			224		
HS	363			354		
HD	154			146		
AD	121			134		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

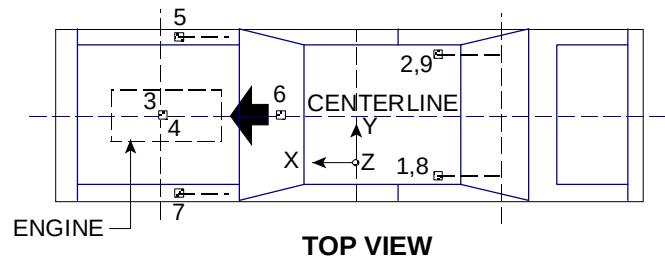
SEAT BELT POSITIONING DATA



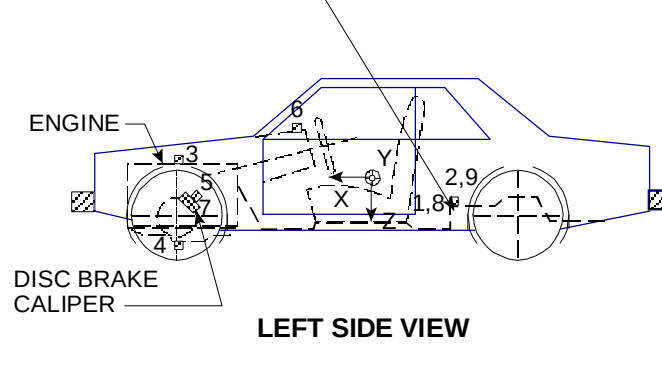
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	340	340
PBL-- Top surface of alum. plate to belt lower edge	250	250
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

VEHICLE ACCELEROMETER LOCATIONS



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



No.	LOCATION	PRE-TEST LENGTH (mm)		
		X	Y	Z
1	Left Rear Seat Cross Member X	2044	-672	269
2	Right Rear Seat Cross Member X	2003	685	278
3	Top of Engine Block	3981	138	706
4	Bottom of Engine	4341	60	146
5	Disc Brake Caliper @ Right Side	3643	804	411
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3646	-812	411
8	Left Rear Seat Cross Member Z	2044	-672	269
9	Right Rear Seat Cross Member Z	2003	685	278

X – From rear surface of vehicle (+ forward)

Y – From vehicle centerline (+ right)

Z – From ground plane (+ up)

** Accelerometer was not requested by the COTR

DATA SHEET NO.8
SUMMARY OF FMVSS 212 and FMVSS 219 (Partial) DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 20 mm molding.

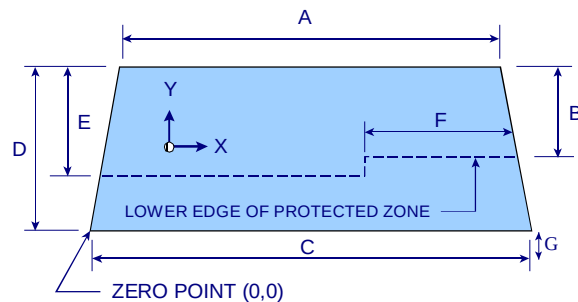
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

Temperature of windshield molding during test: 21°C.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2096.0	2096.0	100.0%
LEFT SIDE	2096.0	2096.0	100.0%
TOTAL	4192.0	4192.0	100.0%



DIMENSIONS (mm)	
A	1247
B	475
C	1495
D	725
E	481
F	534
G	20

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS:

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

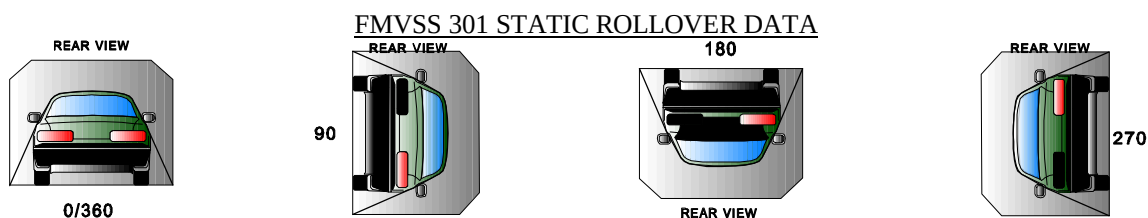
DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: _____ MA0501 _____ TEST DATE: _____ July 22, 2009 _____
VEHICLE MAKE/MODEL: _____ 2010 Hyundai Genesis 2-door Coupe _____
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

FUEL SPILLAGE MEASUREMENT:

Time Interval	Amount	Maximum Allowable Spillage
Impact Until Motion Ceases	0	28 g
First Five Minutes Following Impact	0	142 g
Next 25 Minutes	0	28 g / 1 minute

SOLVENT SPILLAGE DETAILS: None



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	minutes	05	seconds	5	minutes	6	minutes	5	seconds	7	minutes
90° - 180°	1	minutes	06	seconds	5	minutes	6	minutes	6	seconds	7	minutes
180°-270°	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes
270°-360°	1	minutes	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

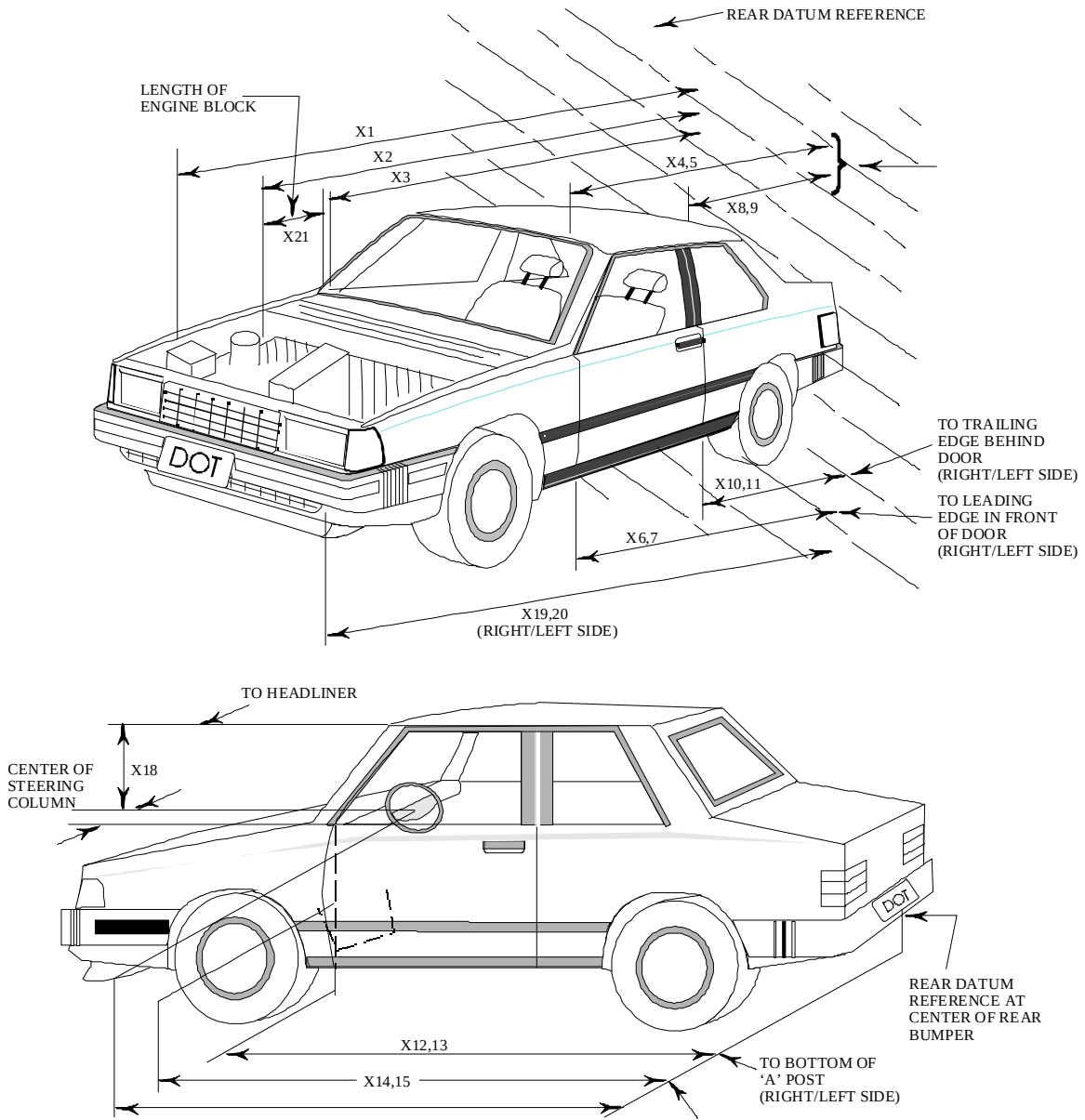
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0° - 90°	None
90° - 180°	None
180°-270°	None
270°-360°	None

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS



DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: _____ MA0501 TEST DATE: _____ July 22, 2009
VEHICLE MAKE/MODEL: _____ 2010 Hyundai Genesis 2-door Coupe

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4629	4249	380
X2	Rear Surface of Vehicle to Front of Engine	4082	3889	193
X3	Rear Surface of Vehicle to Firewall	3505	3425	80
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3114	3110	4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3110	3109	1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3128	3125	3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3124	3123	1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	1829	1826	3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	1826	1827	-1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	1815	1814	1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	1814	1813	1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3131	3127	4
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3133	3132	1
X14	Rear Surface of Vehicle to Firewall, Right Side	3403	3427	-24
X15	Rear Surface of Vehicle to Firewall, Left Side	3451	3436	15
X16	Rear Surface of Vehicle to Steering Column	2633	2649	-16
X17	Center of Steering Column to "A" Post	306	297	9
X18	Center of Steering Column to Headliner	396	383	13
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4556	4210	346
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4556	4223	333
X21	Length of Engine Block	447	447	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2866	2860	6
CD	Rear Surface of Vehicle to Center of Dash Panel	2853	2850	3
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2864	2860	4

All Dimensions in mm

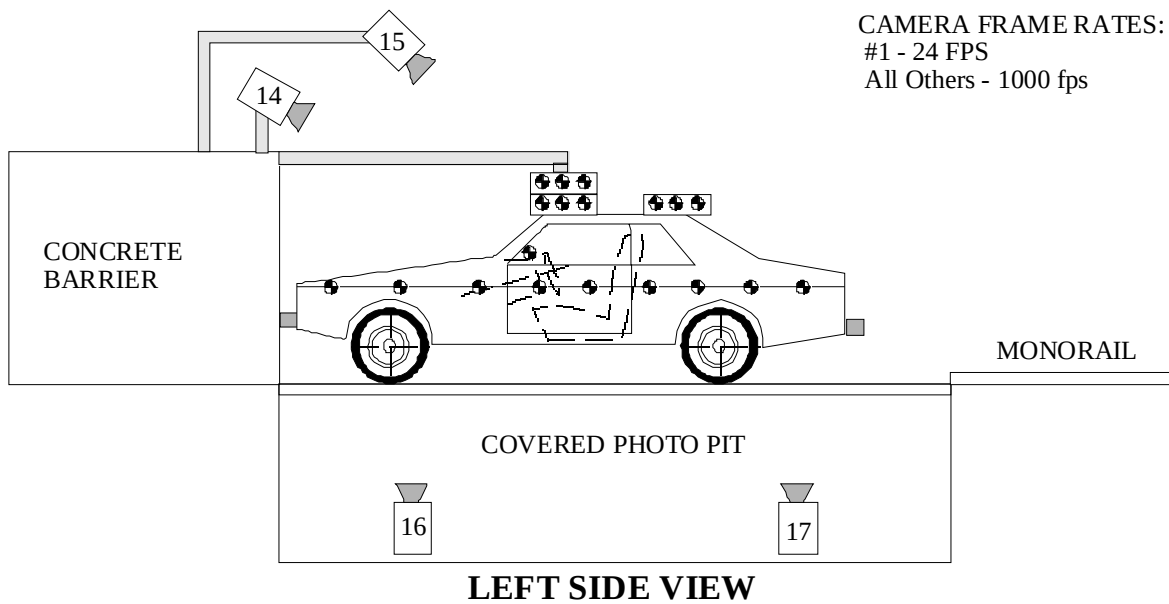
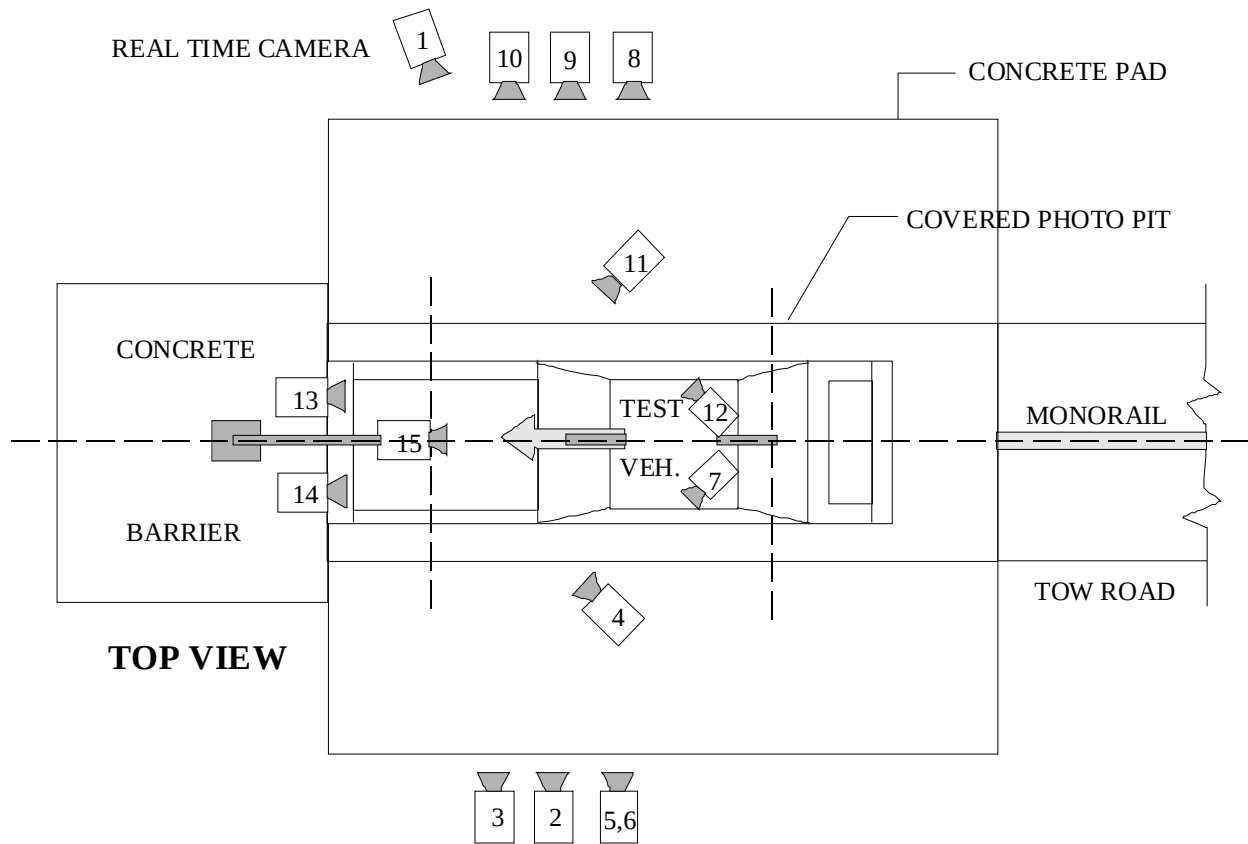
DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: MA0501 TEST DATE: July 22, 2009
VEHICLE MAKE/MODEL: 2010 Hyundai Genesis 2-door Coupe

TARGET VEHICLE STRUCTURAL MEASUREMENTS

	Elements	Pre-Test (mm)
1	Total length	4629
2	Total Width	1834
3	Bumper Top Height	473
4	Bumper Bottom Height	381
5	Longitudinal Member Top Height	478
6	Distance Between Longitudinal Members	830
7	Longitudinal Member Width	61
8	Engine top height	820
9	Engine bottom height	146
10	Engine and gearbox width	565
11	Front bumper-engine distance	547
12	Front shock absorber fixing height	867
13	Bonnet leading edge height	651
14	Front shock absorber fixing width	1208
15	Front bumper – front axle distance	832
16	Front axle – A pillar distance	625
17	A-pillar – B pillar distance	1401
18	B-pillar – rear axle distance	798
19	B-pillar – C Pillar distance	806
20	Roof sill bottom height	1278
21	Roof sill top height	1351
22	Floor sill bottom height	264
23	Floor sill top height	345

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	30
2	Overall Left Side	9528	1631	927	-4.0	9082	28	1000
3	Left Side View	6811	1037	937	-2.3	6365	50	1000
4	Driver and Interior View	7025	2981	2059	-12.2	-	35	1000
5	Steering Column (Bottom)	7676	1941	1205	-4.7	7230	25	1000
6	Steering Column (Top)	7676	1941	1801	-9.1	7230	28-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	7691	2119	889	-0.9	7245	28	1000
9	Right Side View	9103	965	946	-1.7	8657	50	1000
10	Right Passenger View	7709	1754	1181	-2.1	7263	35	1000
11	Passenger and Interior View	7069	3087	1890	-8.5	-	35	1000
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-37.5	-	13	500
14	Driver Front View	620	-92	1987	-37.5	-	13	500
15	Windshield View	0	-530	3374	56.0	-	20	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	2941	-3048	90	-	13	500

*X = film plane to monorail centerline ** = referenced to horizontal plane

Y = film plane to impact location N.T. indicates No Timing

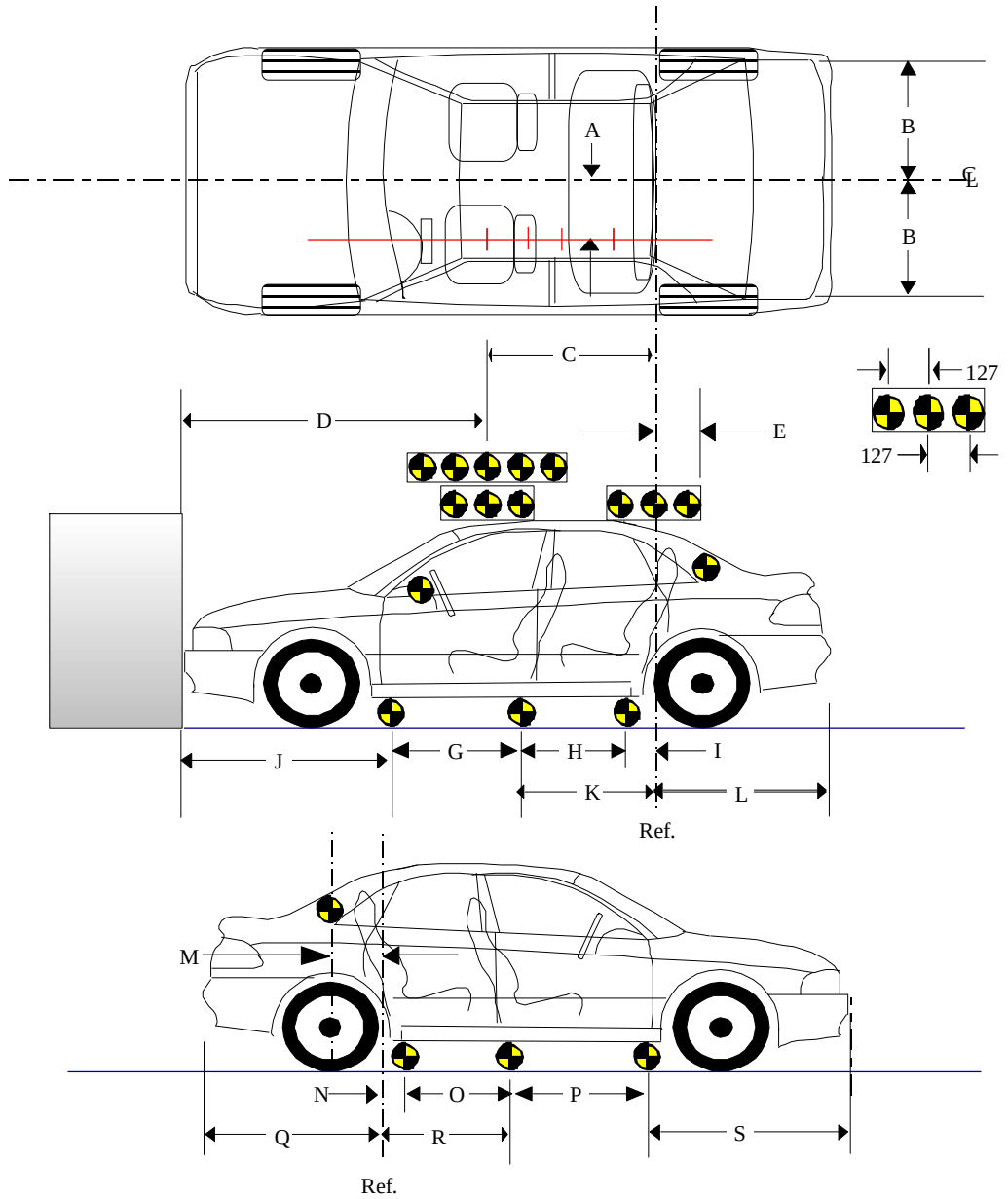
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

(Dimensions in millimeters)

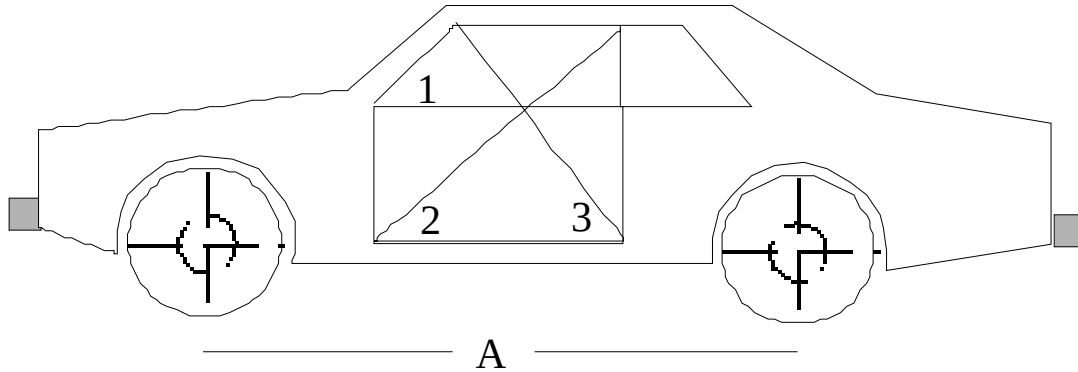
A	370
B	623
C	1218
D	2101
E	139
F	1499
G	960
H	960
I	114
J	1283
K	1074
L	1313
M	143
N	114
O	962
P	959
Q	1314
R	1076
S	1281



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



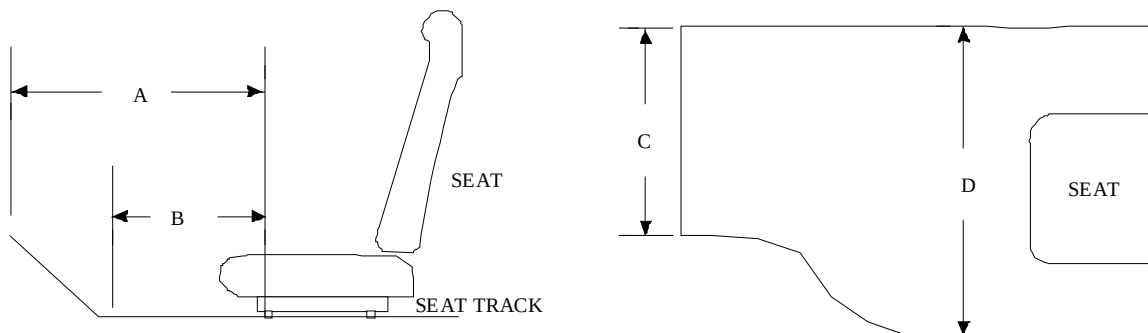
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1287	1545	1031	1285	1558	1037
AFTER TEST	1285	1547	1032	1284	1558	1040
DIFFERENCE	2	-2	-1	1	0	-3

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2824	2822
AFTER TEST	2782	2744
DIFFERENCE	42	78

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	749	679	70
B	564	569	-5
C	470	672	-202
D	507	171	336

PASSENGER

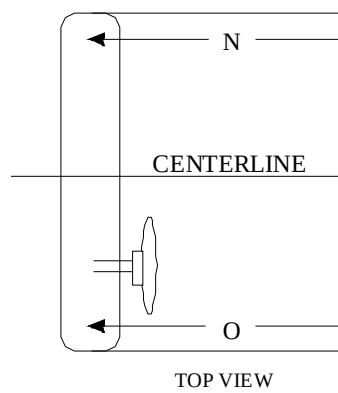
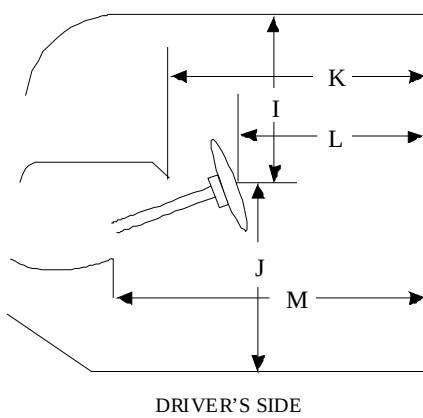
Measurement	Pre-Test	Post-Test	Difference
A	719	703	16
B	528	535	-7
C	464	464	0
D	479	477	2

Units = mm

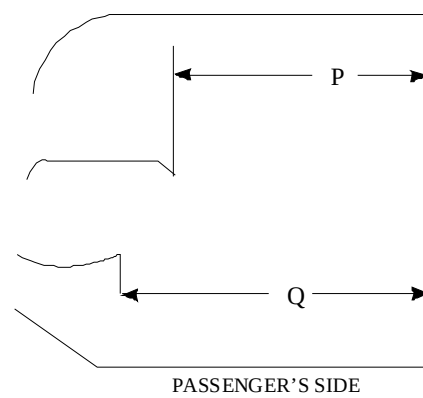
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



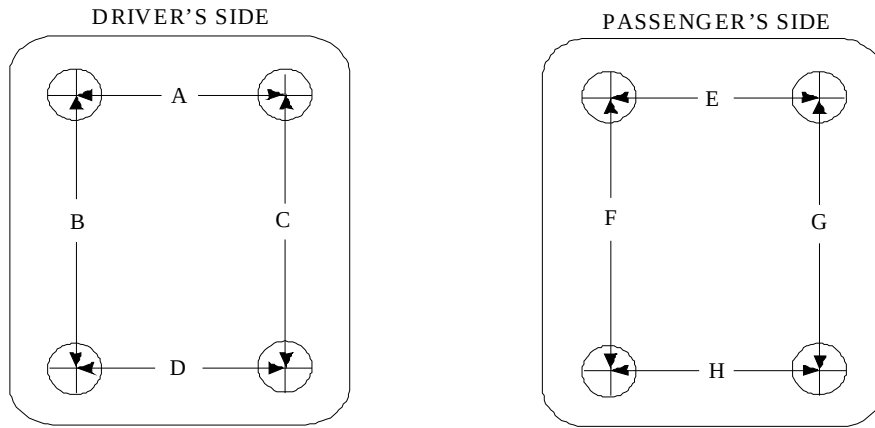
Measurement	Pre-Test	Post-Test	Difference
I	396	383	13
J	601	636	-35
K	1002	1020	-18
L	825	842	-17
M	1151	1153	-2
N	1058	1054	4
O	1056	1052	4
P = K (PASS.)	1196	1196	0
Q = M (PASS.)	1160	1158	2

Units = mm

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

FLOORBOARD DEFORMATION



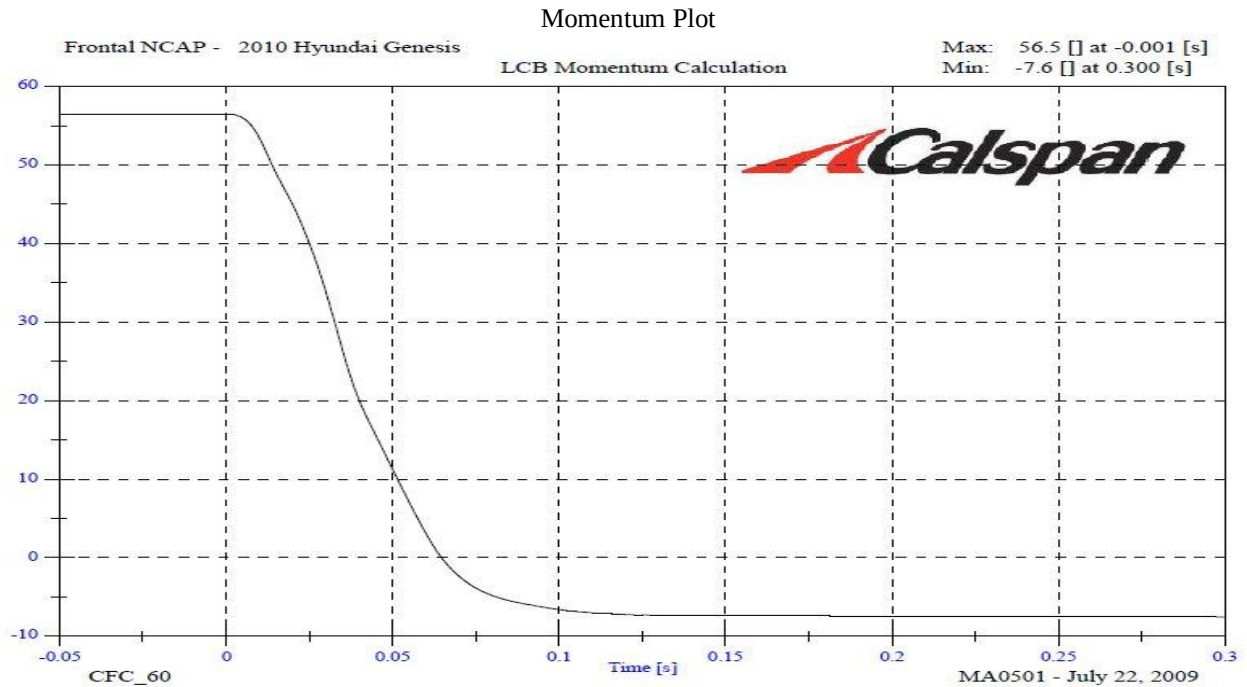
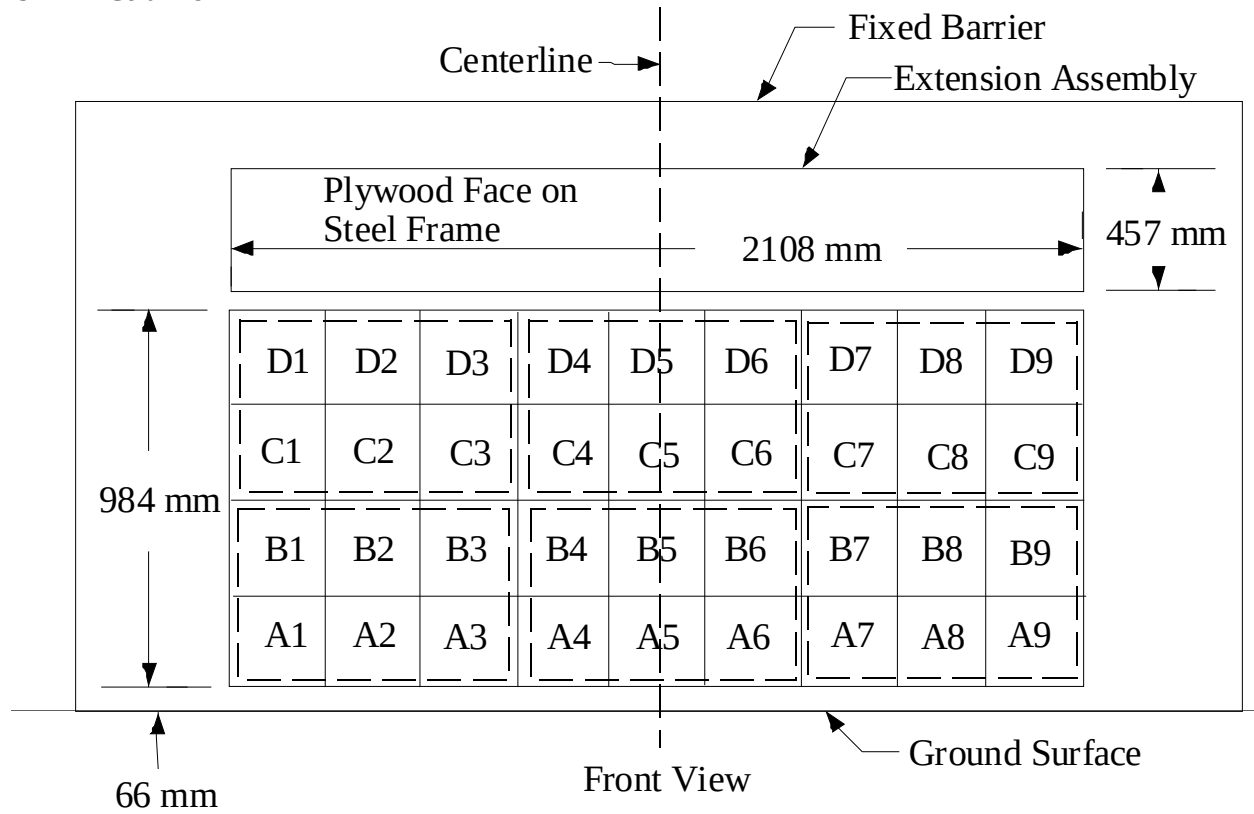
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	470	672	-202
B	409	369	40
C	373	380	-7
D	507	171	336
E	464	464	0
F	356	354	2
G	313	317	-4
H	479	477	2

Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns



DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA
FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Hyundai Genesis 2-door Coupe

NHTSA Test No.: MA0501 VIN: KMHHT6KD8AU011170

Model Year: 2010 Build Date: April 20, 2009 Test Date: July 22, 2009

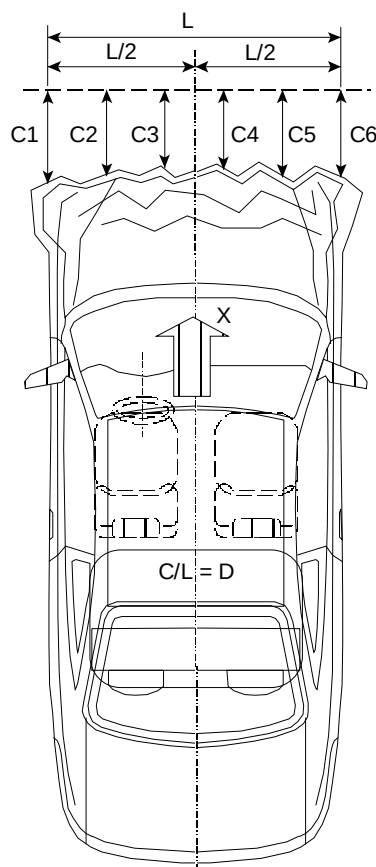
Vehicle Size Category: Coupe Test Weight: 1744 kg

Vehicle Wheelbase: 2824 mm; Front Overhang: 832 mm; Overall Width: 1834 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4392	4161	231
C2 =	4553	4223	330
C3 =	4606	4240	366
C4 =	4607	4231	376
C5 =	4552	4201	351
C6 =	4394	4162	232



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region:

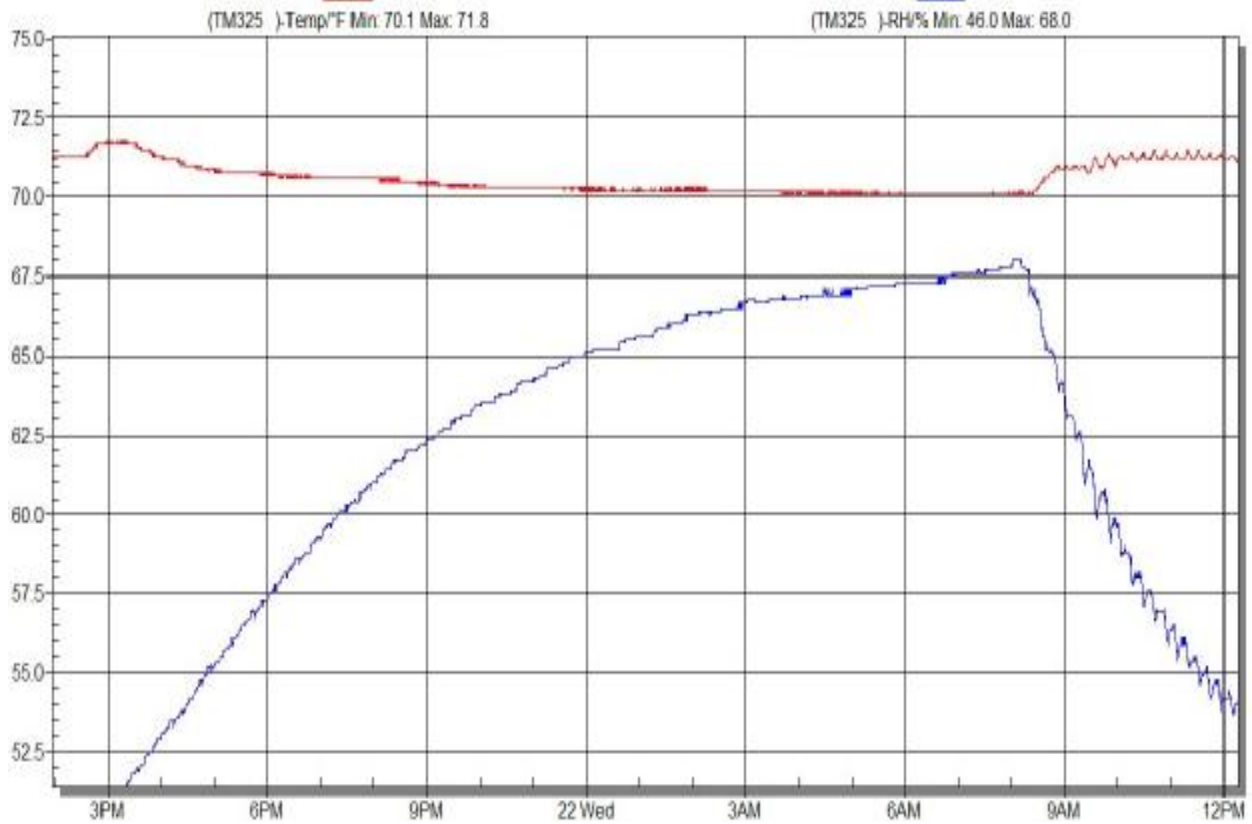
L1=	<u>1572</u>	mm
L2=	<u>786.0</u>	mm
L5=	<u>314.4</u>	mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: MA0501 Vehicle: 2010 Hyundai Genesis 2-door Coupe

7/22/2009 0:59:59.9

Downloaded Data - Tuesday, July 22, 2009



APPENDIX A
PHOTOGRAPHS

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Figure A-1: Load Cell Locations



Figure A-2: Vehicle Certification Placard



Figure A-3: Vehicle Tire Placard



Figure A-4: Right Front, As Received



Figure A-5: Left Rear, As Received



Figure A-6: Pre-Test Front View



Figure A-7: Post-Test Front View



Figure A-8: Pre-Test Left Side View



Figure A-9: Post-Test Left Side View



Figure A-10: Pre-Test Right Side View



Figure A-11: Post-Test Right Side View



Figure A-12: Pre-Test Right Front Three-Quarter View



Figure A-13: Post-Test Right Front Three-Quarter View



Figure A-14: Pre-Test Left Rear Three-Quarter View



Figure A-15: Post-Test Left Rear Three-Quarter View



Figure A-16: Left Rear Three-Quarter View of Doors After Impact



Figure A-17: Right Rear Three-Quarter View of Doors After Impact



Figure A-18: Pre-Test Windshield View



Figure A-19: Post-Test Windshield View



Figure A-20: Pre-Test Engine Compartment View



Figure A-21: Post-Test Engine Compartment View



Figure A-22: Pre-Test Fuel Cap View



Figure A-23: Post-Test Fuel Cap View



Figure A-24: Pre-Test Front Underbody View



Figure A-25: Post-Test Front Underbody View



Figure A-26: Pre-Test Mid Underbody View



Figure A-27: Post-Test Mid Underbody View



Figure A-28: Pre-Test Rear Underbody View



Figure A-29: Post-Test Rear Underbody View



Figure A-30: Pre-Test Driver Head Location



Figure A-31: Post-Test Driver Head Location



Figure A-32: Pre-Test Driver Position View



Figure A-33: Post-Test Driver Position View



Figure A-34: Pre-Test Driver and Interior View



Figure A-35: Post-Test Driver and Interior View



Figure A-36: Pre-Test Driver Feet View



Figure A-37: Post-Test Driver Feet View



Figure A-38: Pre-Test Driver Knee Bolster View



Figure A-39: Post-Test Driver Knee Bolster View



Figure A-40: Pre-Test Driver Floor Pan View



Figure A-41: Post-Test Driver Floor Pan View



Figure A-42: Post-Test Driver Head View



Figure A-43: Post-Test Driver Contact to Airbag



Figure A-44: Pre-Test Passenger Head Location



Figure A-45: Post-Test Passenger Head Location



Figure A-46: Pre-Test Passenger Position View



Figure A-47: Post-Test Passenger Position View



Figure A-48: Pre-Test Passenger and Interior View



Figure A-49: Post-Test Passenger and Interior View



Figure A-50: Pre-Test Passenger Feet View



Figure A-51: Post-Test Passenger Feet View



Figure A-52: Pre-Test Passenger Knee Bolster View

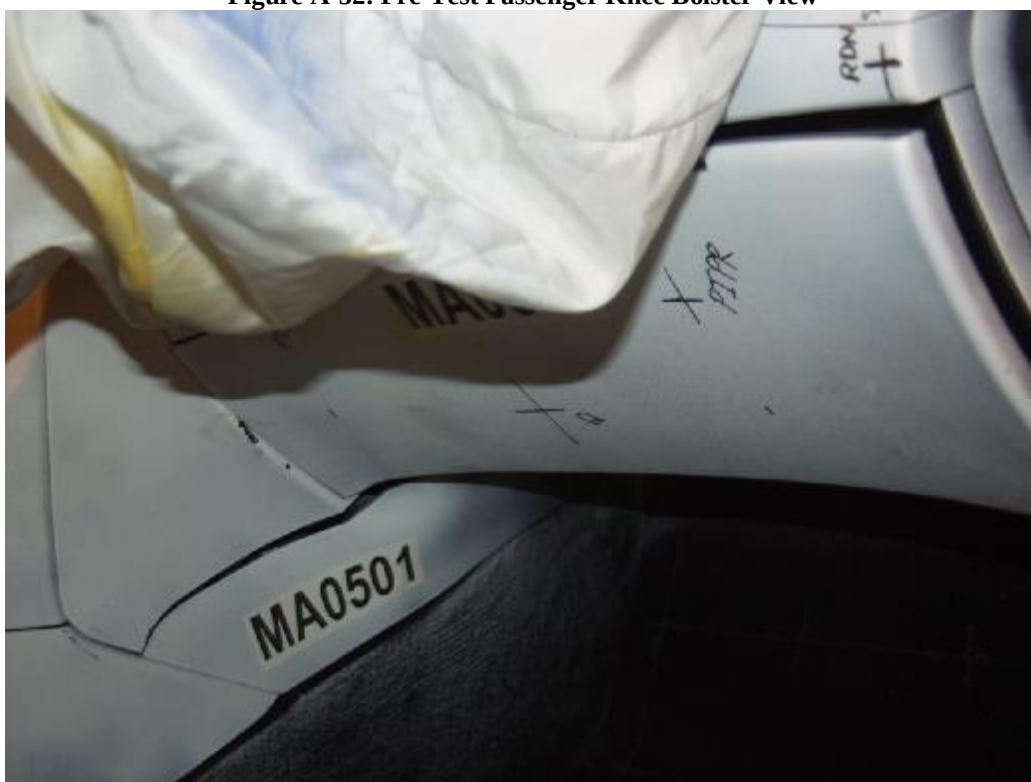


Figure A-53: Post-Test Passenger Knee Bolster View



Figure A-54: Pre-Test Passenger Floor Pan View



Figure A-55: Post-Test Passenger Floor Pan View



Figure A-56: Post-Test Passenger Head View

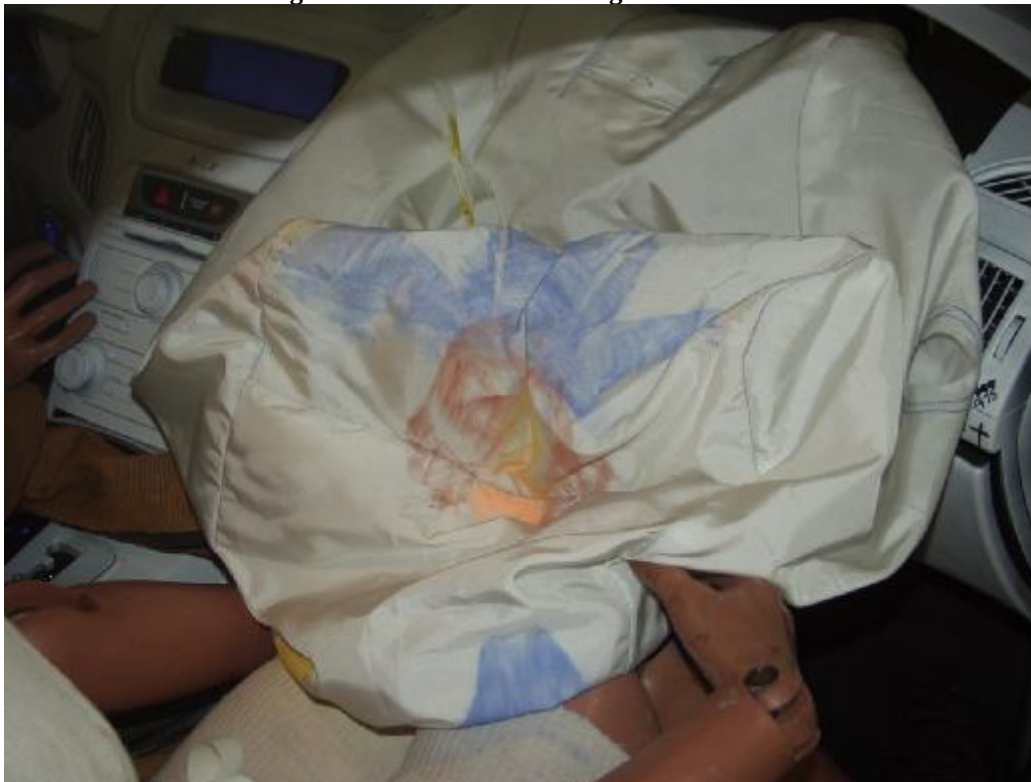


Figure A-57: Post-Test Passenger Contact to Airbag



Figure A-58: Rollover View - 90°



Figure A-59: Rollover View - 180°



Figure A-60: Rollover View - 270°

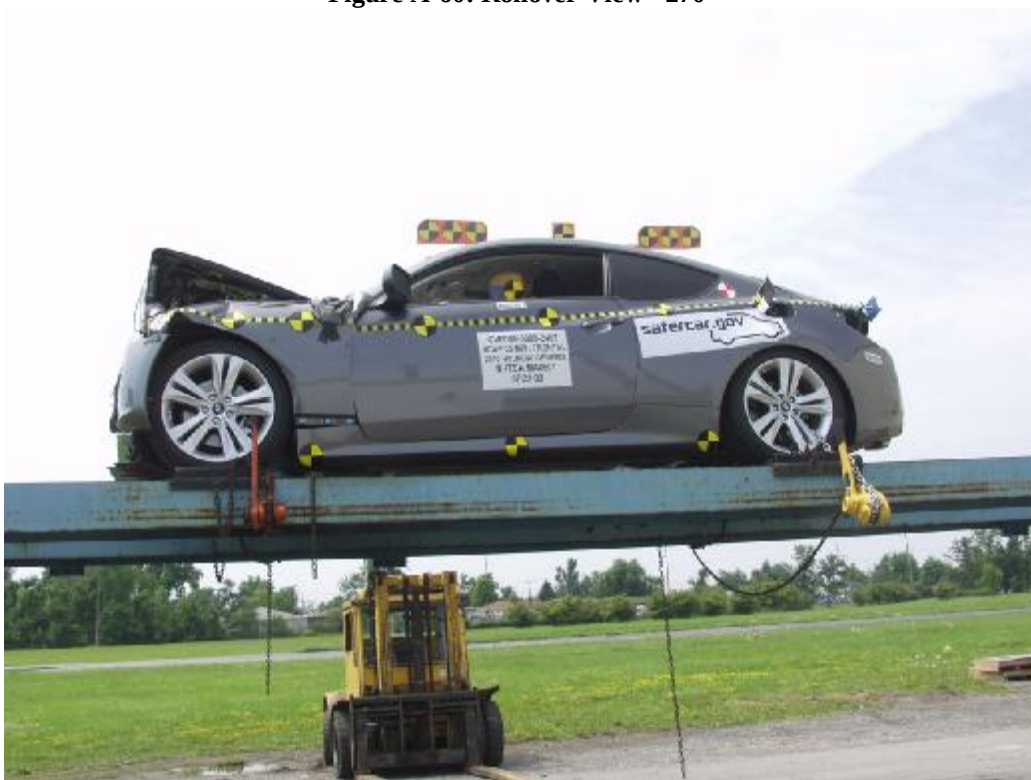


Figure A-61: Rollover View - 360°



Figure A-62: Impact View

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

**Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers**

Transducer	SAE Sign Convention (positive unless noted)	
Upper Neck Load Cell	Fx	Head rearward
	Fy	Head left
	Fz	Neck in tension
	Mx	Left ear to left shoulder
	My	Chin to chest (flexion)
	Mz	Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative	
Pelvic Load Cell (Lower Lumbar)	Fx	Chest rearward
	Fy	Chest left
	Fz	Spine in tension
Femur Load Cell	Compression is negative	
Upper Tibia Load Cell (right and left leg)	Mx	Support tibia at ends, load left side center
	My	Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz	Tibia in tension
	Mx	Support tibia at ends, load left side center
	My	Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.: MA0501

DATA TYPE	SAE FILTER CLASS (Hz)
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60

Table of Data Plots

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P1 Head CG x [g, CFC_1000]	B-8
2	V1P1 Head CG y [g, CFC_1000]	B-8
3	V1P1 Head CG z [g, CFC_1000]	B-8
4	V1P1 Head CG Resultant [g, CFC_1000]	B-8
5	V1P1 Chest x [g, CFC_180]	B-9
6	V1P1 Chest y [g, CFC_180]	B-9
7	V1P1 Chest z [g, CFC_180]	B-9
8	V1P1 Chest Resultant [g, CFC_180]	B-9
9	V1P1 Chest Compression x [mm, CFC_600]	B-10
10	V1P1 Left Femur z [N, CFC_600]	B-11
11	V1P1 Right Femur z [N, CFC_600]	B-11
12	V1P2 Head CG x [g, CFC_1000]	B-12
13	V1P2 Head CG y [g, CFC_1000]	B-12
14	V1P2 Head CG z [g, CFC_1000]	B-12
15	V1P2 Head CG Resultant [g, CFC_1000]	B-12
16	V1P2 Chest x [g, CFC_180]	B-13
17	V1P2 Chest y [g, CFC_180]	B-13
18	V1P2 Chest z [g, CFC_180]	B-13
19	V1P2 Chest Resultant [g, CFC_180]	B-13
20	V1P2 Chest Compression x [mm, CFC_600]	B-14
21	V1P2 Left Femur z [N, CFC_600]	B-15
22	V1P2 Right Femur z [N, CFC_600]	B-15

The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: www.nhtsa.dot.gov

V1P1 Head 9 Array X Arm Ay	V1P1 Lap Belt Load
V1P1 Head 9 Array X Arm Az	V1P1 Shoulder Belt Load
V1P1 Head 9 Array Y Arm Ax	V1P2 Lap Belt Load
V1P1 Head 9 Array Y Arm Az	V1P2 Shoulder Belt Load
V1P1 Head 9 Array Z Arm Ax	V1 Left Rear #1x
V1P1 Head 9 Array Z Arm Ay	V1 Right Rear #2x
V1P1 Head CG Ax	V1 Engine Top #3x
V1P1 Head CG Ay	V1 Engine Bottom #4x
V1P1 Head CG Az	V1 Right Caliper #5x
V1P1 Head CG Red Ax	V1 Left Caliper #7x
V1P1 Head CG Red Ay	V1 Left Rear #8z
V1P1 Head CG Red Az	V1 Right Rear #9z
V1P1 Upper Neck Fx	
V1P1 Upper Neck Fy	
V1P1 Upper Neck Fz	
V1P1 Upper Neck Mx	
V1P1 Upper Neck My	
V1P1 Upper Neck Mz	
V1P1 Chest Ax	
V1P1 Chest Ay	
V1P1 Chest Az	
V1P1 Chest Red Ax	
V1P1 Chest Red Ay	
V1P1 Chest Red Az	
V1P1 Chest Compression	
V1P1 Pelvic Ax	
V1P1 Pelvic Ay	
V1P1 Pelvic Az	
V1P1 Left Femur Fz	
V1P1 Right Femur Fz	
V1P1 Left Upper Tibia Mx	
V1P1 Left Upper Tibia My	
V1P1 Left Lower Tibia Fz	
V1P1 Left Lower Tibia Mx	
V1P1 Left Lower Tibia My	
V1P1 Right Upper Tibia Fz	
V1P1 Right Upper Tibia Mx	
V1P1 Right Upper Tibia My	
V1P1 Right Lower Tibia Mx	
V1P1 Right Lower Tibia My	
V1P1 Left Foot Aft Ax	
V1P1 Left Foot Aft Az	
V1P1 Left Foot Fore Az	
V1P1 Right Foot Aft Ax	
V1P1 Right Foot Aft Az	
V1P1 Right Foot Fore z	
V1P2 Head 9 Array X Arm Ay	

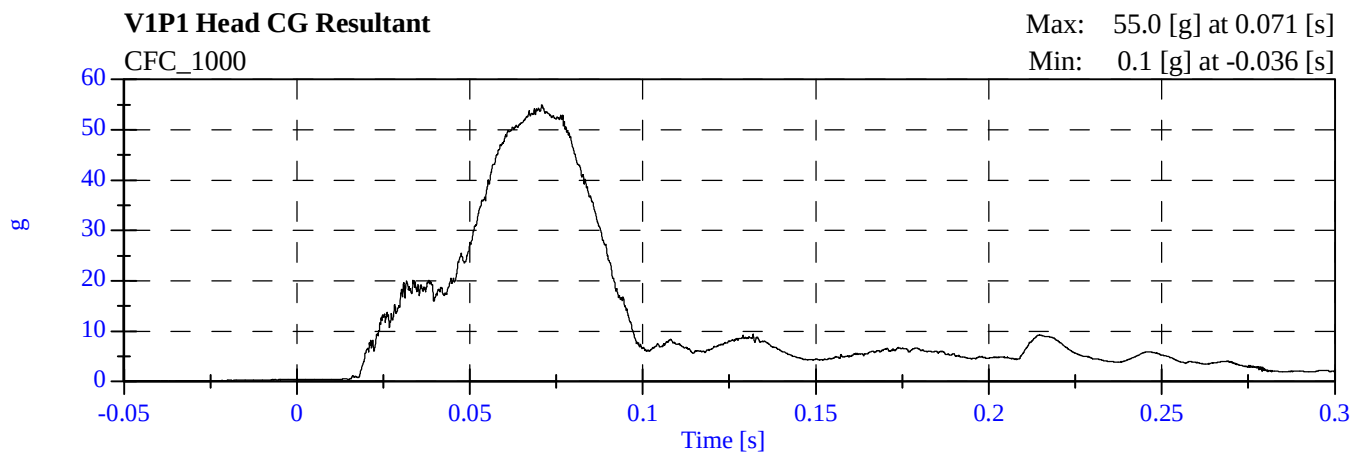
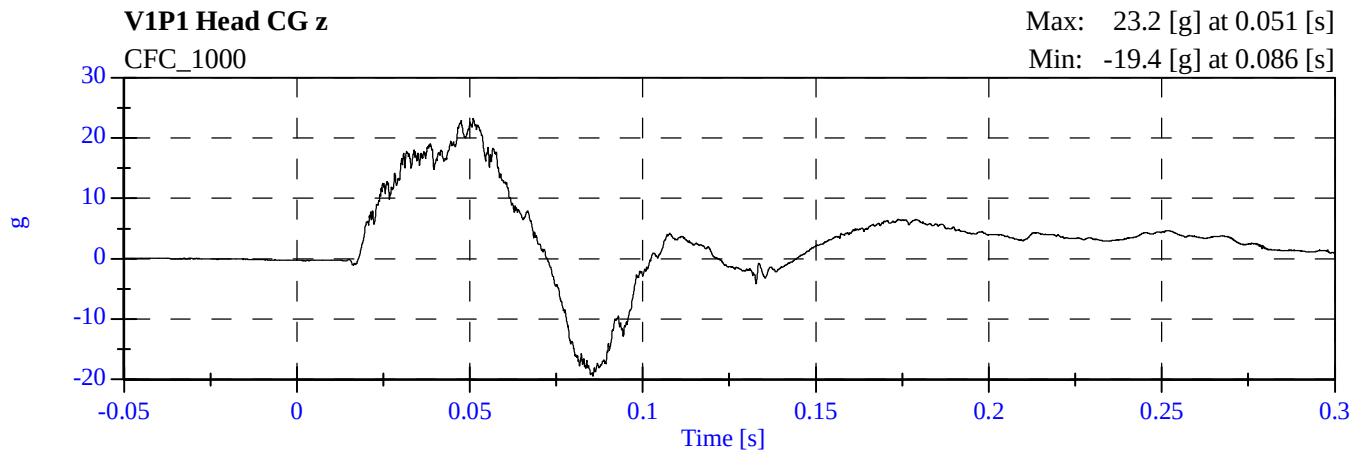
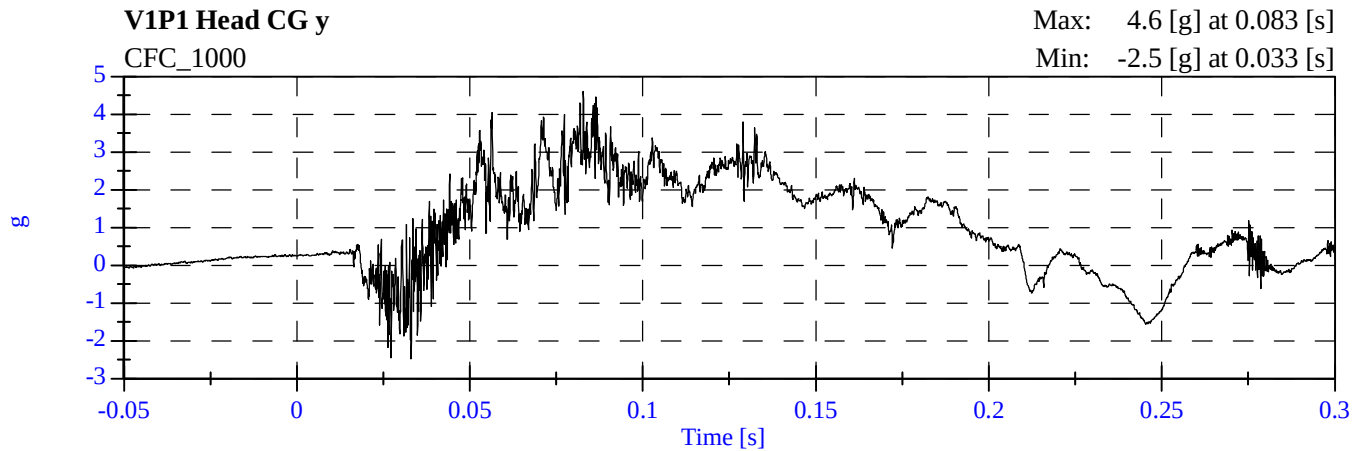
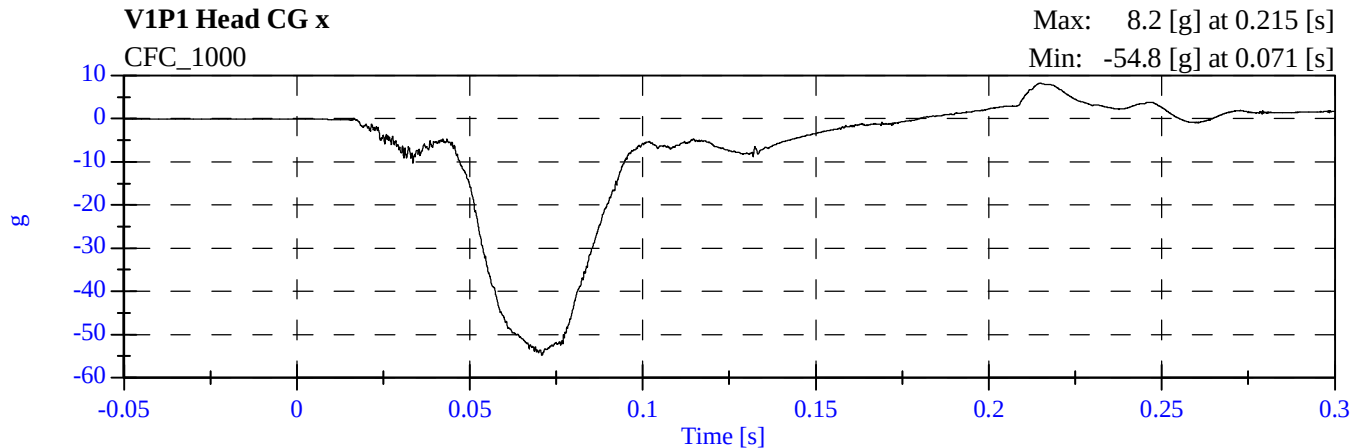
V1P2 Head 9 Array X Arm Az	
V1P2 Head 9 Array Y Arm Ax	
V1P2 Head 9 Array Y Arm Az	
V1P2 Head 9 Array Z Arm Ax	
V1P2 Head 9 Array Z Arm Ay	
V1P2 Head CG Ax	
V1P2 Head CG Ay	
V1P2 Head CG Az	
V1P2 Head CG Red Ax	
V1P2 Head CG Red Ay	
V1P2 Head CG Red Az	
V1P2 Upper Neck Fx	
V1P2 Upper Neck Fy	
V1P2 Upper Neck Fz	
V1P2 Upper Neck Mx	
V1P2 Upper Neck My	
V1P2 Upper Neck Mz	
V1P2 Chest Ax	
V1P2 Chest Ay	
V1P2 Chest Az	
V1P2 Chest Red Ax	
V1P2 Chest Red Ay	
V1P2 Chest Red Az	
V1P2 Chest Compression	
V1P2 Pelvic Ax	
V1P2 Pelvic Ay	
V1P2 Pelvic Az	
V1P2 Left Femur Fz	
V1P2 Right Femur Fz	
V1P2 Left Upper Tibia Fz	
V1P2 Left Upper Tibia Mx	
V1P2 Left Upper Tibia My	
V1P2 Left Lower Tibia Mx	
V1P2 Left Lower Tibia My	
V1P2 Right Upper Tibia Mx	
V1P2 Right Upper Tibia My	
V1P2 Right Lower Tibia Fz	
V1P2 Right Lower Tibia Mx	
V1P2 Right Lower Tibia My	
V1P2 Left Foot Aft Ax	
V1P2 Left Foot Aft Az	
V1P2 Left Foot Fore Az	
V1P2 Right Foot Aft Ax	
V1P2 Right Foot Aft Az	
V1P2 Right Foot Fore Az	
Barrier Load Cell A1 Fx	
Barrier Load Cell A2 Fx	
Barrier Load Cell A3 Fx	
Barrier Load Cell A4 Fx	

Barrier Load Cell A5 Fx	
Barrier Load Cell A6 Fx	
Barrier Load Cell A7 Fx	
Barrier Load Cell A8 Fx	
Barrier Load Cell A9 Fx	
Barrier Load Cell B1 Fx	
Barrier Load Cell B2 Fx	
Barrier Load Cell B3 Fx	
Barrier Load Cell B4 Fx	
Barrier Load Cell B5 Fx	
Barrier Load Cell B6 Fx	
Barrier Load Cell B7 Fx	
Barrier Load Cell B8 Fx	
Barrier Load Cell B9 Fx	
Barrier Load Cell C1 Fx	
Barrier Load Cell C2 Fx	
Barrier Load Cell C3 Fx	
Barrier Load Cell C4 Fx	
Barrier Load Cell C5 Fx	
Barrier Load Cell C6 Fx	
Barrier Load Cell C7 Fx	
Barrier Load Cell C8 Fx	
Barrier Load Cell C9 Fx	
Barrier Load Cell D1 Fx	
Barrier Load Cell D2 Fx	
Barrier Load Cell D3 Fx	
Barrier Load Cell D4 Fx	
Barrier Load Cell D5 Fx	
Barrier Load Cell D6 Fx	
Barrier Load Cell D7 Fx	
Barrier Load Cell D8 Fx	
Barrier Load Cell D9 Fx	

TEST NOTES	
Data Channel	Anomalies

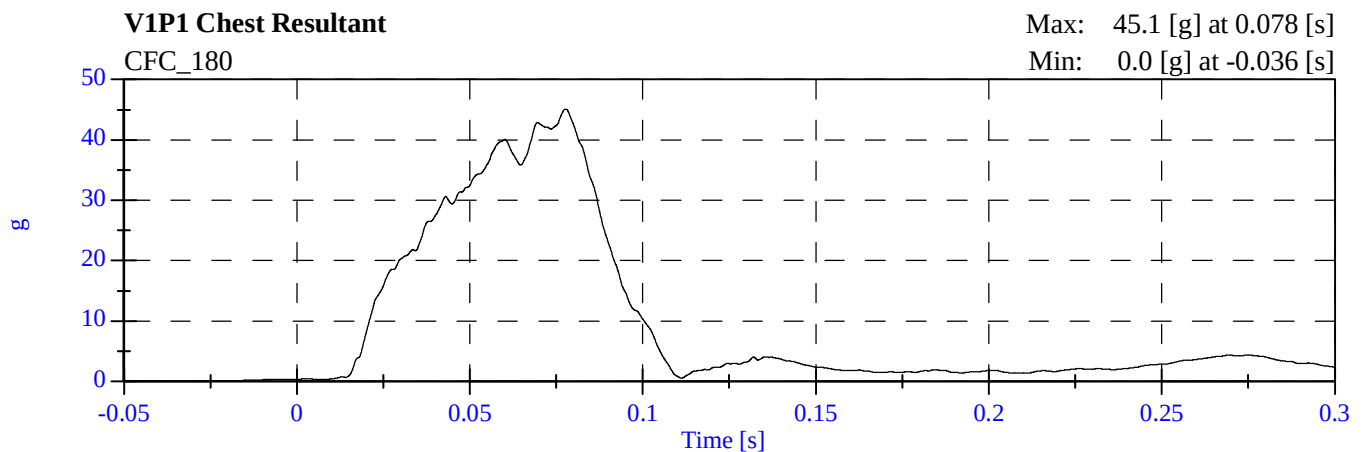
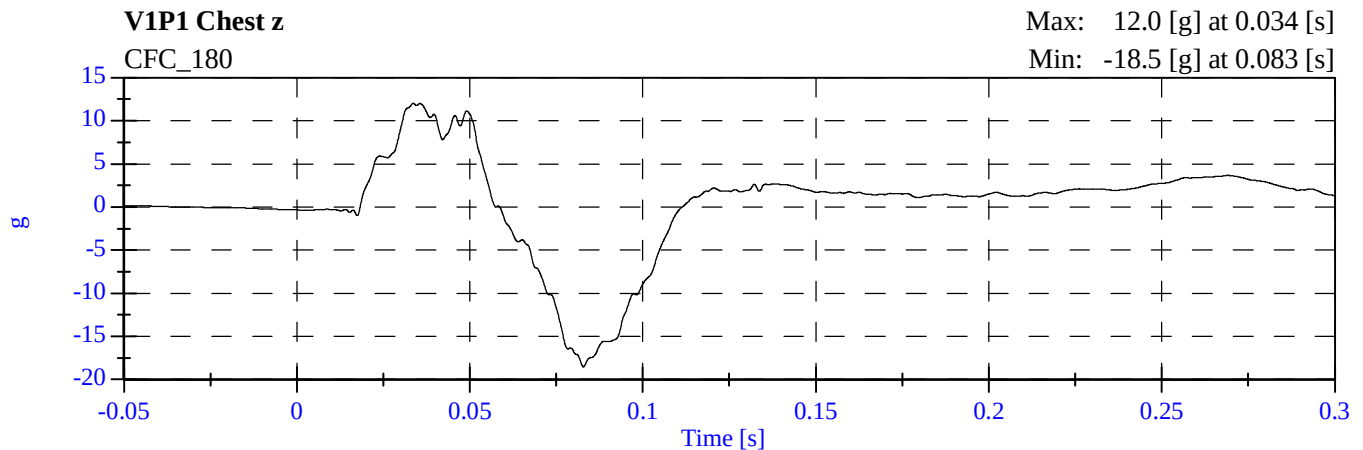
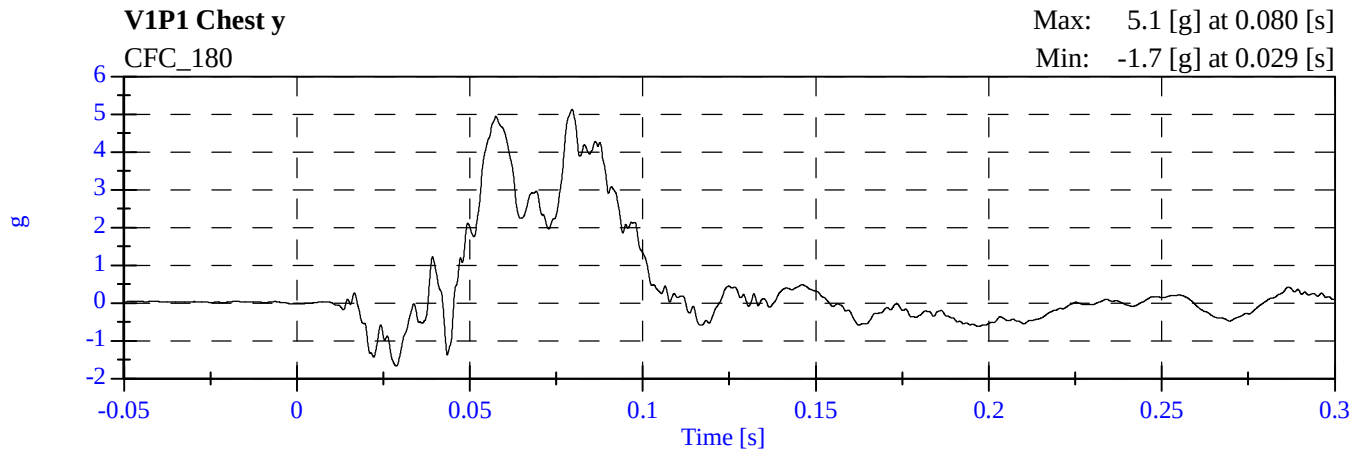
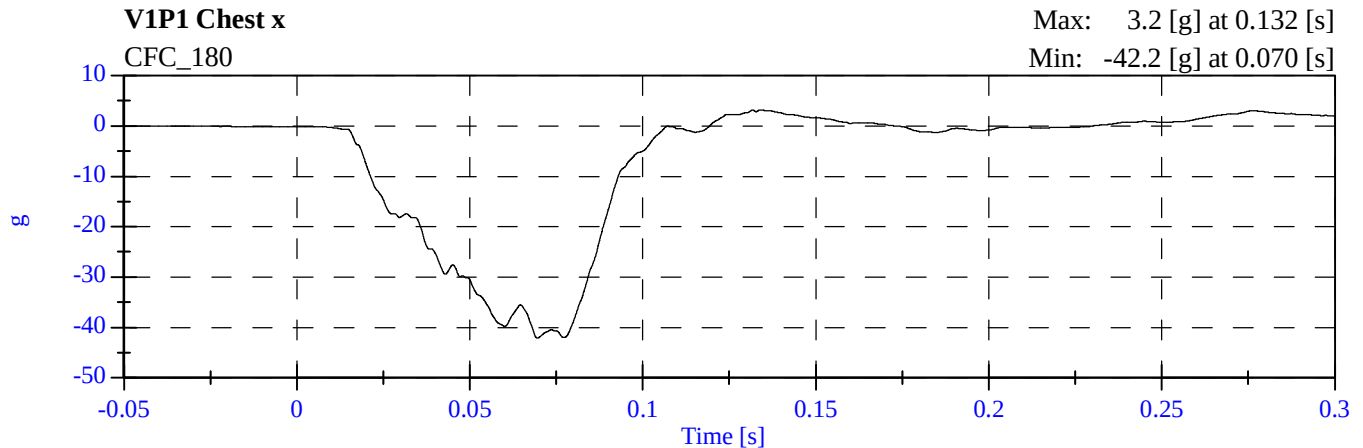
Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009



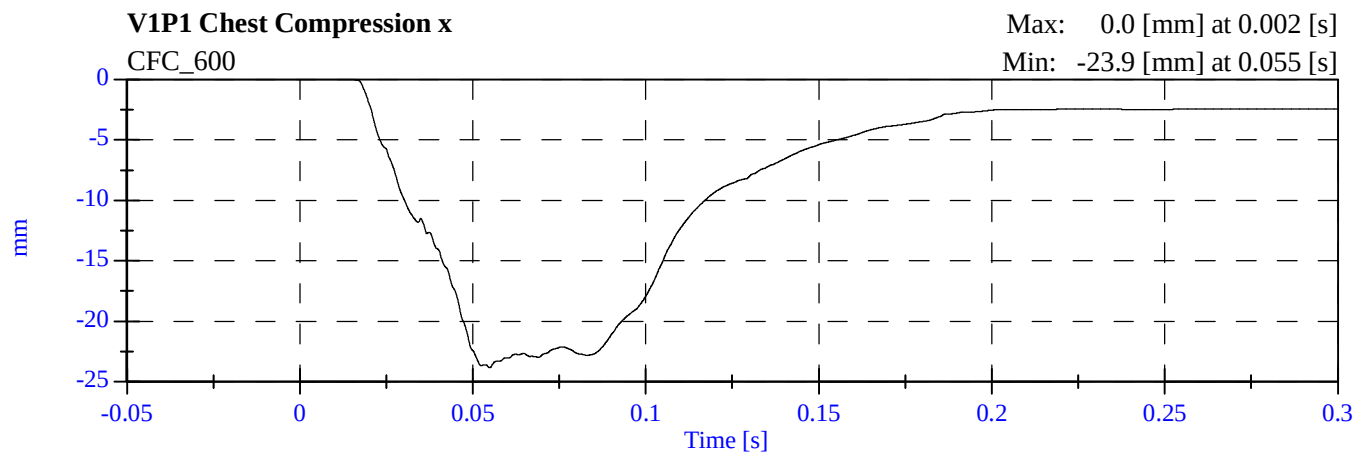
Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009



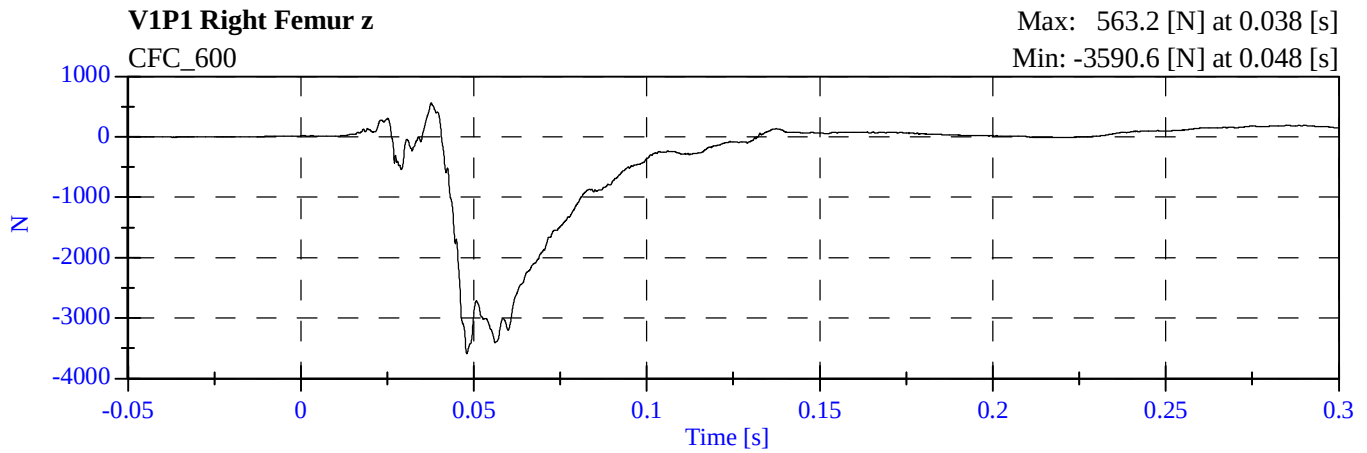
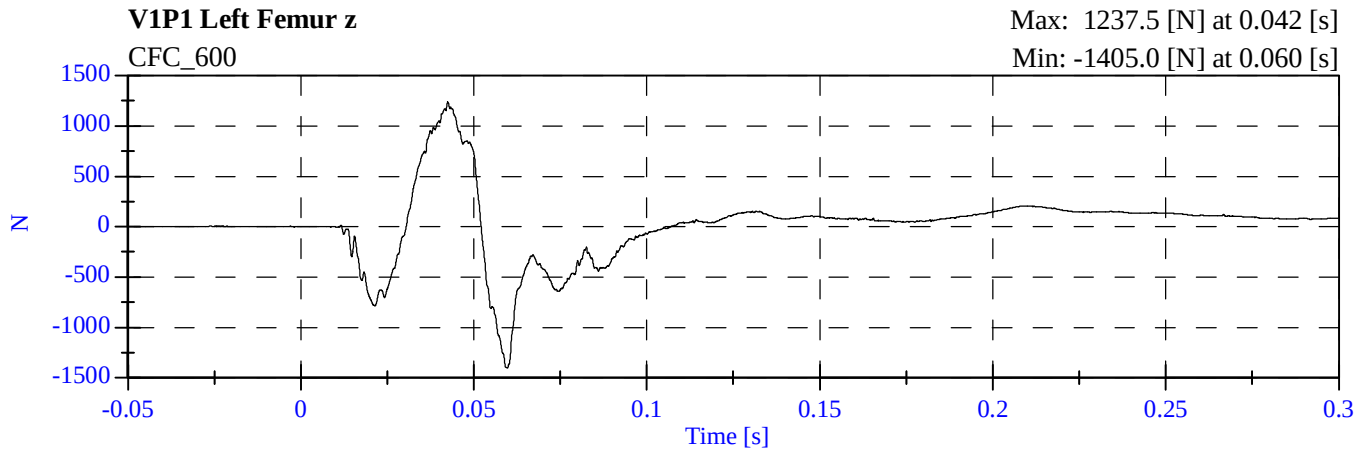
Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009



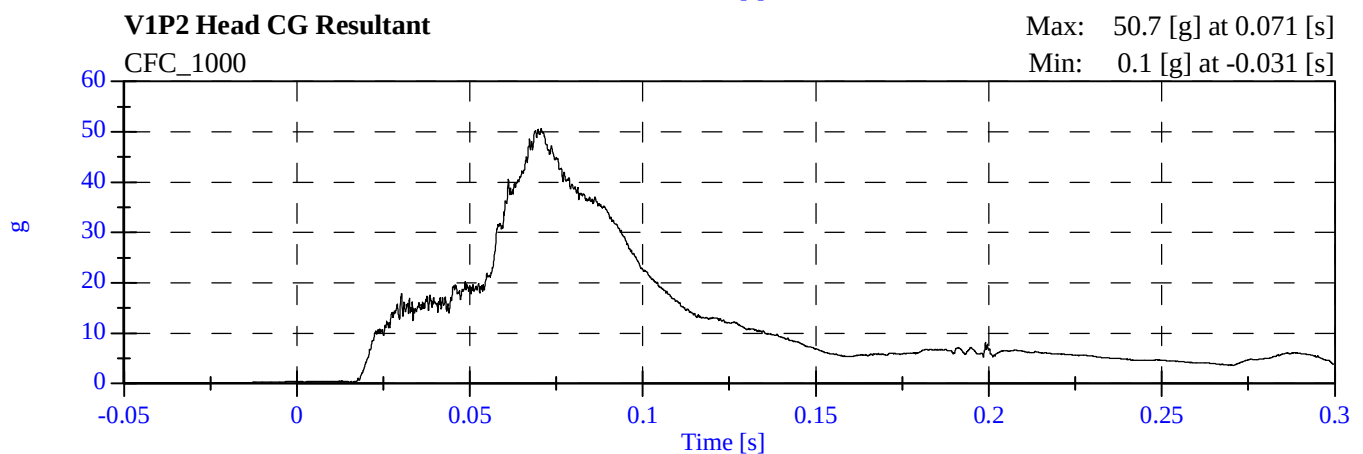
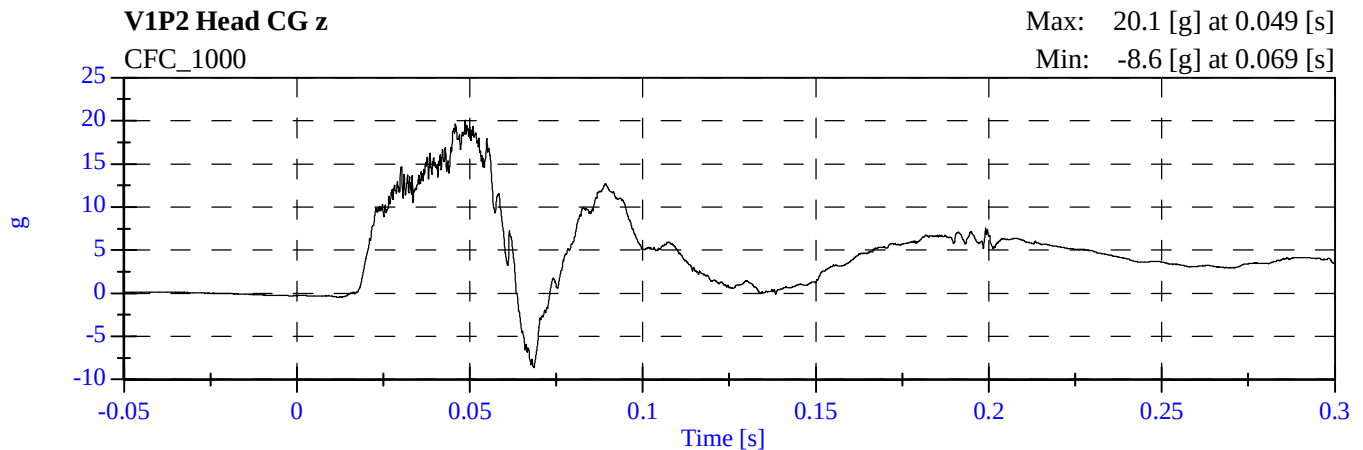
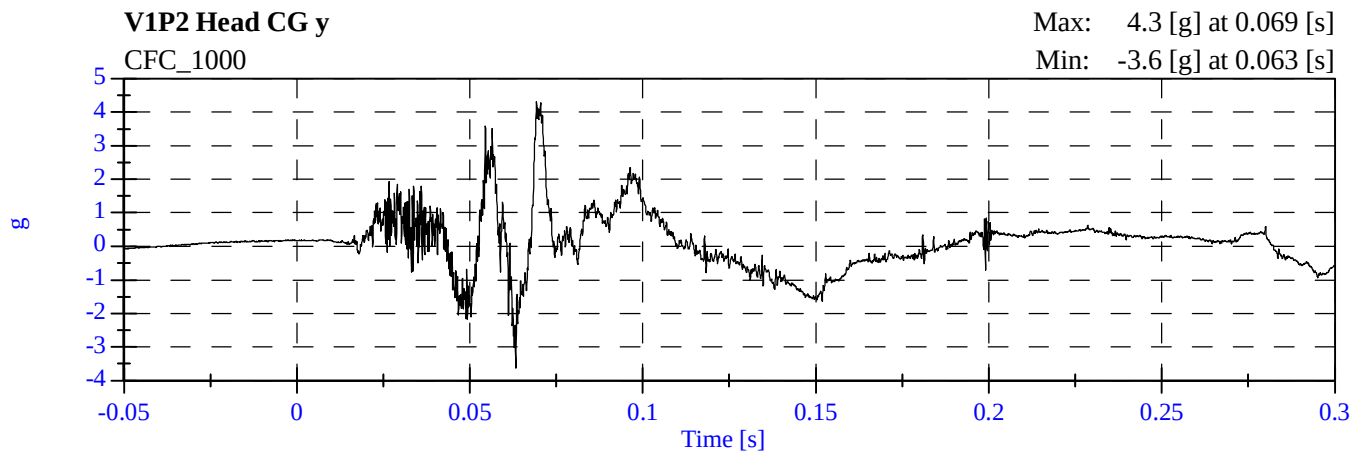
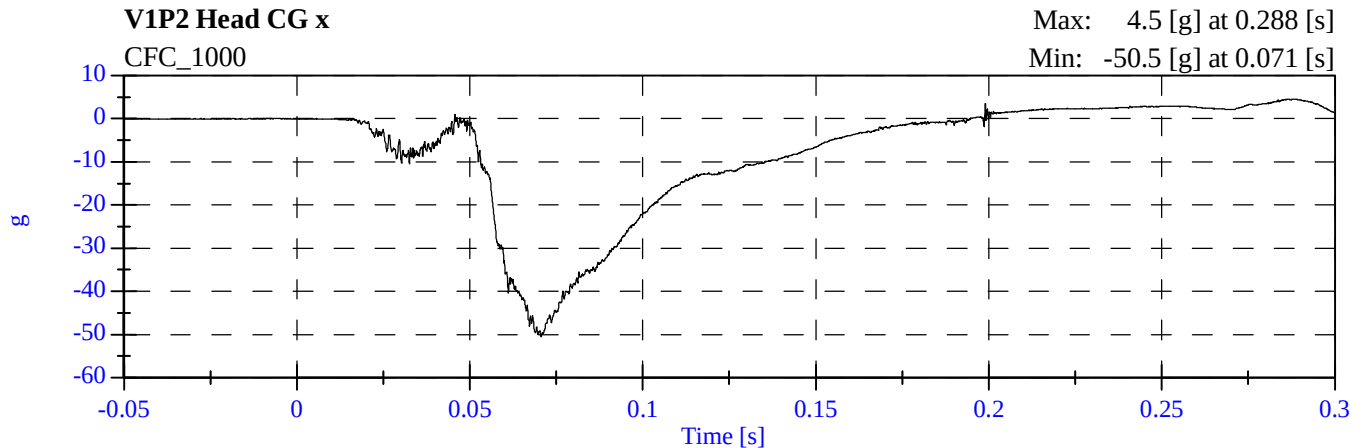
Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009



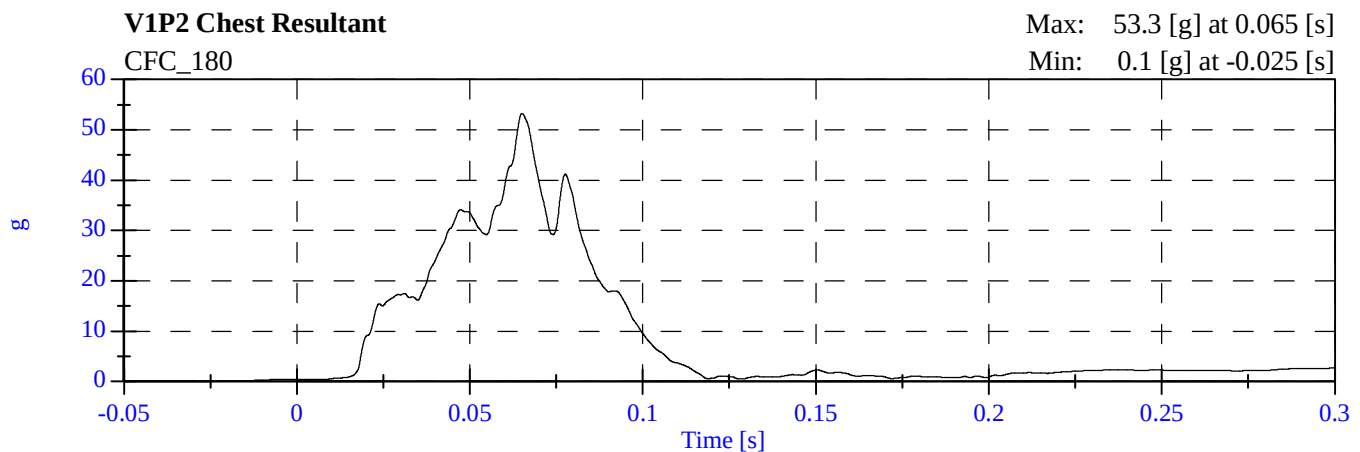
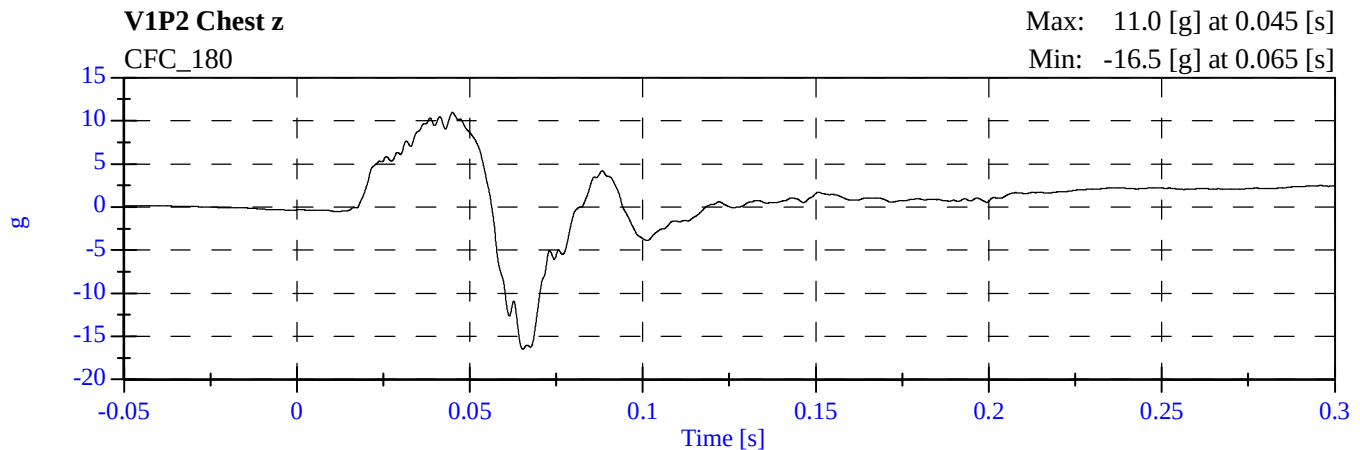
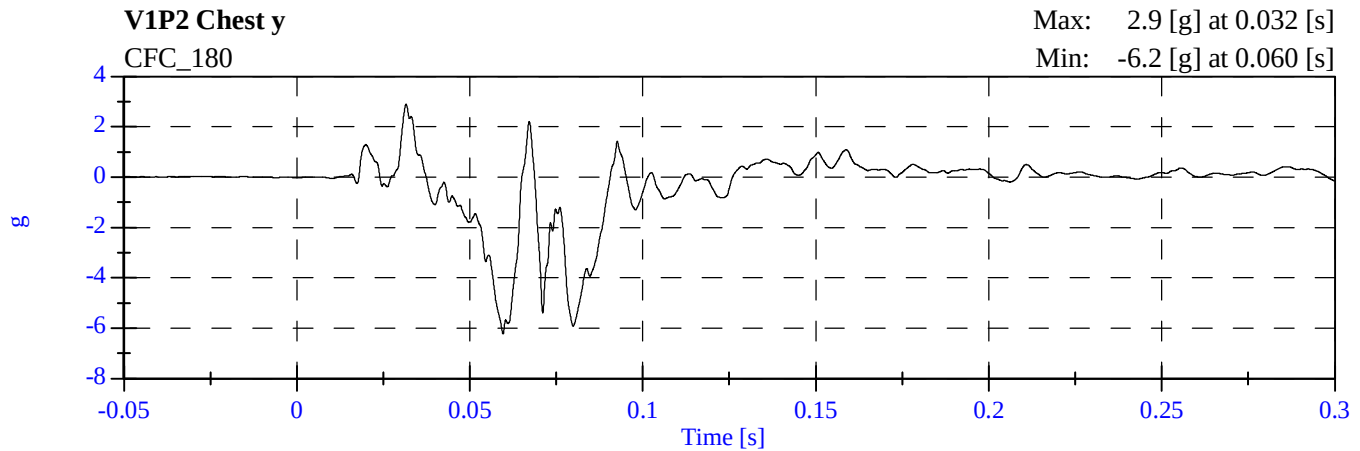
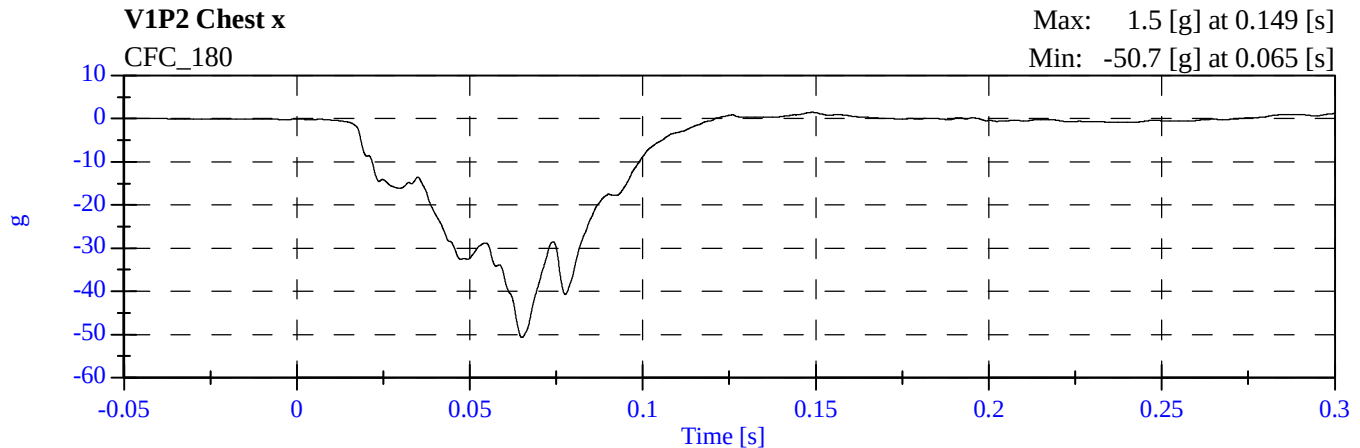
Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009

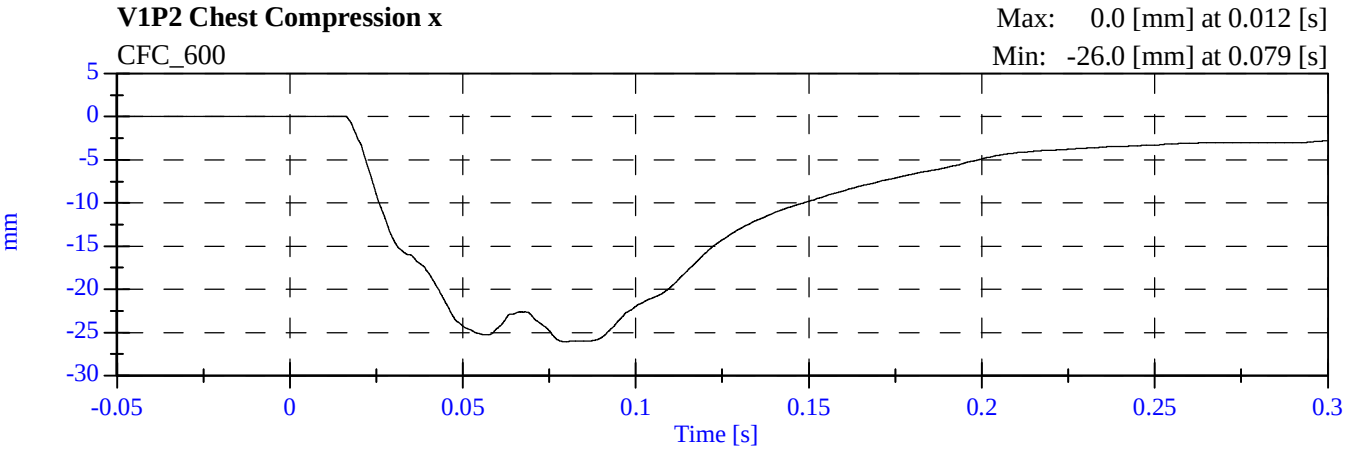


Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009

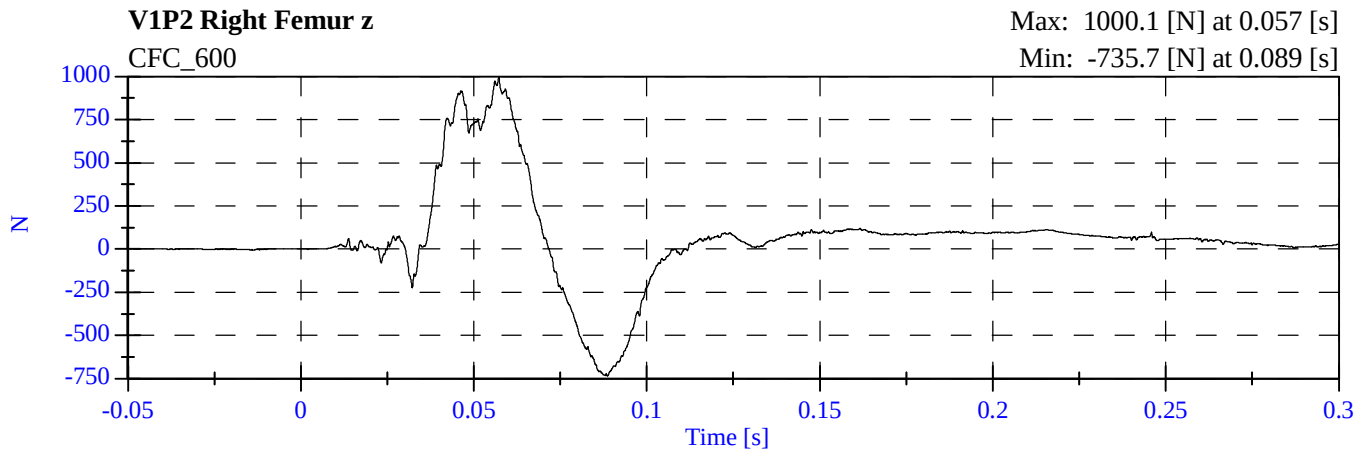
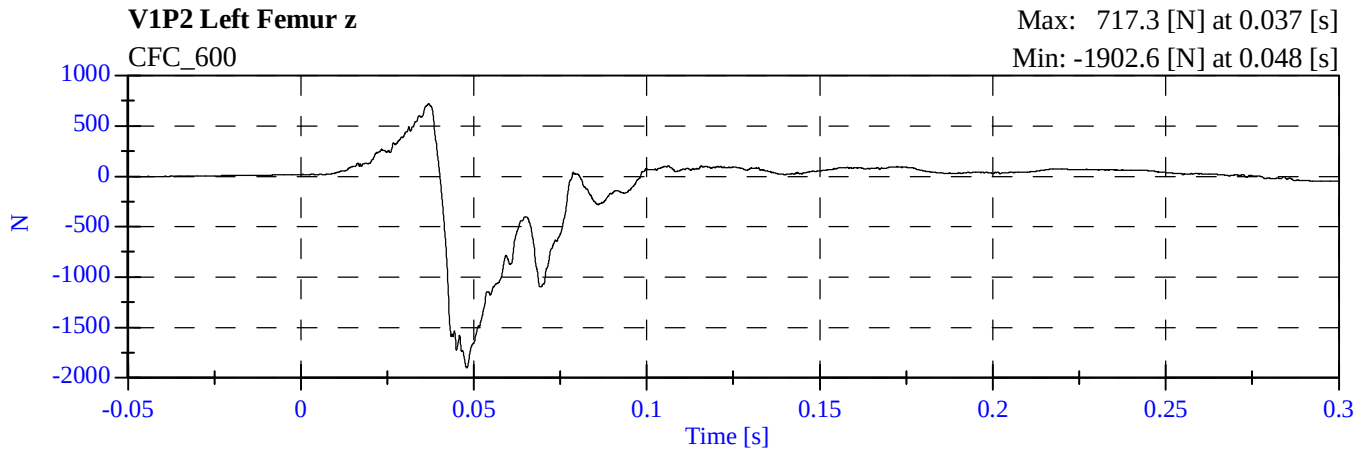


Frontal NCAP - 2010 Hyundai Genesis
MA0501 - July 22, 2009



Frontal NCAP - 2010 Hyundai Genesis

MA0501 - July 22, 2009



APPENDIX C

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

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

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

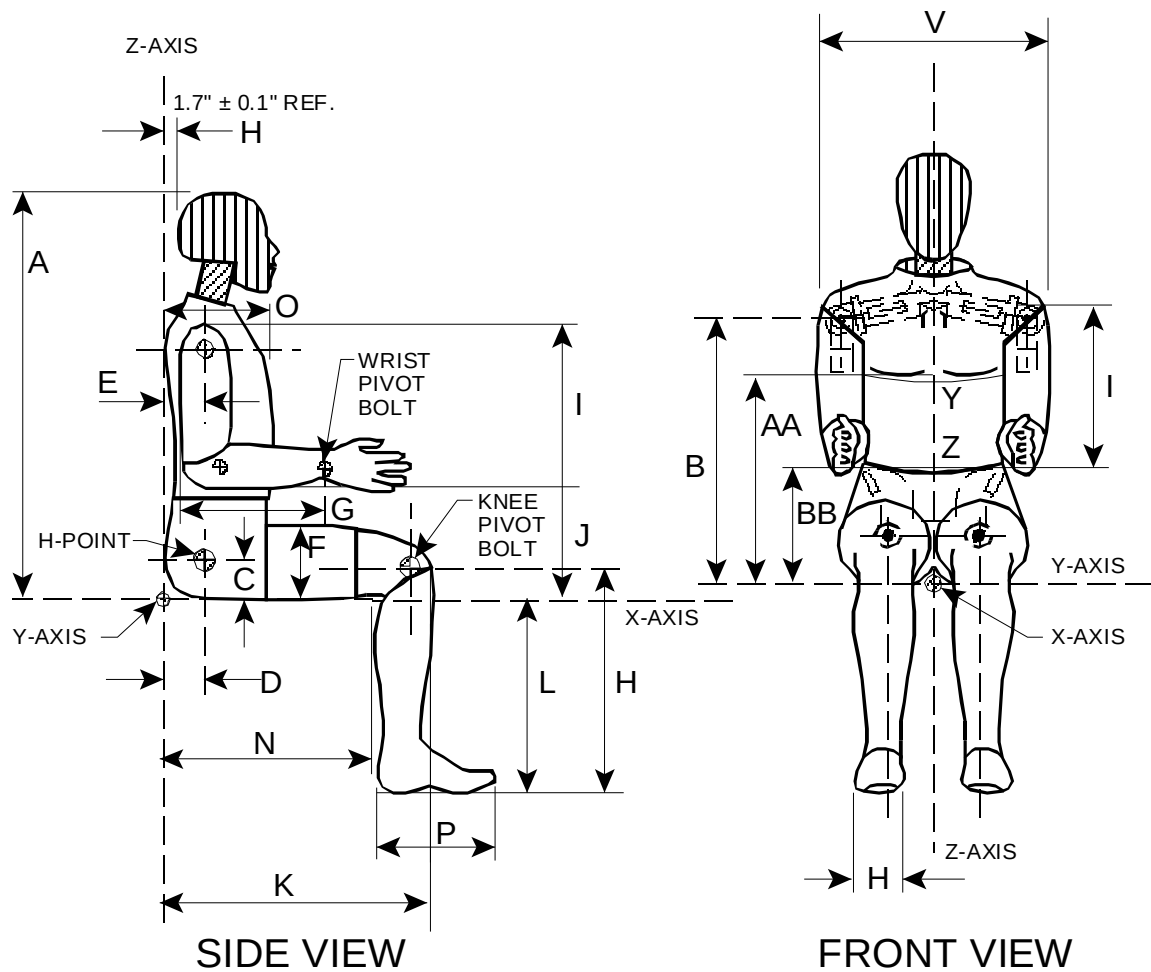
Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	064	
#2/Right Front Passenger	061	

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Inducant Testing Final Report No. 6525-V-1.

EXTERNAL DIMENSIONS SPECIFICATIONS



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

PART 572E
HEAD DROP TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 02/10/09
Workfile 064H 02-10-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	27
Peak Resultant Acceleration	225-275 G's	263.90
Peak Lateral Acceleration	15 G's Max	7.33
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	02/26/09	6 Axis Neck Transducer
Workfile	064NF3 02-26-09	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.67
Relative Humidity		10% - 70%	23.0
Impact Velocity		6.89 – 7.13 m/s	7.03
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.59
	20 ms	17.60 - 22.60 G's	20.94
	30 ms	12.50 - 18.50 G's	16.63
Max Pendulum G's Above 30 ms		29 G's Max	16.63
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.40
D Plane Rotation	Max	64 - 78 Deg	70.63
	Time	57 - 64 ms	60.10
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	92.40
	Time	47 - 58 ms	50.80
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.00
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.60

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	02/26/09	6 Axis Neck Transducer
Workfile	064NE 02-26-09	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.67
Relative Humidity		10% - 70%	24.0
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.00
	20 ms	14.00 - 19.00 G's	18.32
	30 ms	11.00 - 16.00 G's	14.49
Max Pendulum G's Above 30 ms		22 G's Max	14.49
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	39.70
D Plane Rotation	Max	81 - 106 Deg	99.76
	Time	72 - 82 ms	76.10
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-70.85
	Time	65 - 79 ms	71.60
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	156.60
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	143.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 04/21/09
Workfile 064 142 RIBST12 04-21-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.0
Relative Humidity	10% - 70%	30.0
Pendulum Velocity	6.58 – 6.83 m/s	6.58
Maximum Deflection	63.50 – 72.64 mm	68.32
Maximum Resistive Force	5159.9 – 5893.9 N	5381.6
Internal Hysteresis	69 - 85 %	71.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 02/16/09
Workfile 064LF/RF 02-16-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	18.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5163.11
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	18.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5335.72

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Sequential Test Number 1
Date 03/25/09

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.0
Relative Humidity			18.0
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.6
Shoulder Pivot Height	B	19.9 - 20.5 in	20.5
H-Point Height	C	3.3 - 3.5 in	3.5
H-Point from Backline	D	5.3 - 5.5 in	5.5
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.5
Thigh Clearance	F	5.5 - 6.1 in	6.0
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Elbow Rest Height	J	7.5 - 8.3 in	7.8
Buttock Knee Length	K	22.8 - 23.8 in	23.5
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.1
Buttock Popliteal Length	N	17.8 - 18.8 in	18.7
Chest Depth	O	8.4 - 9.0 in	8.5
Foot Length	P	9.9 - 10.5 in	10.2
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Foot Breadth	W	3.6 - 4.2 in	3.8
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.5
Waist Circumference	Z	32.9 - 34.1 in	33.4

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 02-10-09
Workfile 061H 02-10-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	26.0
Peak Resultant Acceleration	225-275 G's	267.36
Peak Lateral Acceleration	15 G's Max	4.63
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	03/16/09	6 Axis Neck Transducer
Workfile	061NF 03-16-09	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.67
Relative Humidity		10% - 70%	61
Impact Velocity		6.89 – 7.13 m/s	7.00
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.62
	20 ms	17.60 - 22.60 G's	21.16
	30 ms	12.50 - 18.50 G's	15.90
Max Pendulum G's Above 30 ms		29 G's Max	15.90
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39.00
D Plane Rotation	Max	64 - 78 Deg	69.60
	Time	57 - 64 ms	60.30
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	100.01
	Time	47 - 58 ms	51.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	114.80
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.60

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	03/16/09	6 Axis Neck Transducer
Workfile	061NE 03-16-09	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	19.00
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	19.50
	20 ms	14.00 - 19.00 G's	18.41
	30 ms	11.00 - 16.00 G's	14.63
Max Pendulum G's Above 30 ms		22 G's Max	14.63
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.30
D Plane Rotation	Max	81 - 106 Deg	94.82
	Time	72 - 82 ms	76.60
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-60.25
	Time	65 - 79 ms	72.00
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	162.10
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	142.10

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 04/21/09
Workfile 061NRT1 04-21-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	34.0
Pendulum Velocity	6.58 – 6.83 m/s	6.59
Maximum Deflection	63.50 – 72.64 mm	64.01
Maximum Resistive Force	5159.9 – 5893.9 N	5669.3
Internal Hysteresis	69 - 85 %	73.77

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 02/16/09
Workfile 061LF/RF 02-16-09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	18
Probe Velocity	2.07 – 2.13 m/s	2.12
Peak Knee Impact Force	4715.1 – 5782.7 N	5279.06
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	18
Probe Velocity	2.07 – 2.13 m/s	2.12
Peak Knee Impact Force	4715.1 – 5782.7 N	5288.93

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Sequential Test Number 1
Date 3/25/09

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.0
Relative Humidity			18
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.7
Shoulder Pivot Height	B	19.9 - 20.5 in	20.4
H-Point Height	C	3.3 - 3.5 in	3.5
H-Point from Backline	D	5.3 - 5.5 in	5.3
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.7
Thigh Clearance	F	5.5 - 6.1 in	6.1
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Buttock Popliteal Length	N	17.8 - 18.8 in	18.7
Chest Depth	O	8.4 - 9.0 in	8.4
Foot Length	P	9.9 - 10.5 in	10.1
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Foot Breadth	W	3.6 - 4.2 in	3.9
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.5
Waist Circumference	Z	32.9 - 34.1 in	33.4

Remarks:

Laboratory Technician:

B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	P52011	5/27/2009	11/23/2009
	Y	ENDEVCO	P52128	5/27/2009	11/23/2009
	Z	ENDEVCO	P51990	5/27/2009	11/23/2009
Head	X (R)	ENDEVCO	P51303	5/27/2009	11/23/2009
	Y (R)	ENDEVCO	P51985	5/27/2009	11/23/2009
	Z (R)	ENDEVCO	P51294	5/27/2009	11/23/2009
Neck Load Cell	X	DENTON	440Fx	4/7/2009	4/2/2010
	Y	DENTON	440Fy	4/7/2009	4/2/2010
	Z	DENTON	440Fz	4/7/2009	4/2/2010
Neck Moment	X	DENTON	440Mx	4/7/2009	4/2/2010
	Y	DENTON	440My	4/7/2009	4/2/2010
	Z	DENTON	440Mz	4/7/2009	4/2/2010
Chest	X	ENDEVCO	P52000	5/28/2009	11/24/2009
	Y	ENDEVCO	P49163	5/28/2009	11/24/2009
	Z	ENDEVCO	P52009	5/28/2009	11/24/2009
Chest	X (R)	ENDEVCO	P52035	5/28/2009	11/24/2009
	Y (R)	ENDEVCO	P52030	5/28/2009	11/24/2009
	Z (R)	ENDEVCO	P52033	5/28/2009	11/24/2009
Chest Deflection	X	SERVO	64	5/24/2009	11/20/2009
Pelvic	X	ENDEVCO	P17285	5/28/2009	11/24/2009
	Y	ENDEVCO	P17837	5/28/2009	11/24/2009
	Z	ENDEVCO	P17553	5/28/2009	5/23/2010

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	1525	5/29/2009	11/25/2009
Right Femur Load Cell	Fz	DENTON	1533	5/29/2009	11/25/2009
Left Upper Tibia	Mx	DENTON	374Mx	6/2/2009	5/28/2010
	My	DENTON	374My	6/2/2009	5/28/2010
Left Lower Tibia	Fz	DENTON	372Fz	6/2/2009	5/28/2010
	Mx	DENTON	372My	6/2/2009	5/28/2010
	My	DENTON	372My	6/2/2009	5/28/2010
Right Upper Tibia	Mx	DENTON	404Mx	6/1/2009	5/27/2010
	My	DENTON	404My	6/1/2009	5/27/2010
Right Lower Tibia	Fz	DENTON	396Fz	6/1/2009	5/27/2010
	Mx	DENTON	396Mx	6/1/2009	5/27/2010
	My	DENTON	396My	6/1/2009	5/27/2010
Left Foot Rear	X	ENDEVCO	P52383	5/27/2009	11/23/2009
	Z	ENDEVCO	P52152	5/28/2009	11/24/2009
Left Foot Front	Z	ENDEVCO	P52082	5/28/2009	11/24/2009
Right Foot Rear	X	ENDEVCO	P52025	5/28/2009	11/24/2009
	Z	ENDEVCO	P51873	5/28/2009	11/24/2009
Right Foot Front	Z	ENDEVCO	P58987	5/28/2009	11/24/2009
Lap Belt Load Cell		First Technologies	156	4/2/2009	3/28/2010
Shoulder Belt Load Cell		First Technologies	159	4/2/2009	3/28/2010

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	P58871	6/12/2009	12/9/2009
	Y	ENDEVCO	P51281	6/12/2009	12/9/2009
	Z	ENDEVCO	P51209	6/12/2009	12/9/2009
Head	X (R)	ENDEVCO	P52155	6/12/2009	12/9/2009
	Y (R)	ENDEVCO	P51274	6/12/2009	12/9/2009
	Z (R)	ENDEVCO	P52133	6/12/2009	12/9/2009
Neck Load Cell	X	DENTON	1916Fx	7/13/2009	7/8/2010
	Y	DENTON	1916Fy	7/13/2009	7/8/2010
	Z	DENTON	1916Fz	7/13/2009	7/8/2010
Neck Moment	X	DENTON	1916Mx	7/13/2009	7/8/2010
	Y	DENTON	1916My	7/13/2009	7/8/2010
	Z	DENTON	1916Mz	7/13/2009	7/8/2010
Chest	X	ENDEVCO	P52157	6/12/2009	12/9/2009
	Y	ENDEVCO	P52018	6/12/2009	12/9/2009
	Z	ENDEVCO	P52398	5/27/2009	11/23/2009
Chest	X (R)	ENDEVCO	P52156	6/12/2009	12/9/2009
	Y (R)	ENDEVCO	P49179	6/12/2009	12/9/2009
	Z (R)	ENDEVCO	P52405	5/27/2009	11/23/2009
Chest Deflection	X	SERVO	61	7/14/2009	1/10/2010
Pelvic	X	ENDEVCO	P58743	6/12/2009	12/9/2009
	Y	ENDEVCO	P58766	6/12/2009	12/9/2009
	Z	ENDEVCO	P58767	6/12/2009	12/9/2009

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	1532	6/15/2009	6/10/2010
Right Femur Load Cell	Fz	DENTON	1526	6/15/2009	6/10/2010
Left Upper Tibia	Mx	DENTON	91UMx	7/14/2009	7/9/2010
	My	DENTON	91UMy	7/14/2009	7/9/2010
Left Lower Tibia	Fz	DENTON	91LFz	7/14/2009	7/9/2010
	Mx	DENTON	91LMx	7/14/2009	7/9/2010
	My	DENTON	91LMy	7/14/2009	7/9/2010
Right Upper Tibia	Mx	DENTON	200Mx	7/14/2009	7/9/2010
	My	DENTON	200My	7/14/2009	7/9/2010
Right Lower Tibia	Fz	DENTON	128Fz	7/14/2009	7/9/2010
	Mx	DENTON	128Mx	7/14/2009	7/9/2010
	My	DENTON	128My	7/14/2009	7/9/2010
Left Foot Rear	X	ENTRAN	02I02I16-A05	6/12/2009	12/9/2009
	Z	ENTRAN	00L20-A30	6/12/2009	12/9/2009
Left Foot Front	Z	ENTRAN	00L20-A22	6/12/2009	12/9/2009
Right Foot Rear	X	ENDEVCO	J29805	6/12/2009	12/9/2009
	Z	ENTRAN	00L20-A29	6/12/2009	12/9/2009
Right Foot Front	Z	ENTRAN	03E03E20-N12	6/12/2009	12/9/2009
Lap Belt Load Cell		First Technologies	173	4/2/2009	3/28/2010
Shoulder Belt Load Cell		First Technologies	178	4/2/2009	3/28/2010

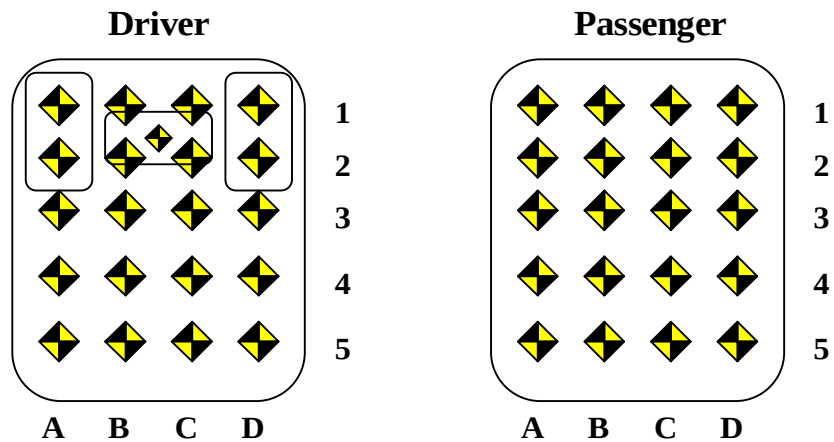
INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ENDEVCO	P35803	3/2/2009	8/29/2009
Right Rear Seat Crossmember X	ENDEVCO	P35757	3/2/2009	8/29/2009
Top of Engine	GS	9440-006	4/16/2009	10/13/2009
Bottom of Engine	GS	9440-011	4/16/2009	10/13/2009
Right Disc Brake Caliper	ICS	FA2474	4/16/2009	10/13/2009
Left Disc Brake Caliper	ICS	FA2486	4/16/2009	10/13/2009
Left Seat Rear Crossmember Z	ENDEVCO	P35811	3/2/2009	8/29/2009
Right Seat Rear Crossmember Z	ENDEVCO	P21399	3/3/2009	8/30/2009

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

DRIVER SIDE INTRUSION MEASUREMENTS

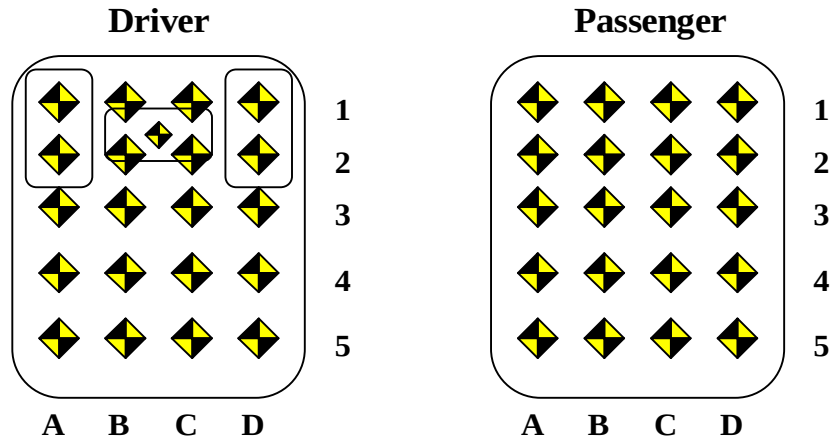


Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3241	-627	418	3229	-615	418	12	-12	0
B1	3340	-483	415	3282	-473	423	58	-10	-8
C1	3347	-336	415	3274	-322	429	73	-14	-14
D1	3271	-213	420	3255	-215	405	16	2	15
A2	3178	-624	331	3168	-616	333	10	-8	-2
B2	3258	-486	331	3235	-476	326	23	-10	5
C2	3255	-341	328	3238	-333	310	17	-8	18
D2	3171	-212	333	3165	-209	306	6	-3	27
A3	3126	-621	259	3129	-615	252	-3	-6	7
B3	3161	-482	260	3168	-479	240	-7	-3	20
C3	3163	-342	258	3169	-338	229	-6	-4	29
D3	3131	-215	264	3131	-211	239	0	-4	25
A4	3034	-621	254	3038	-621	244	-4	0	10
B4	3035	-477	259	3043	-475	238	-8	-2	21
C4	3038	-345	262	3044	-342	234	-6	-3	28
D4	3040	-211	265	3047	-209	240	-7	-2	25
A5	2919	-619	251	2927	-612	243	-8	-7	8
B5	2916	-478	255	2922	-473	236	-6	-5	19
C5	2923	-349	261	2929	-343	237	-6	-6	24
D5	2923	-216	266	2928	-214	244	-5	-2	22
BP	3169	-376	455	3078	-377	494	91	1	-39
G	2922	-526	699	2918	-522	690	4	-4	9
H	2873	-212	703	2871	-209	687	2	-3	16
L	2633	-382	856	2649	-388	870	-16	6	-14
AB	2596	-610	279	2594	-605	267	2	-5	12

BP=Brake Pedal, G=Left side of bolster, H=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt

PASSENGER SIDE INTRUSION MEASUREMENTS



Passenger Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3304	233	420	3299	229	419	5	4	1
B1	3311	364	421	3295	364	428	16	0	-7
C1	3309	501	420	3298	502	429	11	-1	-9
D1	3306	633	418	3301	636	426	5	-3	-8
A2	3210	233	341	3215	233	328	-5	0	13
B2	3213	367	342	3206	365	335	7	2	7
C2	3215	502	342	3206	502	344	9	0	-2
D2	3218	635	343	3212	637	348	6	-2	-5
A3	3114	233	263	3125	235	243	-11	-2	20
B3	3121	370	264	3131	373	249	-10	-3	15
C3	3124	502	263	3130	507	252	-6	-5	11
D3	3124	634	261	3129	633	255	-5	1	6
A4	2997	230	265	3007	233	247	-10	-3	18
B4	3000	367	263	3011	370	255	-11	-3	8
C4	3001	502	260	3013	503	256	-12	-1	4
D4	3005	626	258	3009	627	258	-4	-1	0
A5	2879	230	264	2886	228	249	-7	2	15
B5	2880	369	260	2888	367	252	-8	2	8
C5	2874	503	256	2885	501	251	-11	2	5
D5	2881	628	258	2884	624	254	-3	4	4
R	2898	249	709	2895	247	695	3	2	14
S	2923	537	704	2915	535	693	8	2	11
AB	2596	611	283	2593	607	277	3	4	6

R=Left side of bolster, S=Right side of bolster, L=Steering wheel center;

AB = Front outboard seat anchor bolt