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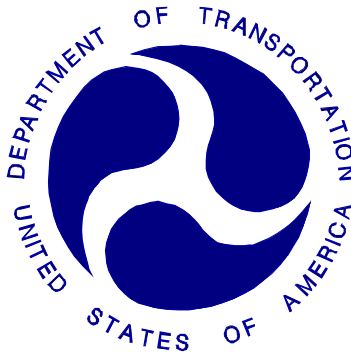
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

GENERAL MOTORS DE MEXICO
2007 CHEVROLET AVALANCHE
MPV

NHTSA NUMBER: G70102

CALSPAN TEST NUMBER: 8812-NCAP-01

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



October 6, 2006

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code: NVS-111
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Washington, DC 20590

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Prepared by:

James A. Czarnecki, Project Engineer

Approved by:

David J. Travale, Program Manager
Transportation Science Center

Approval Date:

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16. Abstract A frontal load cell barrier test of a 2007 Chevrolet Avalanche MPV was performed at Calspan Corporation's crash test facility in Buffalo, New York, on October 6, 2006. The impact velocity was 56.97 kph and the temperature at the barrier face was 20.1°C. The maximum post-test vehicle crush was 735 mm. The test vehicle was equipped with 3-point restraint systems with shoulder belt pretensioners and force limiters, knee bolsters, head restraints 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 (150)	Passenger (142)
Head Injury Criteria (HIC - 36 ms)		-	1000	273.2	287.8
Maximum Thorax Acceleration (3 ms Clip)		g's	60 g's	30.3	37.2
Chest Displacement		mm	-76 mm	-33.5	-30.9
Left Femur Force		Newtons	-10000 N	-2876.6	-3321.0
Right Femur Force		Newtons	-10000 N	-2557.5	-4229.7
17. Key Words 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)			18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5111 Washington, DC 20590		
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.97 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 56.97 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Inducant Test procedure.

1.2 TEST PROCEDURE

This 56.97 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Inducant 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 Inducant Test Procedure.

Both ATDs were fully instrumented, 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. 150) and the right-front passenger (position 2) ATD (Serial No.142) were used in one test (M70105) previous to this test where they did appear to exceed FMVSS 208 head, chest and femur requirements. 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 2007 Chevrolet Avalanche MPV at a velocity of 56.97 kph. The test was performed at Calspan on October 6, 2006. 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	273.2	63.0	99.0	30.3	73.0	76.0	-33.5	-2876.6	-2557.5
Passenger	287.8	69.1	105.1	37.2	72.6	75.6	-30.9	-3321.0	-4229.7

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

TEST NOTES	
Data Channel	Anomalies
V1P2 Left Upper Tibia Mx	Questionable Data
V1 RFP Lap Belt	Data Spikes Presents

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: G70102 Test Mode: 56.3 kph Frontal Barrier
 Test Date: October 6, 2006 Time: 16:52 Temperature: 20.1 °C
 Vehicle Make/Model/Body Style: 2007 Chevrolet Avalanche MPV
 Vehicle Test Weight: 2889.0 kg Impact Velocity: 56.97 kph (55.5 – 57.1 kph)
 Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 735 mm

ATD INFORMATION AND VISIBLE CONTACT POINTS

	DRIVER	PASSENGER
ATD Type:	Part 572E	Part 572E
Restraint System:	Three-point safety belt with torso belt pretensioner and load limiter, airbag, knee bolster and adjustable head restraint	Three-point safety belt with torso belt pretensioner and load limiter, airbag, knee bolster and adjustable head restraint
Head Contact:	The face to the center of the airbag, the back of the head to the outboard half of the head restraint.	The face to the center of the airbag, the back of the head to the center of the head restraint.
Abdomen Contact:	None	None
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee bolster	Glove compartment door
Right Knee Contact:	Knee bolster	Glove compartment door

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Locked	Locked
Front Door Opening	Closed, latched and operable without tools	Closed, latched and operable without tools
Rear Door Opening	Closed, latched and operable without tools	Closed, latched and operable without tools
Hatch/Other Door Opening	Not Applicable	Not Applicable
Front Seat Track Shift (mm)	5 mm forward	0 mm
Front Seat Back Failure	None	None
Glazing Damage	Windshield cracked along its lower edge.	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	885	899	916	900

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	905	895
Lap belt length as measured on ATD	mm	600	630
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	1735	1715

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2007 Chevrolet Avalanche MPV

NHTSA No. : G70102 ; VIN: 3GNFK12337G151784 ; Color: White

Engine Data: 8 cylinders; - CID; 5.3 Liters; - cc

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

Transmission Data: 4 speeds; - Manual; X Automatic; X Overdrive

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

AUTOMATIC DOOR LOCKS:

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

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

DEALER AND DELIVERY INFORMATION:

Date Received: 9-15-2006 ; Odometer Reading 77 km

Selling Dealer: Amherst Chevrolet

Dealer Address: 2915 Niagara Falls Boulevard Amherst, NY 14228

TEST VEHICLE OPTIONS:

X AC; X Power Steering; X Power Brakes; X Power Locks; X Power Seats

X ABS; X Tilt Wheel; X Stability Control X 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:	Yes	No	No	N0	No
Passenger:	Yes	No	No	N0	No
Rear Passenger:	N/A	N/A	N/A	N/A	N/A

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: General Motors De Mexico

Date of Manufacture 07/06

GVWR: 3266 kg; GAWR: 1724 kg FRONT; 1860 kg REAR

VEHICLE CAPACITY DATA:

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

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 645.0 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 304.8 kg (136.1 maximum)

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 =	682.5	671.0	51.9	1353.5
Rear =	649.5	605.0	48.1	1254.5
Total Delivered Weight (UDW) =				2608.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	2608.0	kg	(Maximum)
Rated Cargo/Luggage Weight (RCLW)	=	136.1	kg	
Weight of 2 p.572 Dummies @ 76 each	=	152	kg	
TARGET TEST WEIGHT	=	2896.1	kg	

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 129.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	704.0	689.0	48.2	1393.0
Rear =	764.0	732.0	51.8	1496.0
Total Vehicle Test Weight (ATW) =				2889.0

Weight of Ballast Secured in Vehicle Trunk Area¹ = 160 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:	904	912	992	996	1592.2
FULLY LOADED:	896	904	963	967	-
AS TESTED:	903	910	963	968	1714.0

Vehicle's Wheel Base: 3310 mm

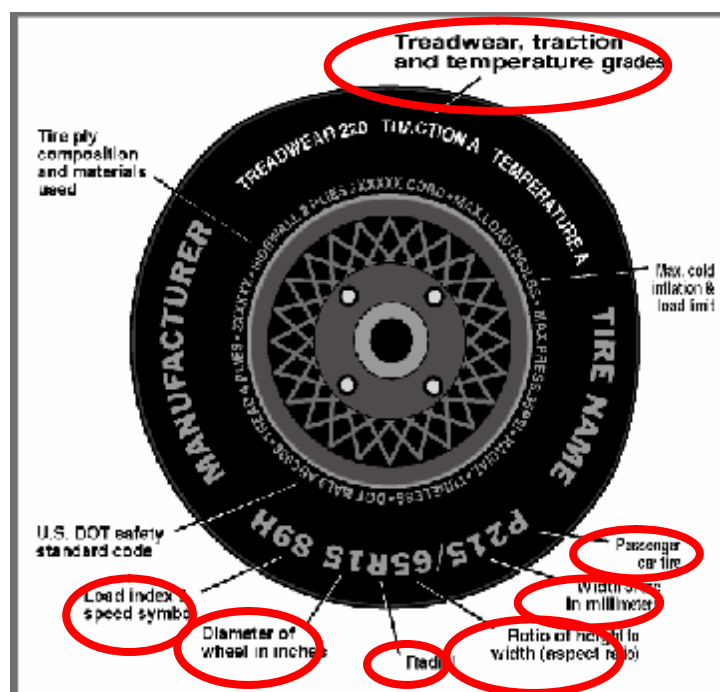
¹Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

²Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2007 Chevrolet Avalanche MPV

NHTSA Test No.: G70102 Test Date: October 6, 2006



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	300	300
Cold Pressure (from tire placard - kPa)*	210	210
Recommended Tire Size (from tire placard)	P265/70R17	P265/70R17
Tire size on Vehicle	P265/70R17	P265/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Wrangler HP	Wrangler HP
Tire Type	Passenger	Passenger
Tire Width (mm)	265	265
Ratio of Height to Width (aspect ratio)	70	70
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	113 S	113 S
Treadwear	340	340
Traction Grade	A	A
Temperature Grade	B	B

*Tire pressure used for test

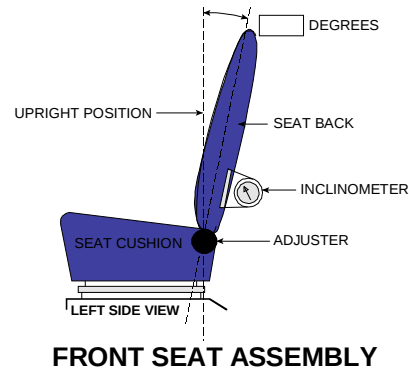
DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2007 Vehicle Model: Chevrolet Avalanche Body Style : MPV

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: 19.3

Measurement instructions: The seat back was positioned in detent 7 where the forward-most detent is defined as 0.

Seat back angle for passenger's seat: 19.3

Measurement instructions: The seat back was positioned in detent 7 where the forward-most detent is defined as 0.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Where the absolute fore-aft travel is 259 mm, the seat was positioned full down and 129.5 mm rearward of the forward most position (mid-position).

Positioning of the passenger's seat: The seat cushion was positioned in detent 12 where the forward-most detent is defined as 0 (25 available positions).

3. FUEL TANK CAPACITY DATA:

- | | | |
|--|----------------|--------|
| 3.1 A. "Usable Capacity" of the standard equipment fuel tank is | 114.3 | 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 = | 105.2 to 107.4 | liters |
| 3.2 Actual Amount of Stoddard solvent added to vehicle for test = | 105.2 | liters |
| 3.3 One-Third of Useable Capacity = | 38.1 | liters |
| 3.4 Is vehicle equipped with electric fuel pump? Yes- ☒ ; No- ☐ | | |

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

The fuel pump operates briefly when the ignition is placed in the "ON" position and the vehicle is not started and continuously while the engine is operating.

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: The steering column was placed in detent 2 where the upper-most detent is defined as 0 (placed in the true mid-position where a total of 5 positions were available)

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: * Driver: Placed in detent 2 where the uppermost detent is defined as 0 (true mid-position); Passenger: Placed in detent 0 (upper-most position).

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

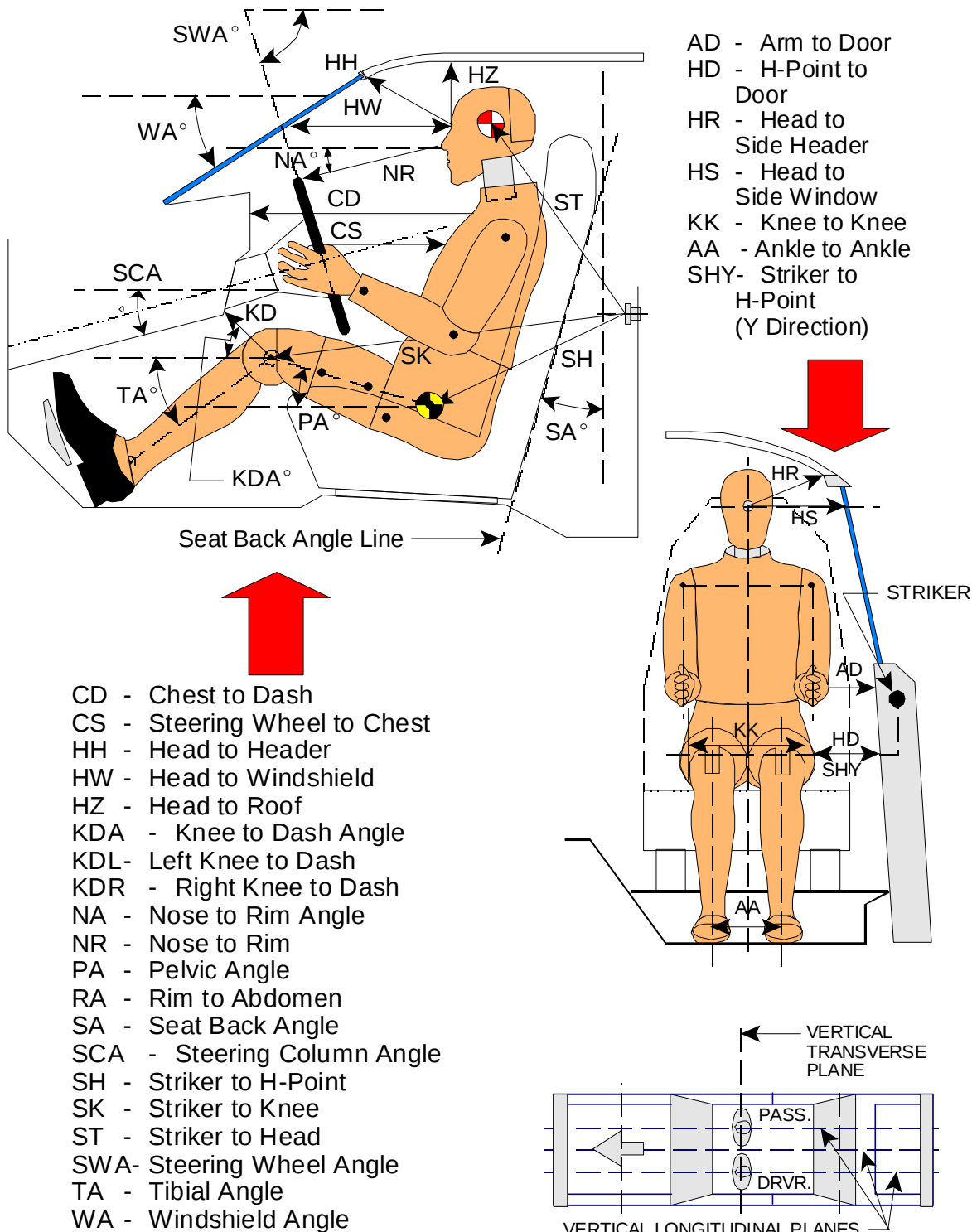
Does vehicle owner's manual describe how to deactivate ADLs? - Yes; X No; - N/A

Comments: The door locks were placed in the locked position for the test.

DATA SHEET NO. 5

FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



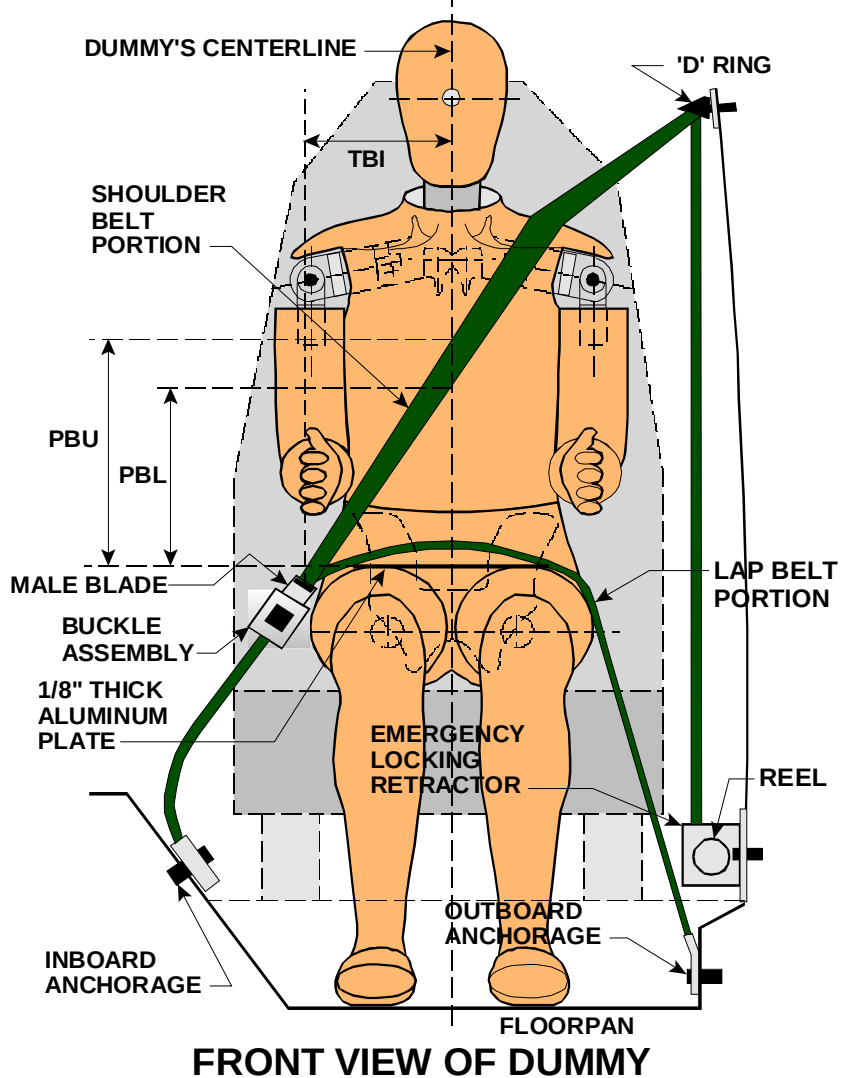
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #150)			PASS. (Serial #142)		
WA ^o	34.2 deg.			N/A		
SWA ^o	69.1 deg.			N/A		
SCA ^o	20.9 deg.			N/A		
SA ^o	19.3 deg.			19.3 deg.		
HZ	252			240		
HH	430			452		
HW	700			693		
HR	233			212		
NR	341	Angle	10 deg.	N/A		
CD	485			507		
CS	275			N/A		
RA	179			N/A		
KDL	153	Angle (KDA)	30 deg.	153		
KDR	148			153	Angle (KDA)	30 deg.
PA ^o	20.7 deg.			22.3 deg.		
TA ^o	49.2 deg.			51.0 deg.		
KK	315			265		
AA	280			205		
ST	690	Angle	22 deg.	693	Angle	20 deg.
SK	720	Angle	87 deg.	710	Angle	85 deg.
SH	329	Angle	96 deg.	320	Angle	91 deg.
SHY	255			250		
HS	352			345		
HD	205			197		
AD	126			132		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

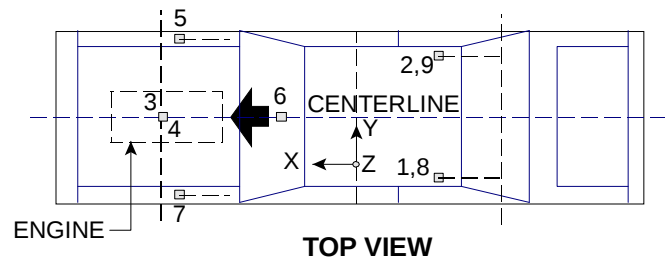
SEAT BELT POSITIONING DATA



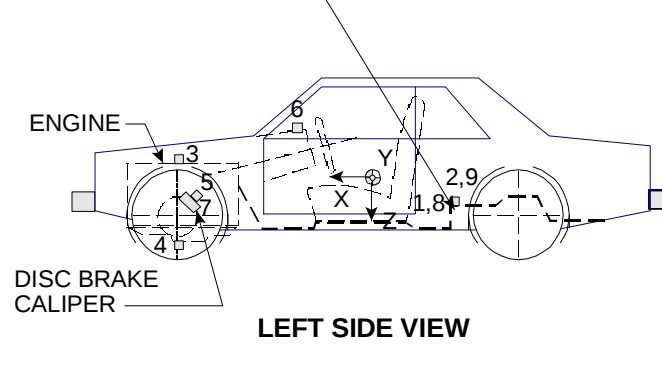
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	334	340
PBL-- Top surface of alum. plate to belt lower edge	255	260
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	2342	-724	-592
2	Right Rear Seat Cross Member X	2358	666	-582
3	Top of Engine Block	4855	-231	-1010
4	Bottom of Engine	4390	150	-323
5	Disc Brake Caliper @ Right Side	4555	796	-527
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	4535	-790	-541
8	Left Rear Seat Cross Member Z	2342	-724	-592
9	Right Rear Seat Cross Member Z	2358	666	-582

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 10 mm molding.

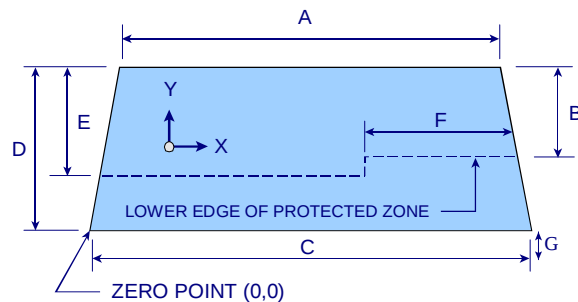
FMVSS 212 REQUIREMENTS:

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: 20.1°C.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2291.0	2291.0	100.0%
LEFT SIDE	2291.0	2291.0	100.0%
TOTAL	4582	4582	100.0%



DIMENSIONS (mm)	
A	1377
B	473
C	1725
D	740
E	465
F	527
G	10

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS: None

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

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

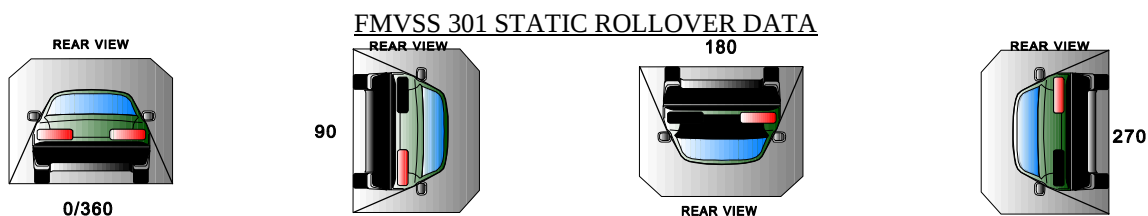
DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: _____ G70102 _____ TEST DATE: _____ October 6, 2006
VEHICLE MAKE/MODEL: _____ 2007 Chevrolet Avalanche MPV _____
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	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes
90° - 180°	1	minutes	05	seconds	5	minutes	6	minutes	5	seconds	7	minutes
180°-270°	1	minutes	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes
270°-360°	1	minutes	08	seconds	5	minutes	6	minutes	8	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:

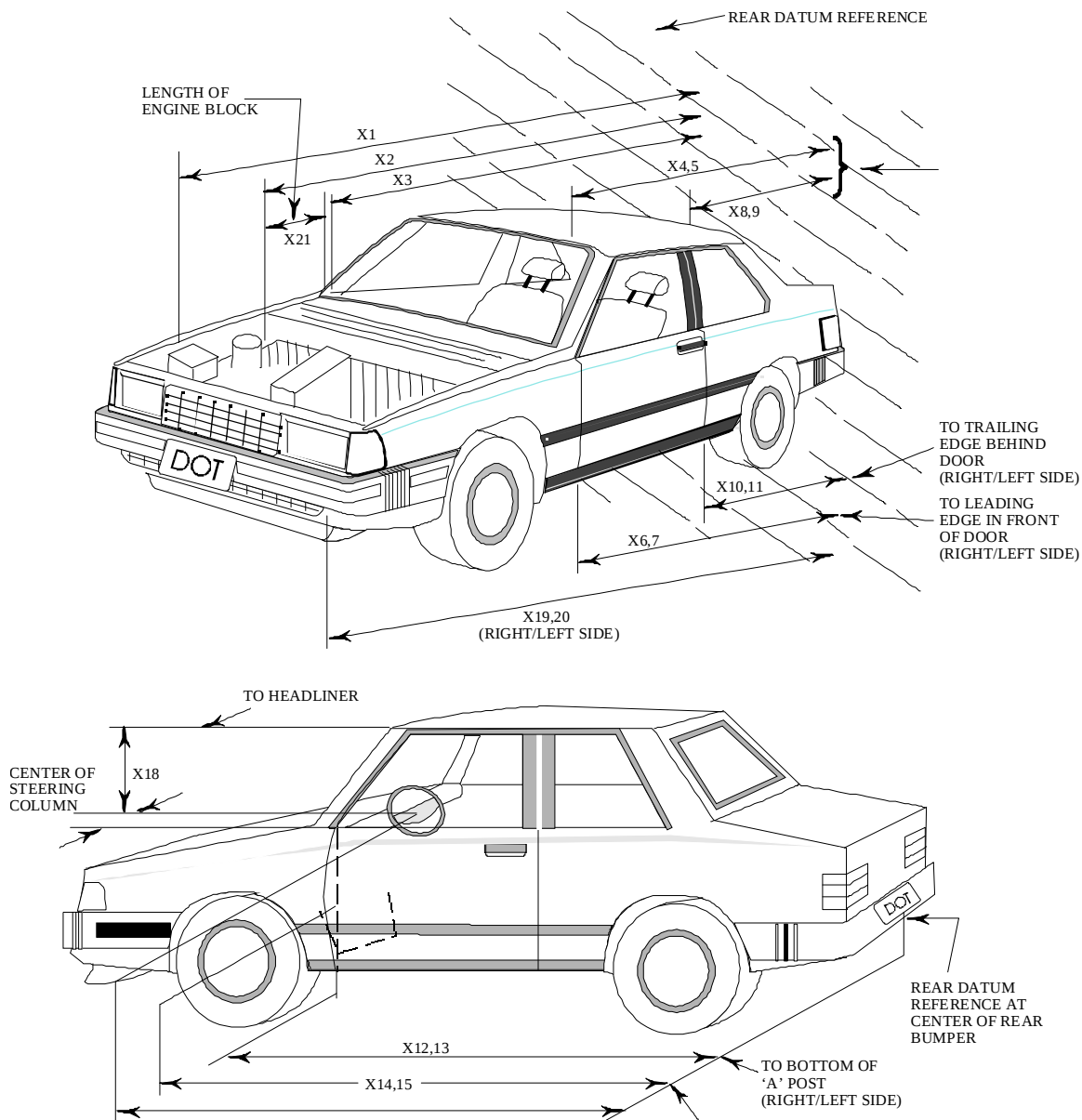
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

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.: G70102 TEST DATE: October 6, 2006
VEHICLE MAKE/MODEL: 2007 Chevrolet Avalanche MPV

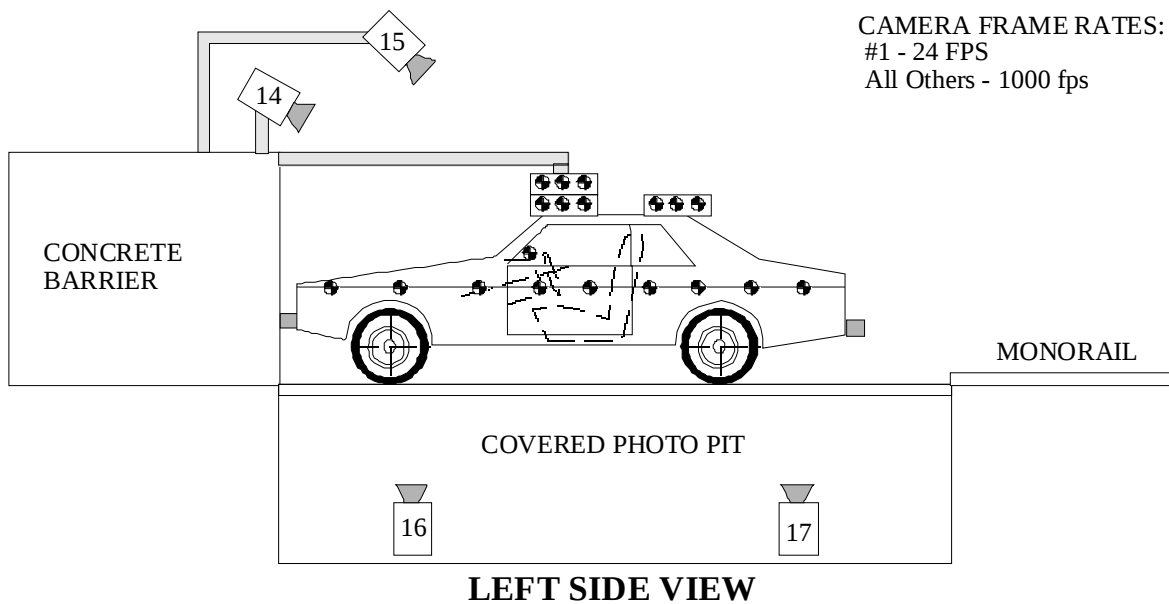
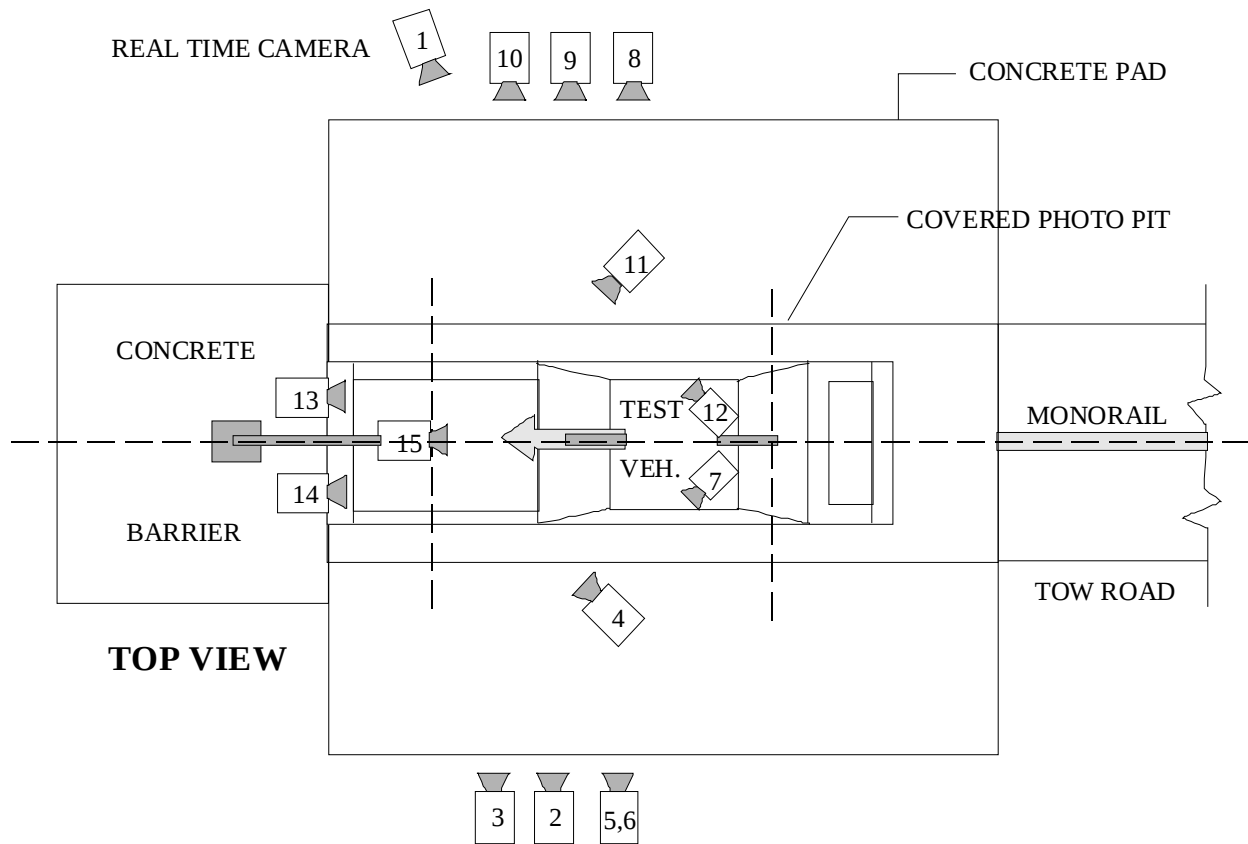
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	5623	4888	735
X2	Rear Surface of Vehicle to Front of Engine	4863	4653	210
X3	Rear Surface of Vehicle to Firewall	4439	4373	66
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	4080	4069	11
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	4078	4075	3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	4019	4019	0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	4021	4029	-8
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2884	2869	15
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2886	2877	9
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2872	2866	6
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2873	2879	-6
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	4136	4121	15
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	4146	4119	27
X14	Rear Surface of Vehicle to Firewall, Right Side	4432	4379	53
X15	Rear Surface of Vehicle to Firewall, Left Side	4433	4404	29
X16	Rear Surface of Vehicle to Steering Column	3572	3566	6
X17	Center of Steering Column to "A" Post	290	246	44
X18	Center of Steering Column to Headliner	454	457	-3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	5575	4917	658
X20	Rear Surface of Vehicle to Left Side of Front Bumper	5574	4914	660
X21	Length of Engine Block	416	416	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3759	3747	12
CD	Rear Surface of Vehicle to Center of Dash Panel	3764	3744	20
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3762	3752	10

All Dimensions in mm

NHTSA TEST No.: G70102 TEST DATE: October 6, 2006
VEHICLE MAKE/MODEL: 2007 Chevrolet Avalanche MPV

	Elements	Pre-Test (mm)
1	Total length	5623
2	Total Width	2010
3	Bumper Top Height	700
4	Bumper Bottom Height	505
5	Longitudinal Member Top Height	600
6	Distance Between Longitudinal Members	710
7	Longitudinal Member Width	100
8	Engine top height	1165
9	Engine bottom height	302
10	Engine and gearbox width	620
11	Front bumper-engine distance	760
12	Front shock absorber fixing height	760
13	Bonnet leading edge height	1045
14	Front shock absorber fixing width	950
15	Front bumper – front axle distance	992
16	Front axle – a pillar distance	615
17	A-pillar – B pillar distance	1160
18	B-pillar – rear axle distance	1554
19	B-pillar – C Pillar distance	1065
20	Roof sill bottom height	1750
21	Roof sill top height	1835
22	Floor sill bottom height	400
23	Floor sill top height	540

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



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

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

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	9257	1899	1068	-3.3	9177	28	1000
3	Left Side View	9955	1351	1099	-1.5	9875	50	1000
4	Driver and Interior View	7925	2768	2047	-7.9	-	35	500
5	Steering Column (Bottom)	8775	2193	1166	-1.6	8695	25	1000
6	Steering Column (Top)	8775	2193	1781	-6.9	8695	28-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	9949	1209	1049	-0.3	10323	28	500
9	Right Side View	9051	1959	1091	-1.0	9425	50	1000
10	Right Passenger View	7620	1888	1449	-2.1	7994	35	1000
11	Passenger and Interior View	9485	2793	2010	-7.9	-	35	500
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-27.5	-	13	500
14	Driver Front View	620	-92	1987	-27.1	-	13	500
15	Windshield View	0	-530	3374	-59	-	20	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	2650	-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

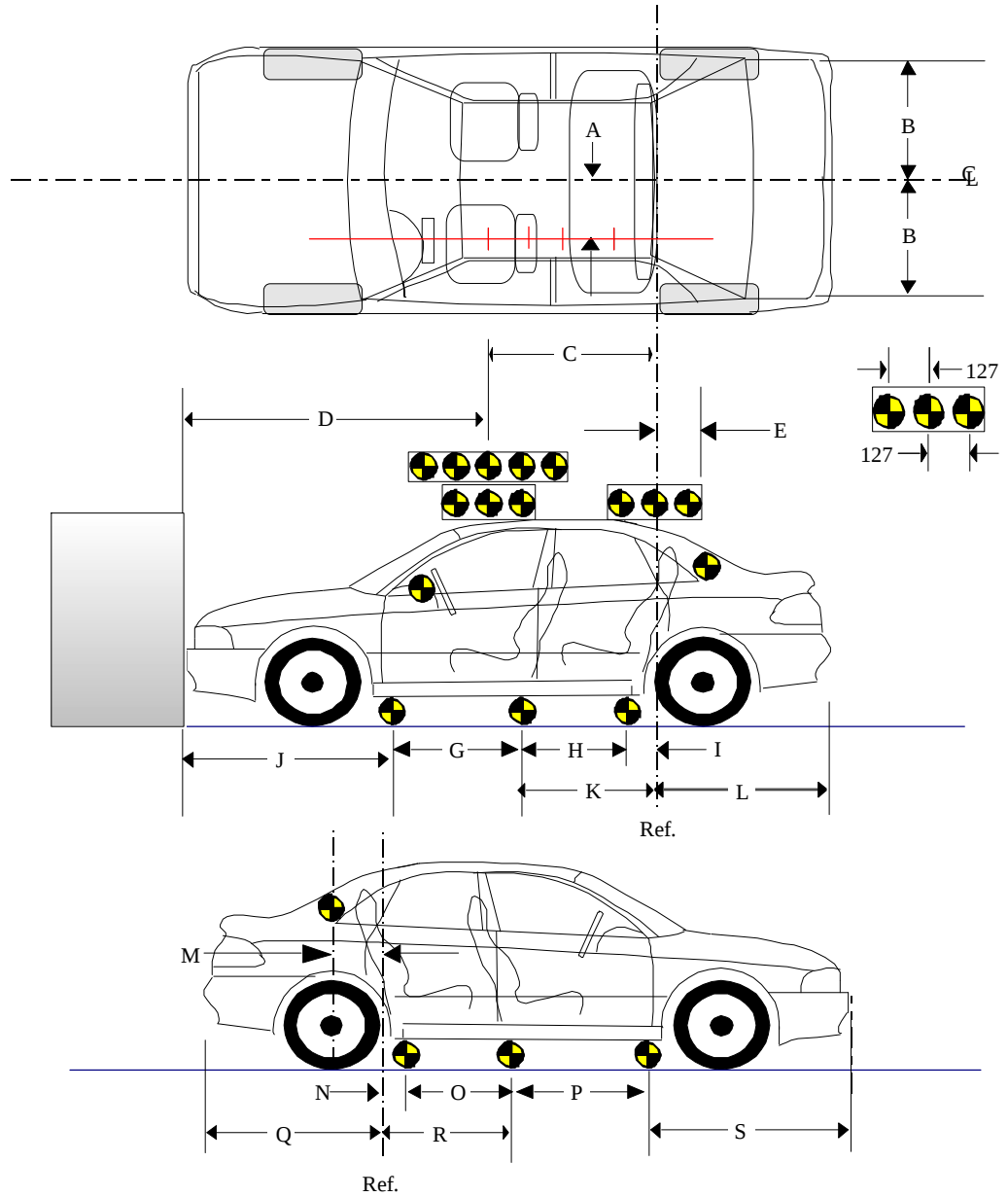
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

(Dimensions in millimeters)

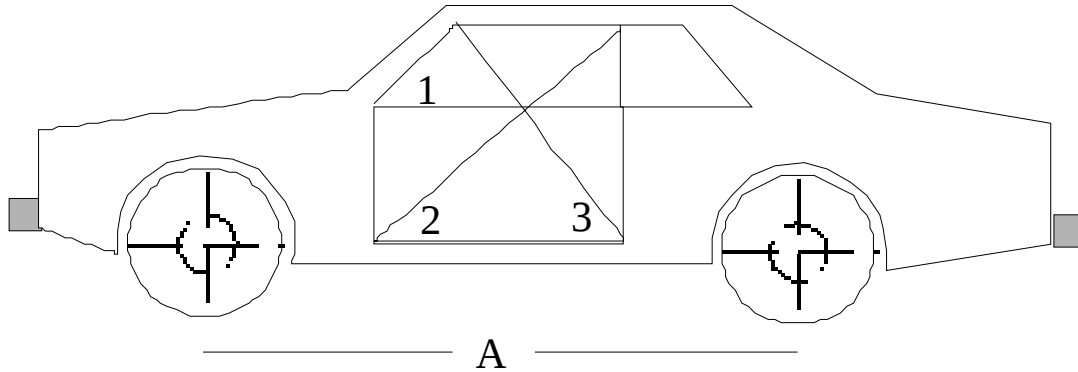
A	450
B	454
C	1219
D	2679
E	166
F	2038
G	1112
H	1129
I	131
J	1525
K	1260
L	1725
M	-161
N	126
O	1122
P	1122
Q	1727
R	1248
S	1526



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



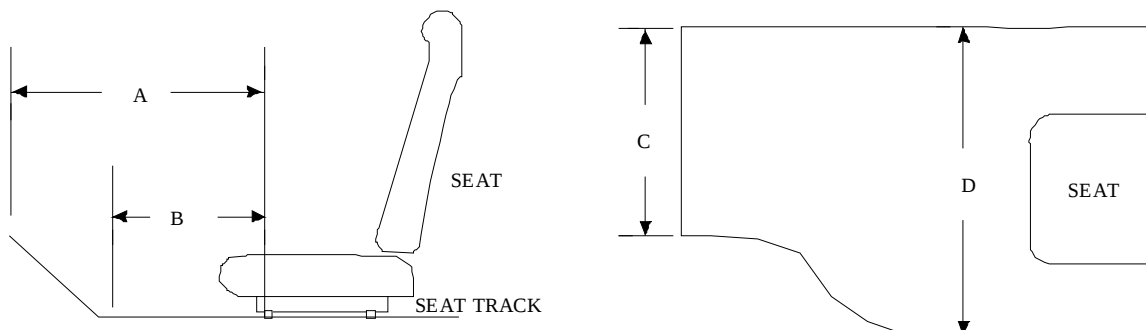
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1139	1571	1234	1138	1582	1234
AFTER TEST	1128	1558	1268	1130	1571	1261
DIFFERENCE	11	13	-34	8	11	-27

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	3310	3308
AFTER TEST	3206	3225
DIFFERENCE	104	83

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	798	757	41
B	568	561	7
C	503	498	5
D	491	493	-2

PASSENGER

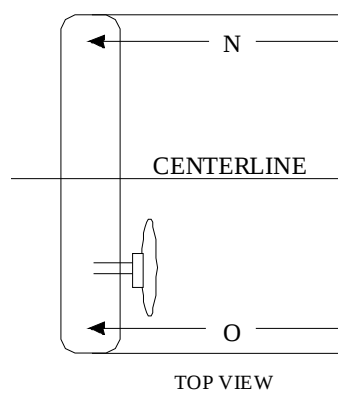
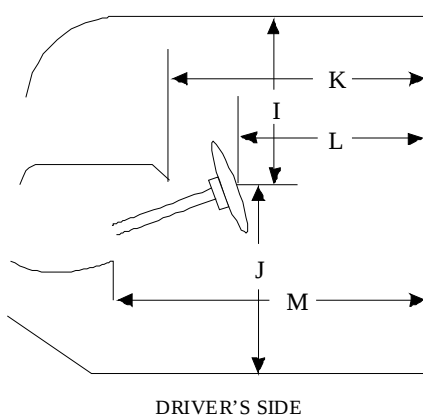
Measurement	Pre-Test	Post-Test	Difference
A	669	626	43
B	534	529	5
C	428	415	13
D	413	408	5

Units = mm

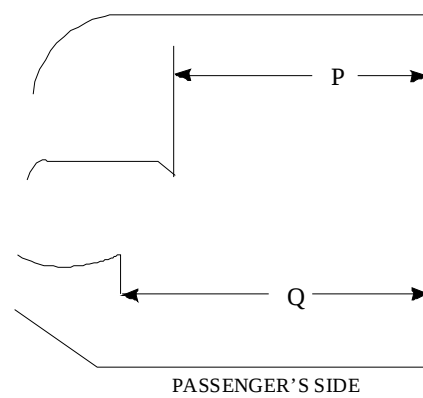
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



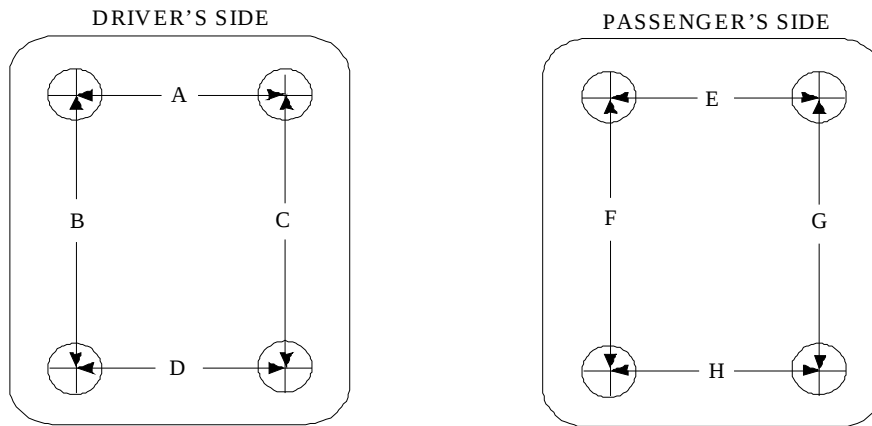
Measurement	Pre-Test	Post-Test	Difference
I	454	457	-3
J	690	715	-25
K	853	836	17
L	673	662	11
M	926	912	14
N	863	849	14
O	863	849	14
P = K (PASS.)	1050	1032	18
Q = M (PASS.)	924	905	19

Units = mm

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

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

FLOORBOARD DEFORMATION



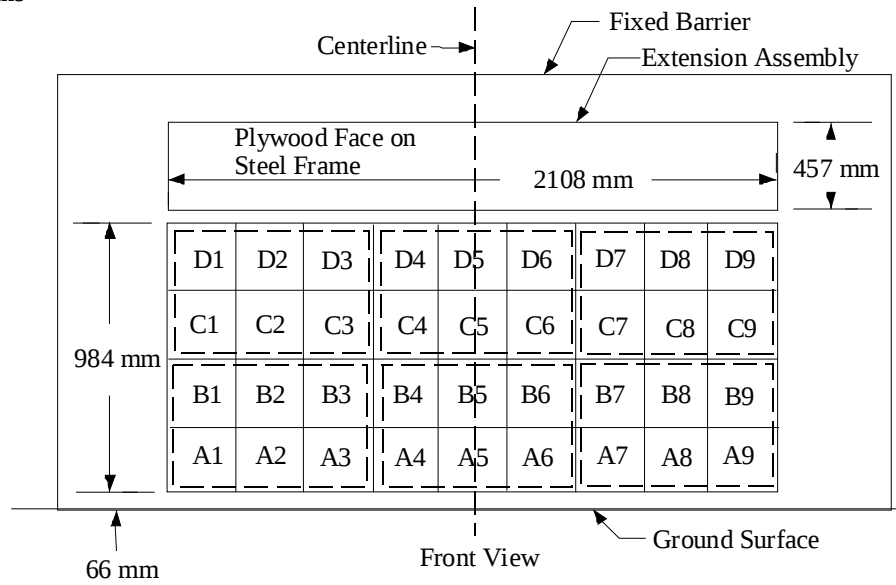
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	503	498	6
B	412	410	2
C	373	347	27
D	491	493	-1
E	428	415	13
F	362	364	-2
G	318	304	14
H	413	408	5

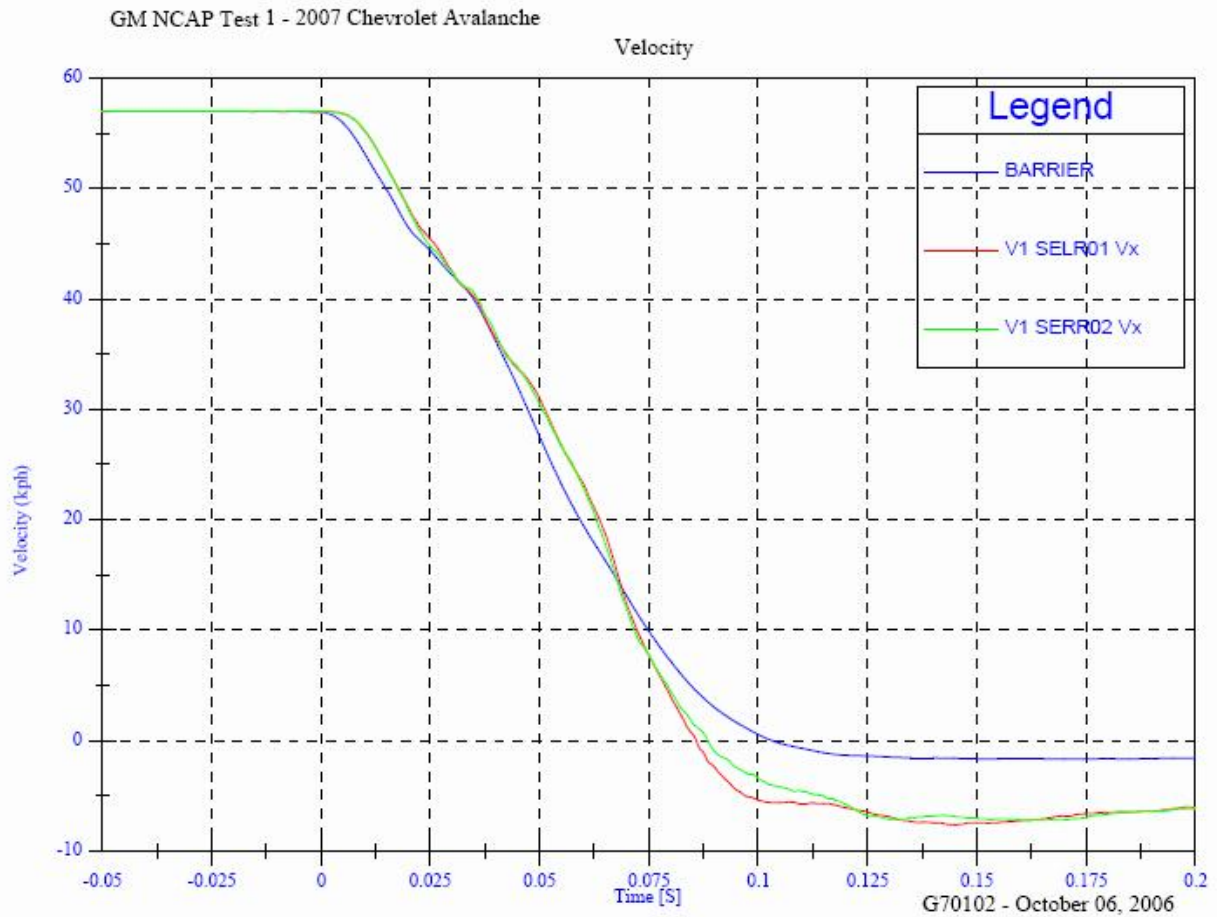
Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns



Momentum Plot



DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Chevrolet Avalanche MPV

NHTSA Test No.: G70102 VIN: 3GNFK12337G151784

Model Year: 2007 Build Date: 07/06 Test Date: October 6, 2006

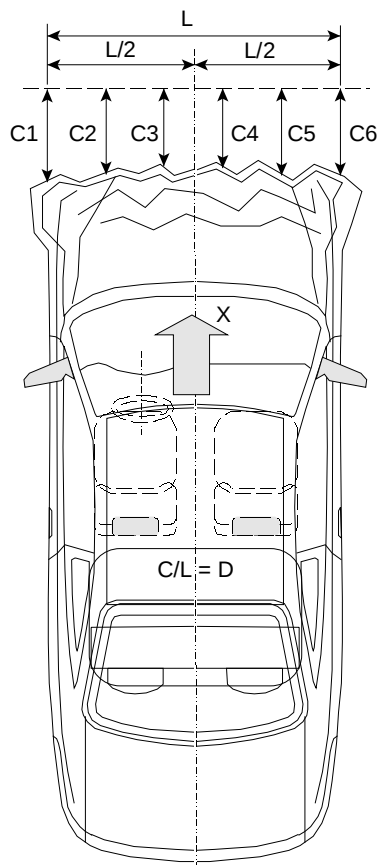
Vehicle Size Category: Utility Vehicle Test Weight: 2889.0 kg

Vehicle Wheelbase: 3310 mm; Front Overhang: 992 mm; Overall Width: 2010 mm

Collision Deformation Classification (CDC) Code: 12FDEW4

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	5395	4869	526
C2 =	5565	4926	639
C3 =	5614	4909	705
C4 =	5613	4909	704
C5 =	5562	4933	629
C6 =	5393	4868	525



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

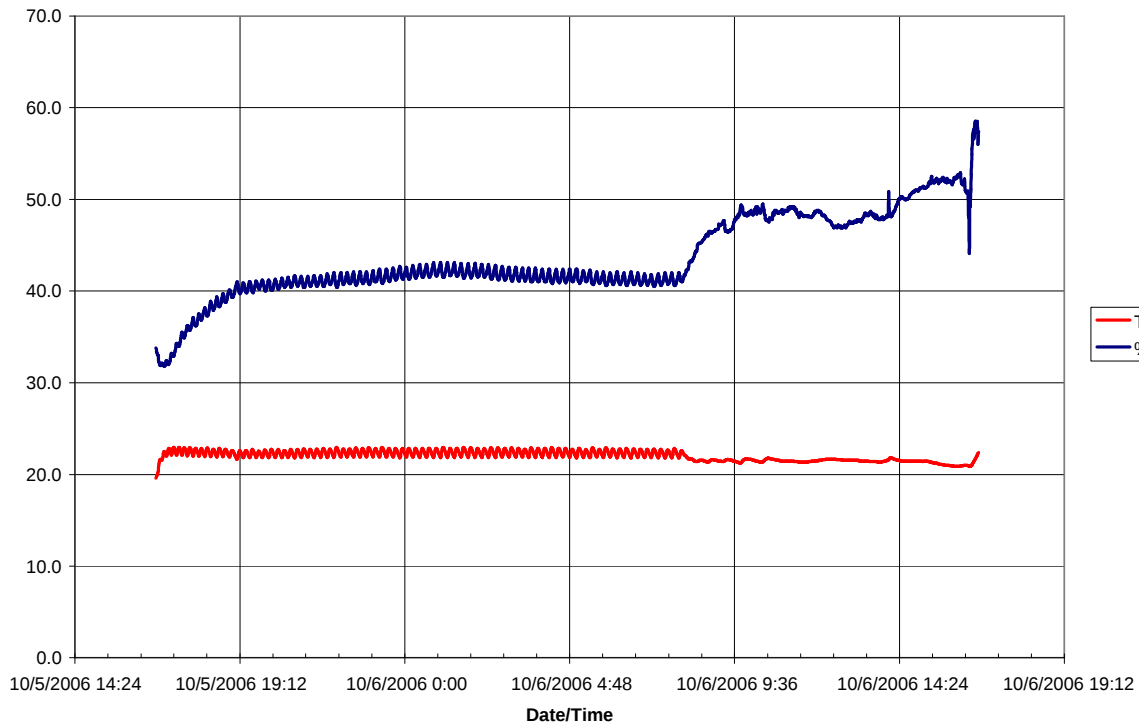
Length of Damaged Region:

L1=	<u>1756</u>	mm
L2=	<u>878.0</u>	mm
L5=	<u>351.2</u>	mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: G70102 Vehicle: 2007 Chevrolet Avalanche MPV

2007 Chevrolet Avalanche G70102 Environmental Conditions



APPENDIX A
PHOTOGRAPHS

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Figure A-1: Load Cell Locations

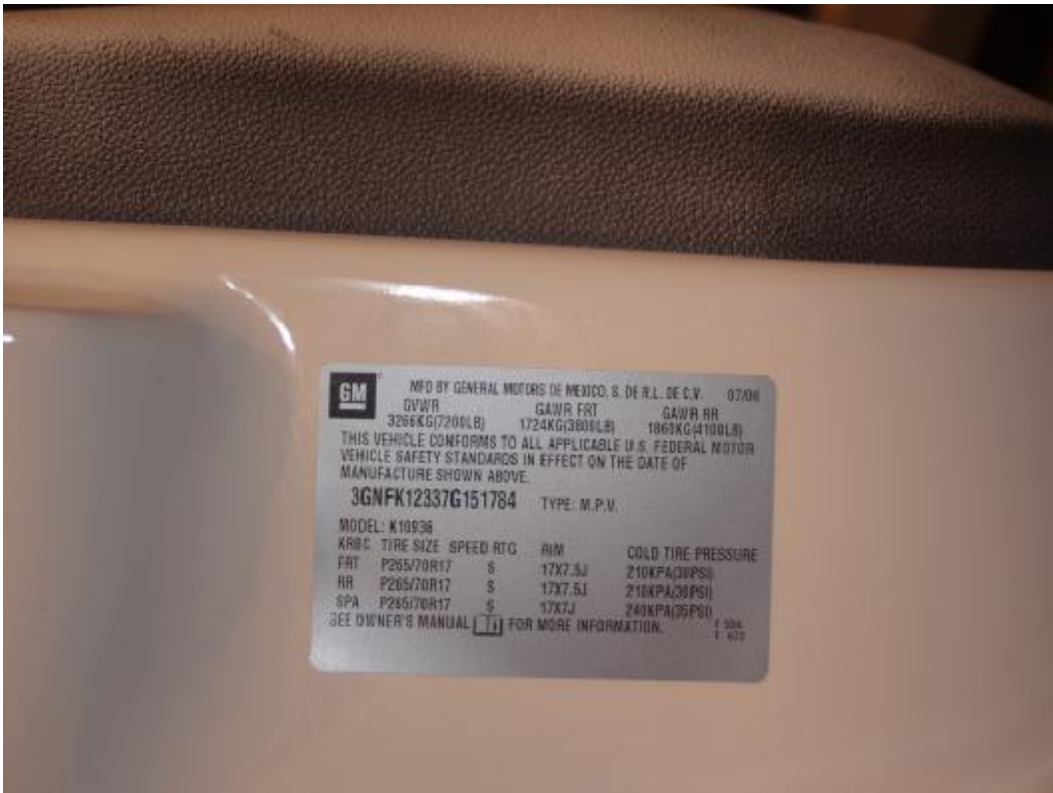


Figure A-2: Vehicle Certification Placard



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

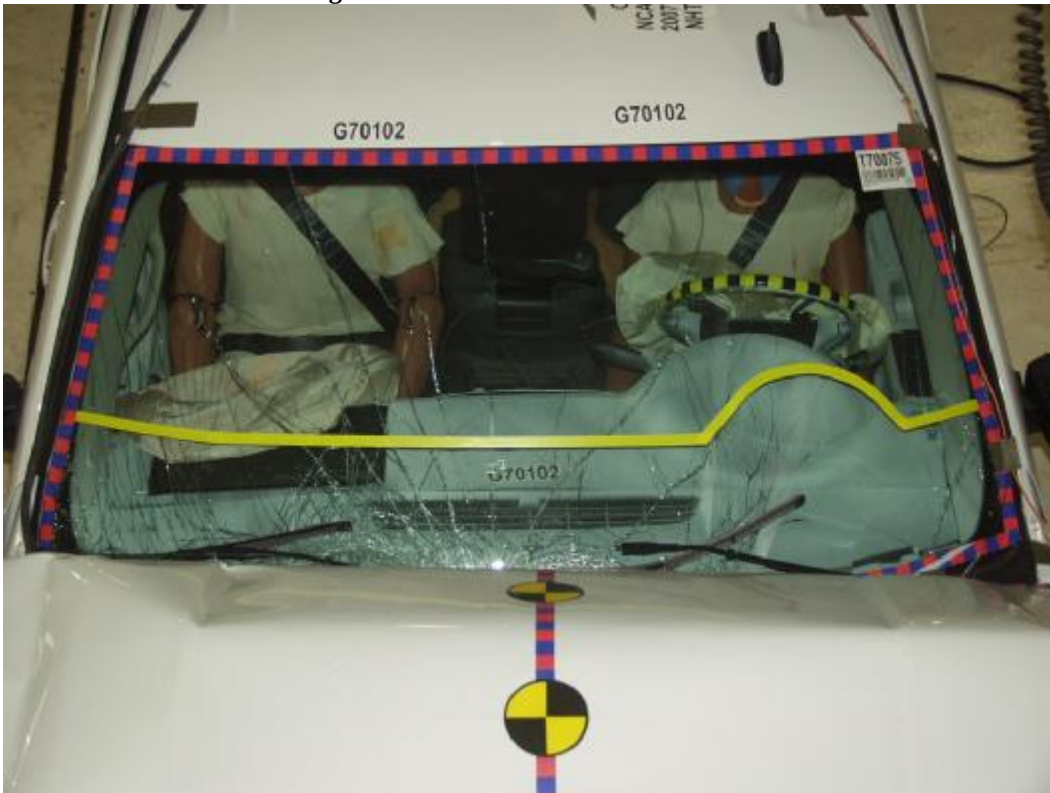


Figure A-19: Post-Test Windshield View



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°

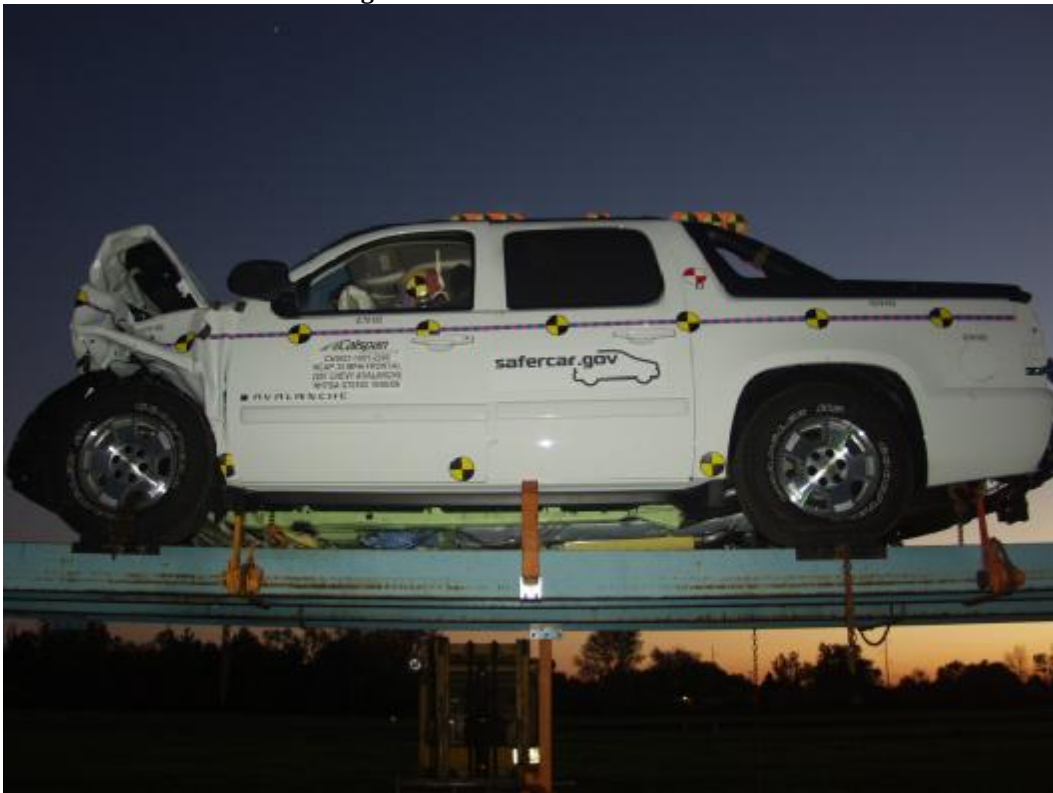


Figure A-61: Rollover View - 360°



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.: G70102

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 CG Ax	V1P1 Lap Belt Load
V1P1 Head CG Ay	V1P1 Shoulder Belt Load
V1P1 Head CG Az	V1P2 Lap Belt Load
V1P1 Head CG Red Ax	V1P2 Shoulder Belt Load
V1P1 Head CG Red Ay	V1 Left Rear #1x
V1P1 Head CG Red Az	V1 Right Rear #2x
V1P1 Upper Neck Fx	V1 Engine Top #3x
V1P1 Upper Neck Fy	V1 Engine Bottom #4x
V1P1 Upper Neck Fz	V1 Right Caliper #5x
V1P1 Upper Neck Mx	V1 Left Caliper #7x
V1P1 Upper Neck My	V1 Left Rear #8z
V1P1 Upper Neck Mz	V1 Right Rear #9z
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 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	

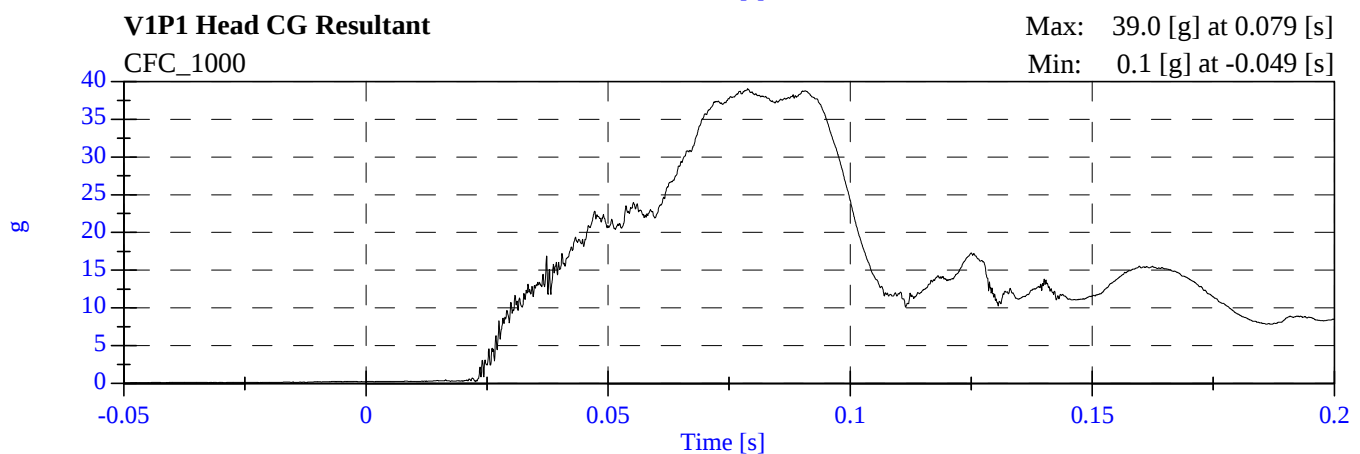
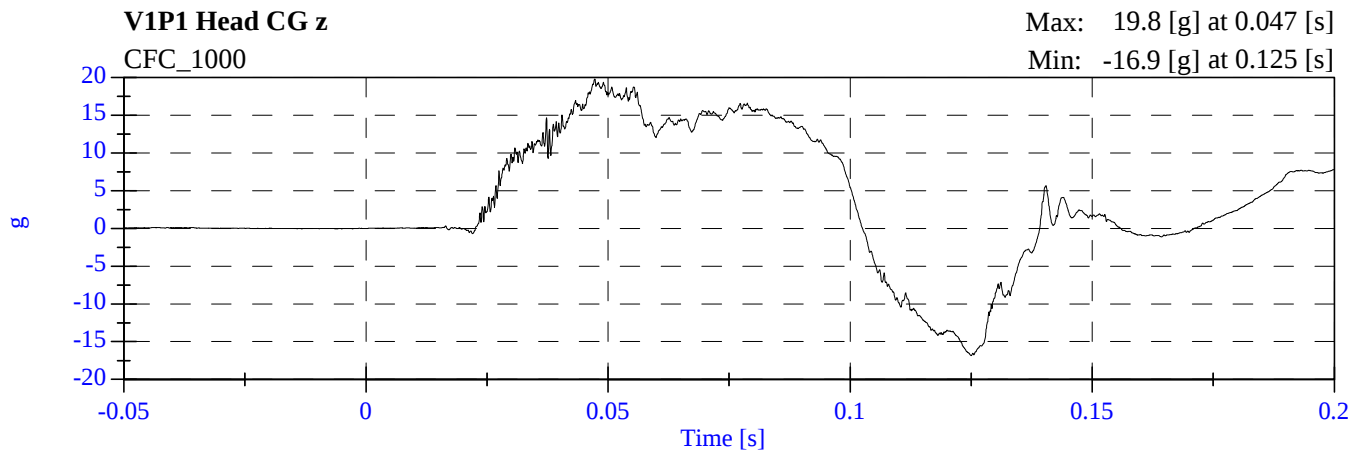
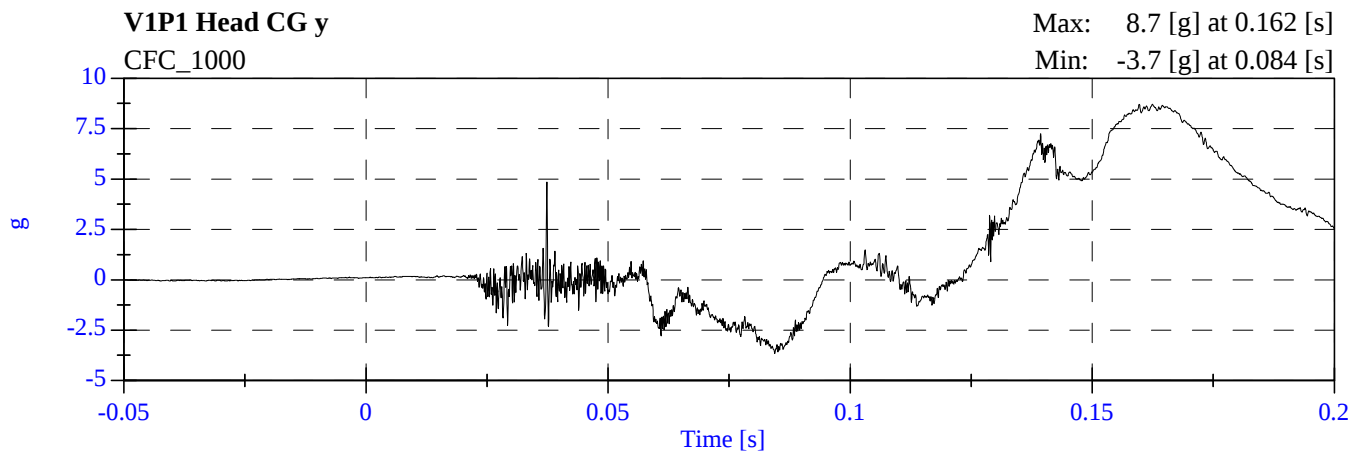
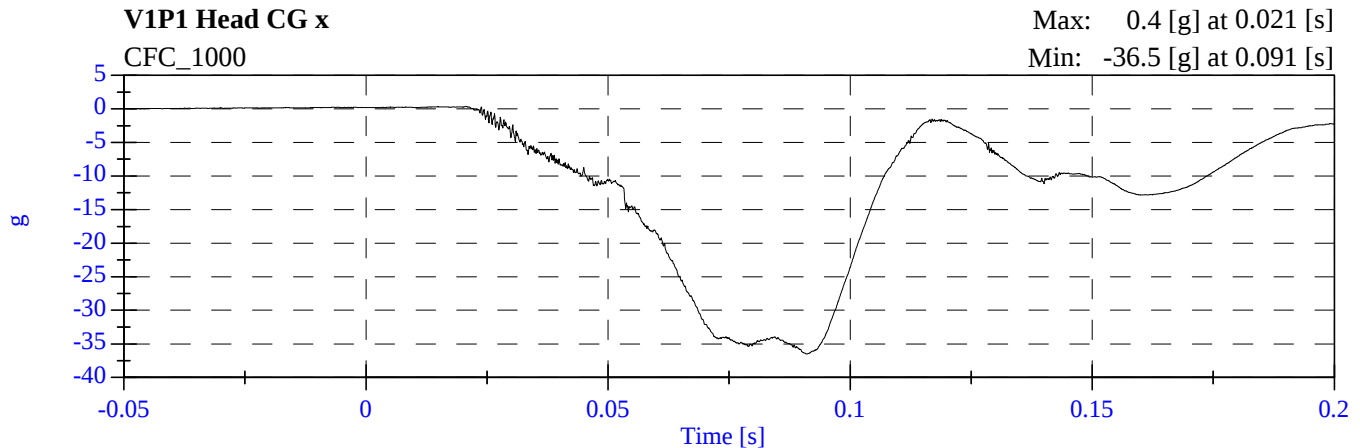
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V1P2 Upper Neck Fz	
V1P2 Upper Neck Mx	
V1P2 Upper Neck My	
V1P2 Upper Neck Mz	
V1P2 Chest Ax	
V1P2 Chest Ay	
V1P2 Chest Az	
V1P2 Chest Red Ax	
V1P2 Chest Red Ay	
V1P2 Chest Red Az	
V1P2 Chest Compression	
V1P2 Pelvic Ax	
V1P2 Pelvic Ay	
V1P2 Pelvic 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
V1P2 Left Upper Tibia Mx	Questionable Data
V1 RFP Lap Belt	Data Spikes Presents

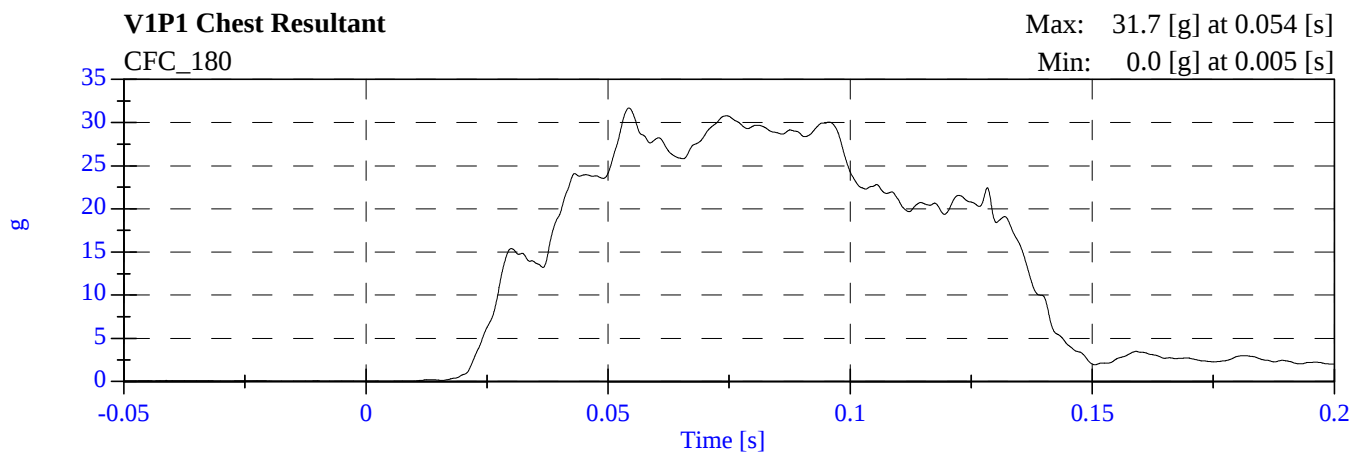
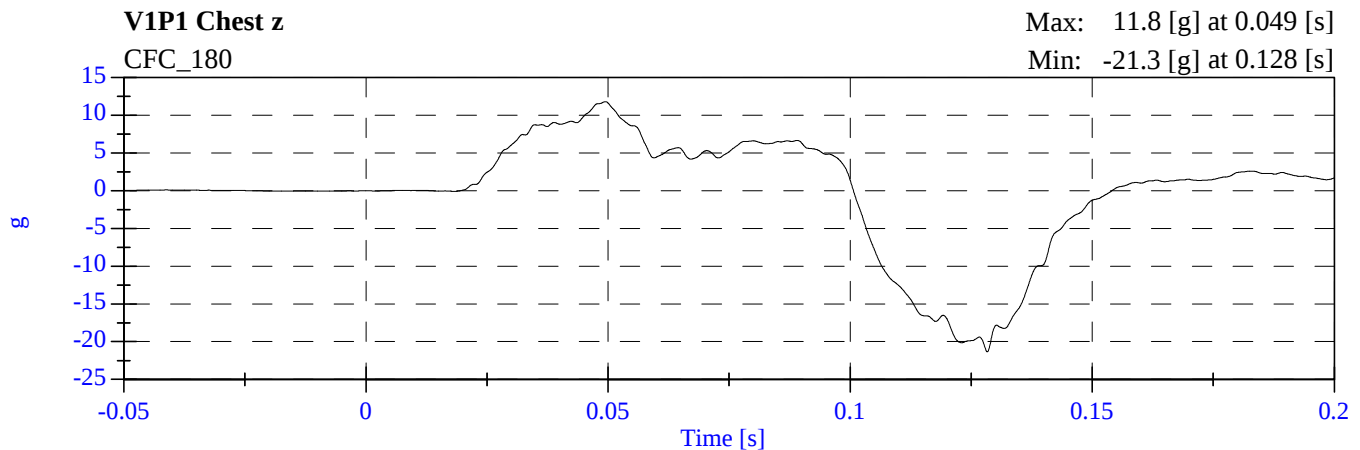
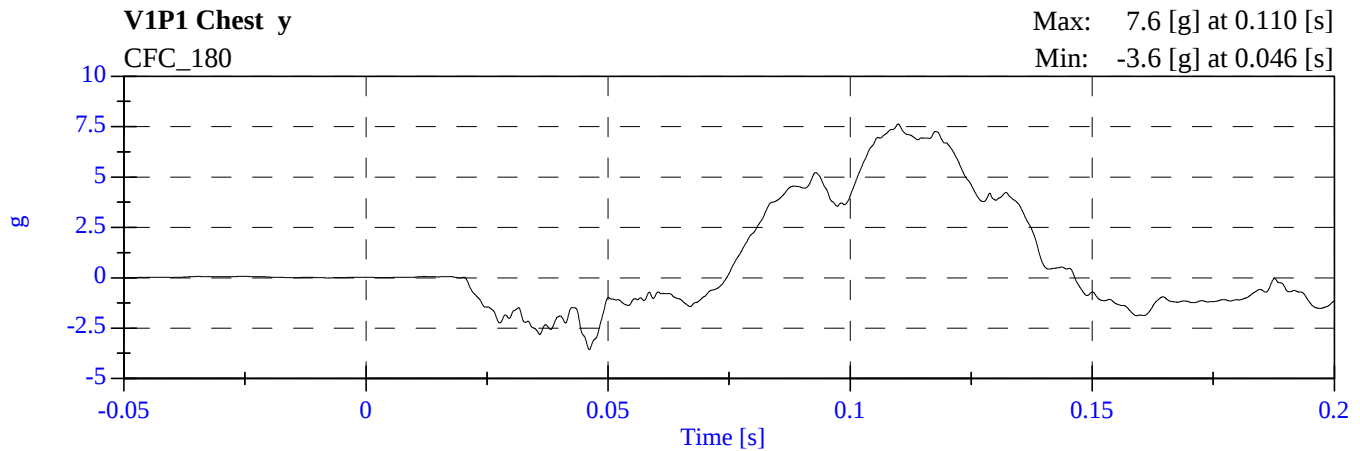
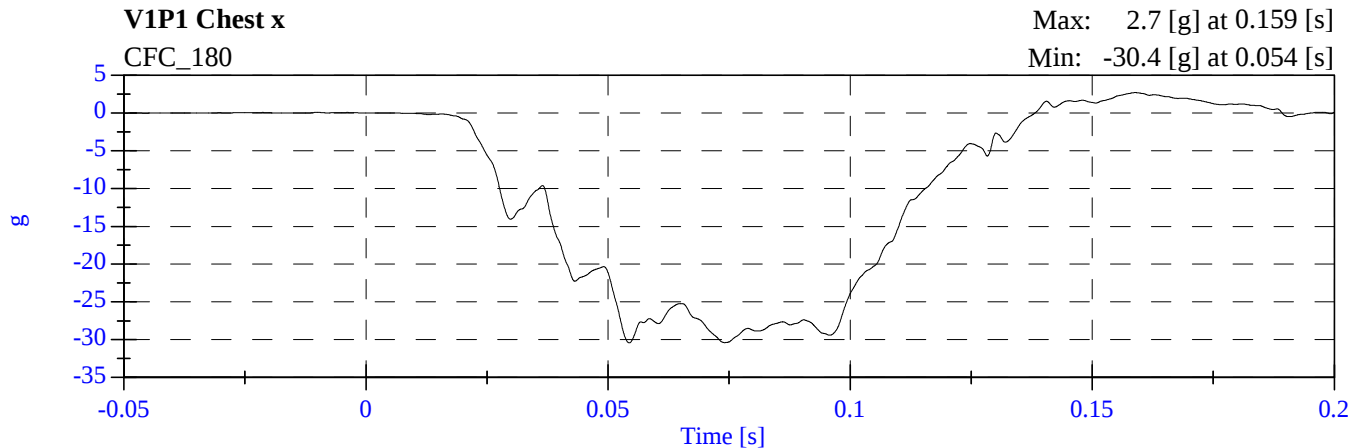
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



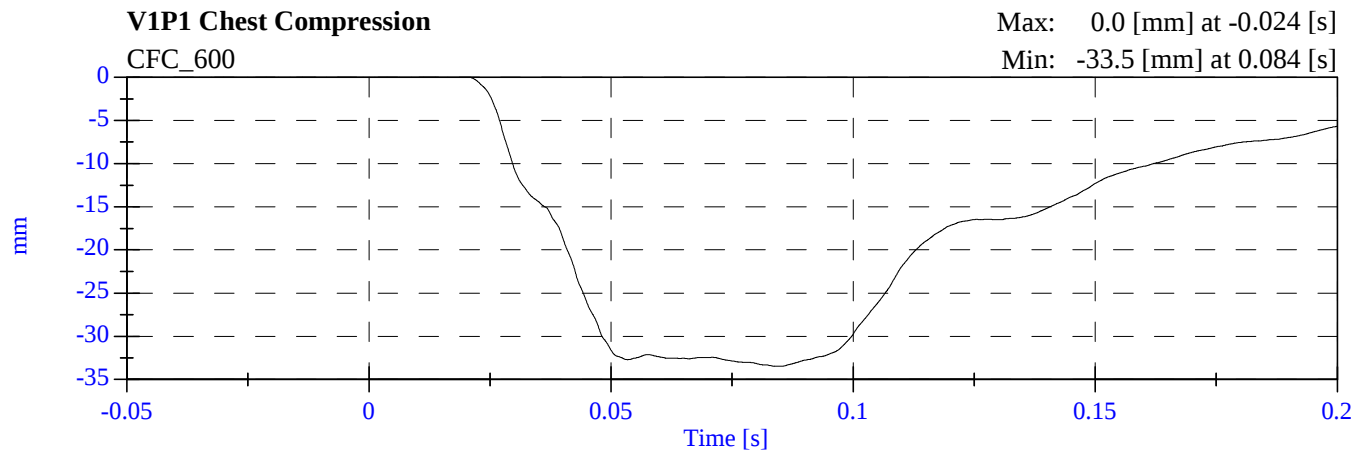
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



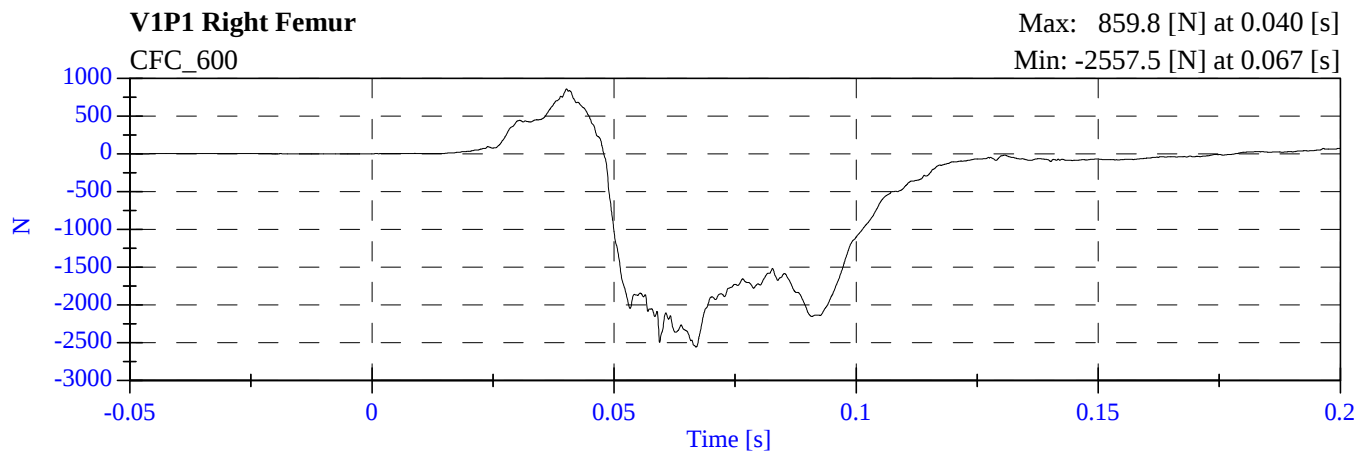
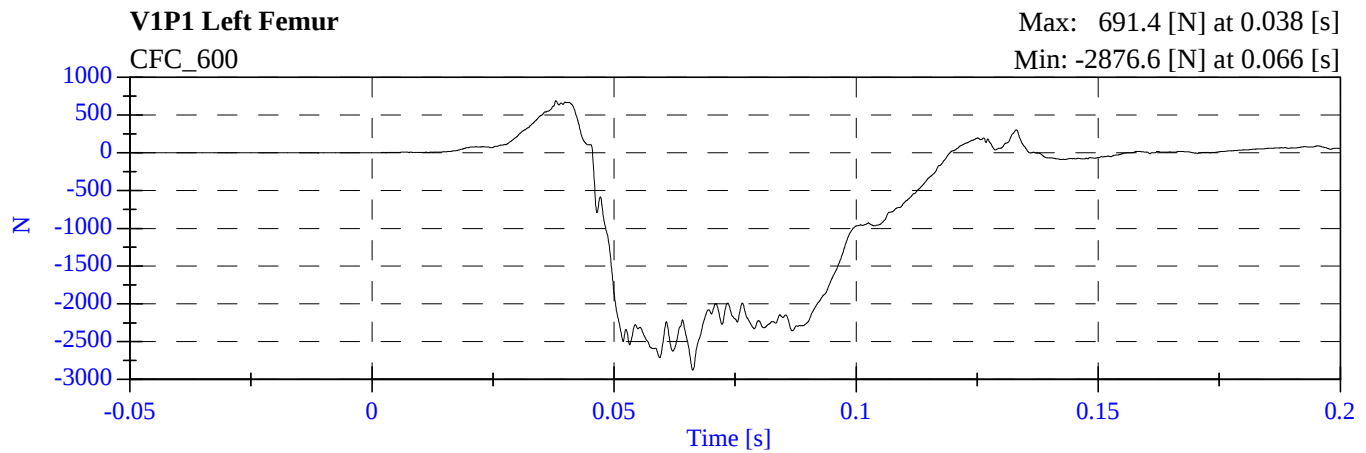
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



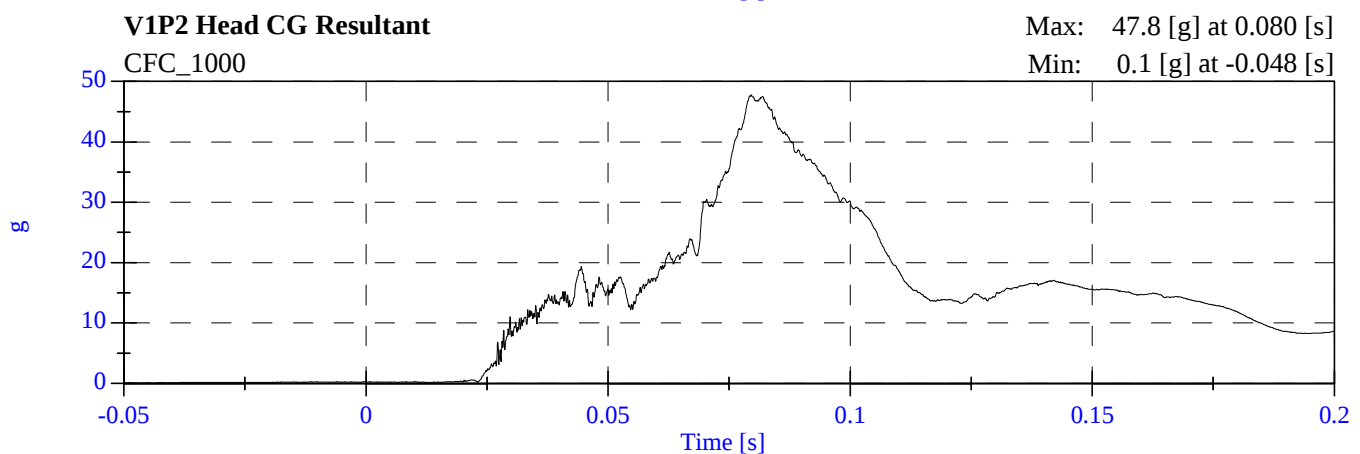
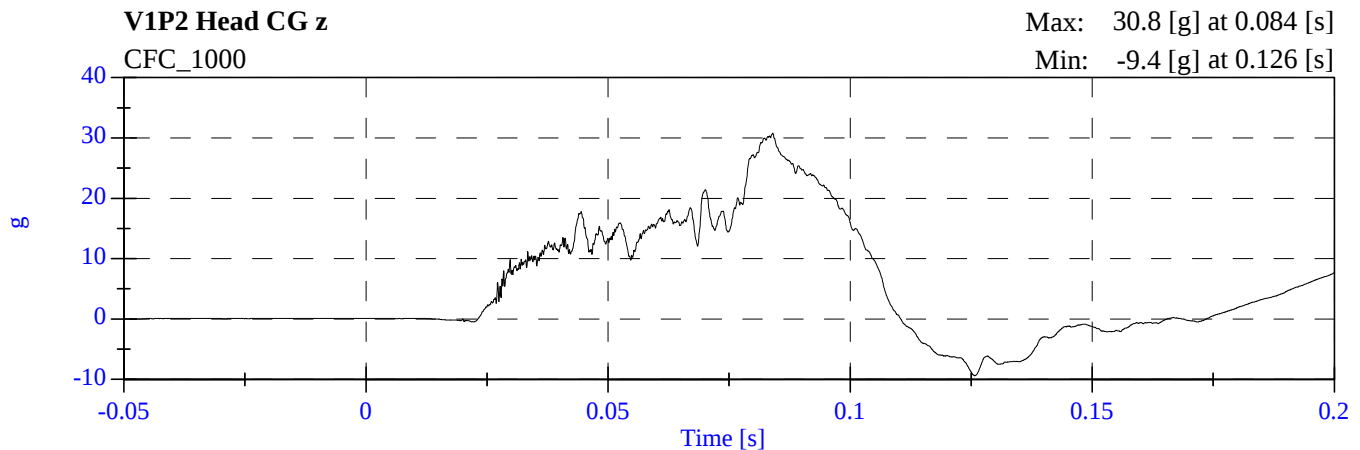
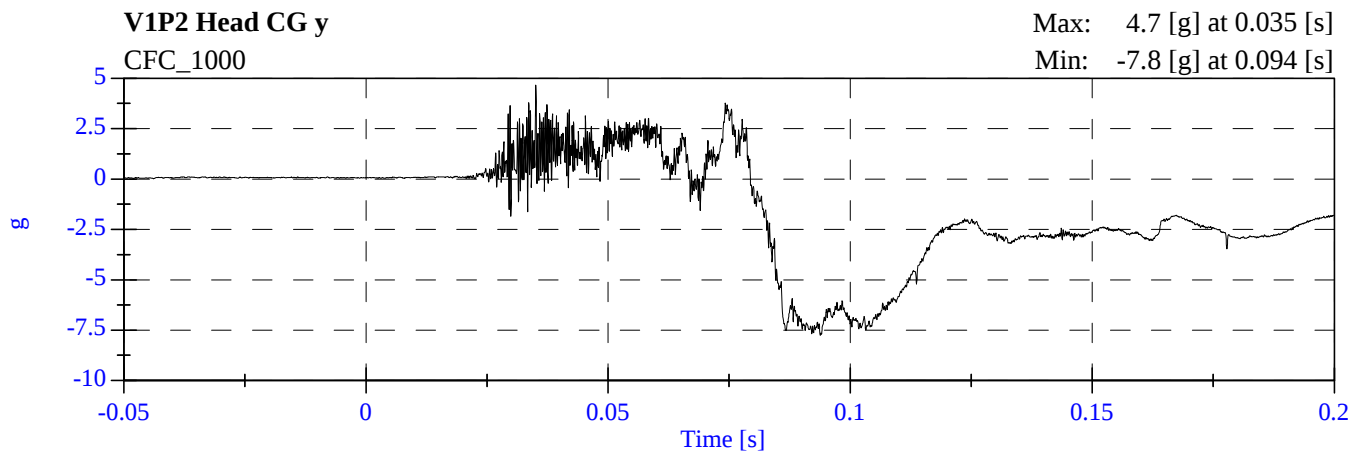
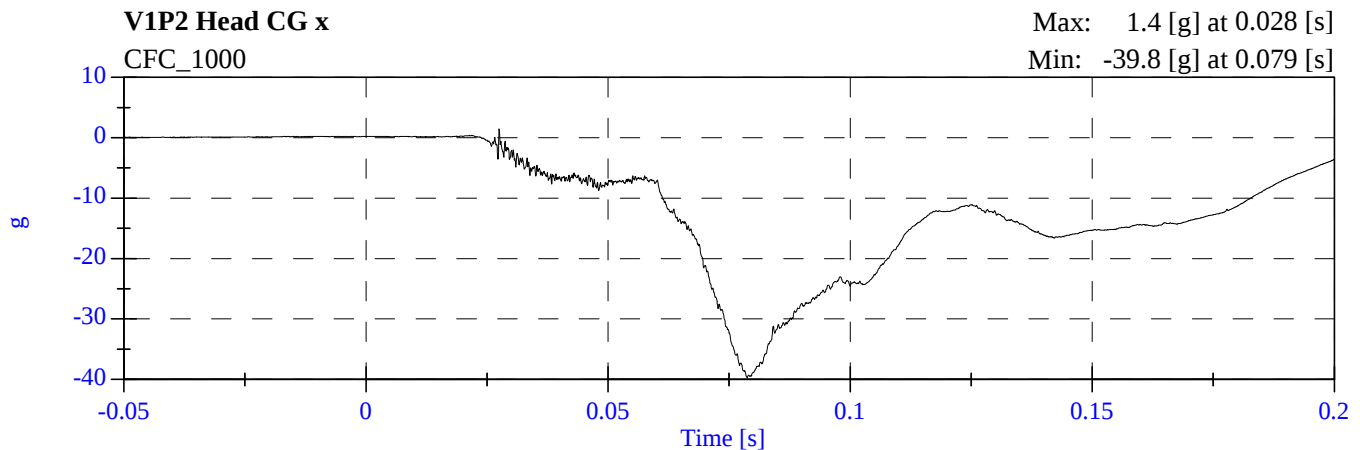
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



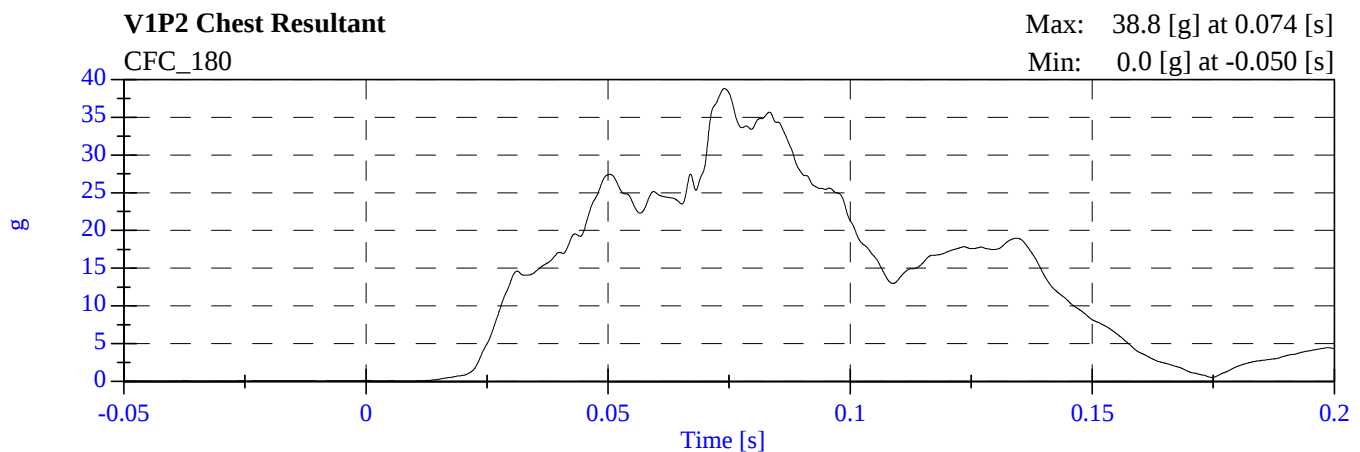
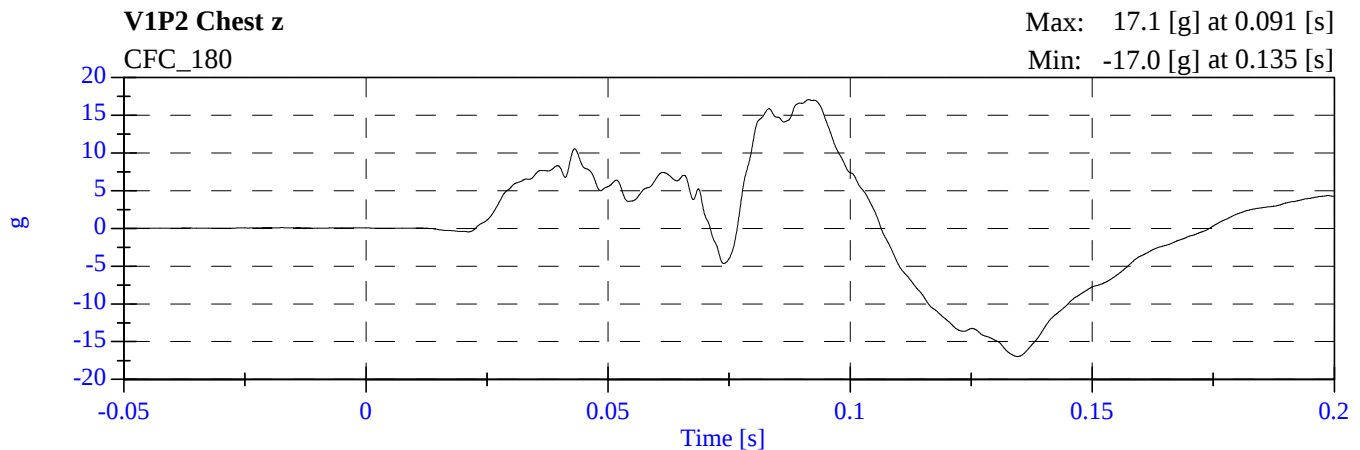
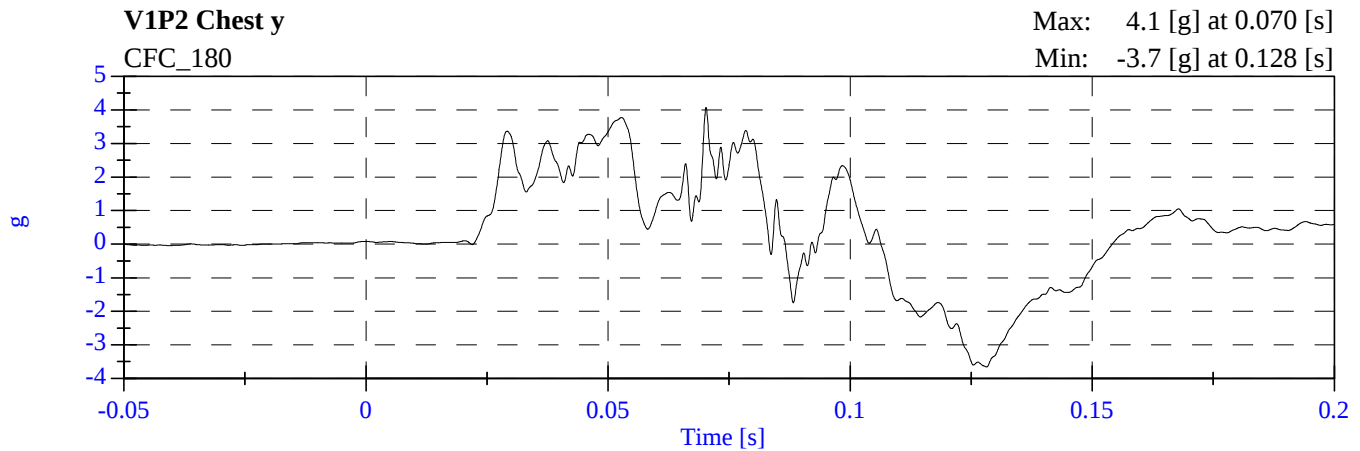
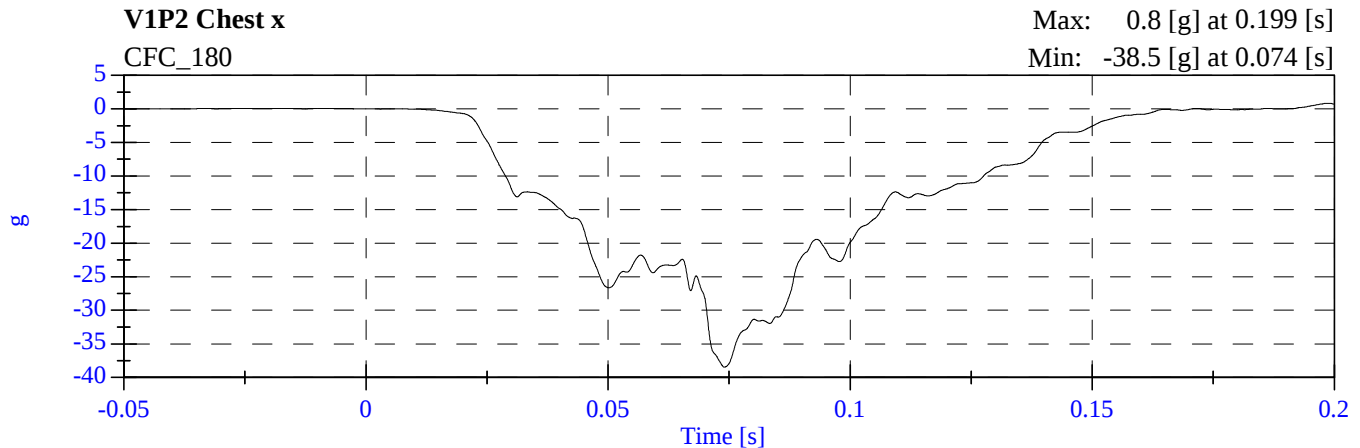
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



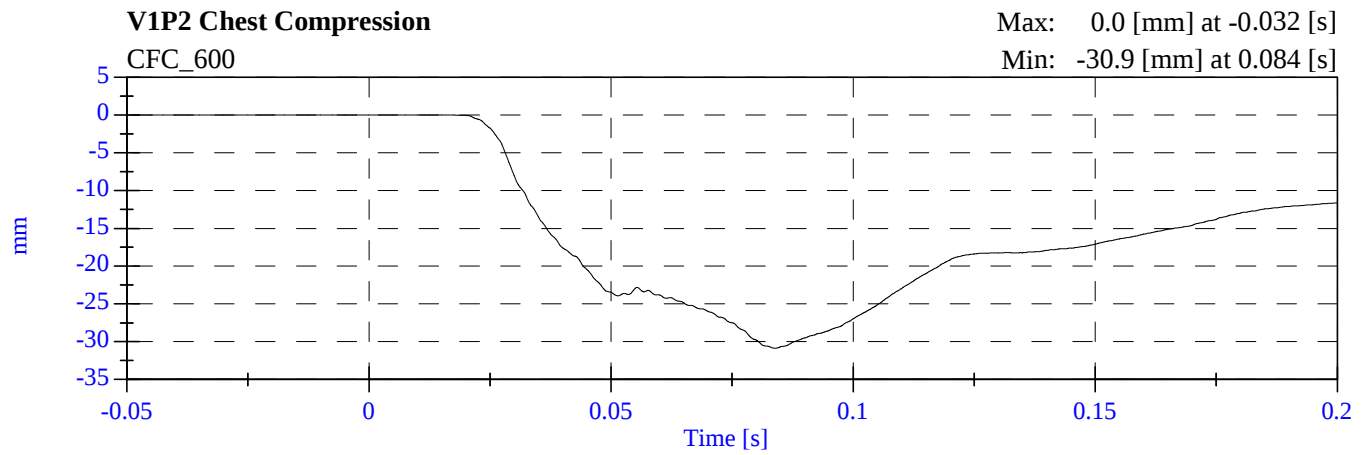
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



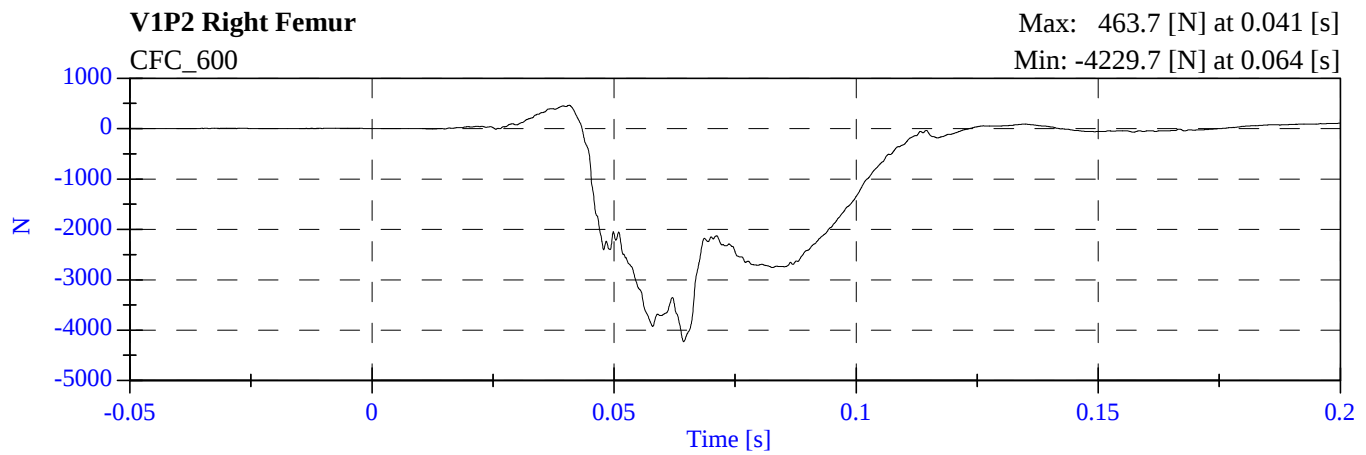
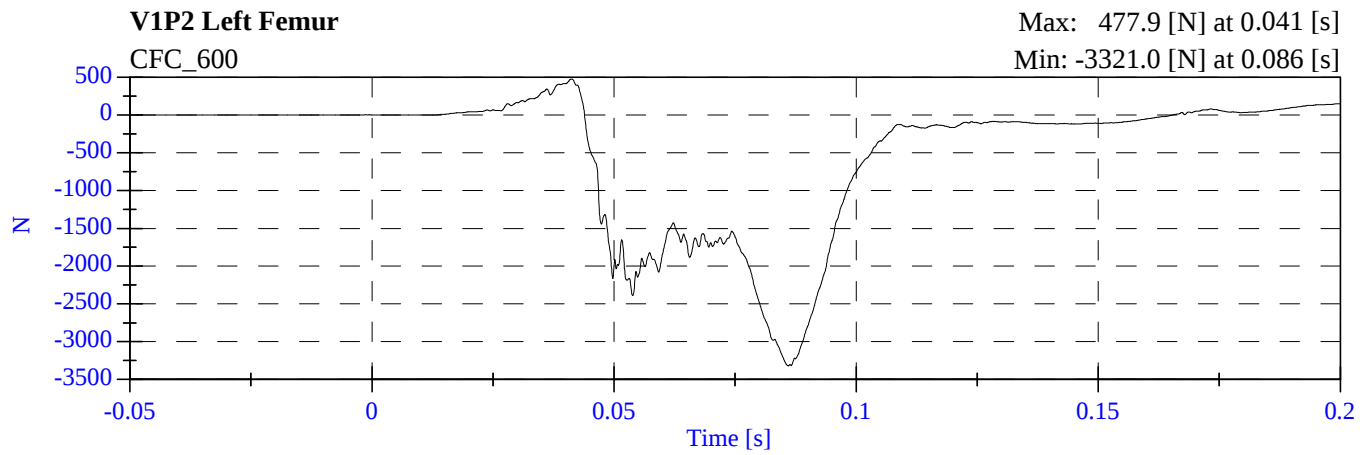
GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



GM NCAP Test 1 - 2007 Chevrolet Avalanche

G70102 - October 06, 2006



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.

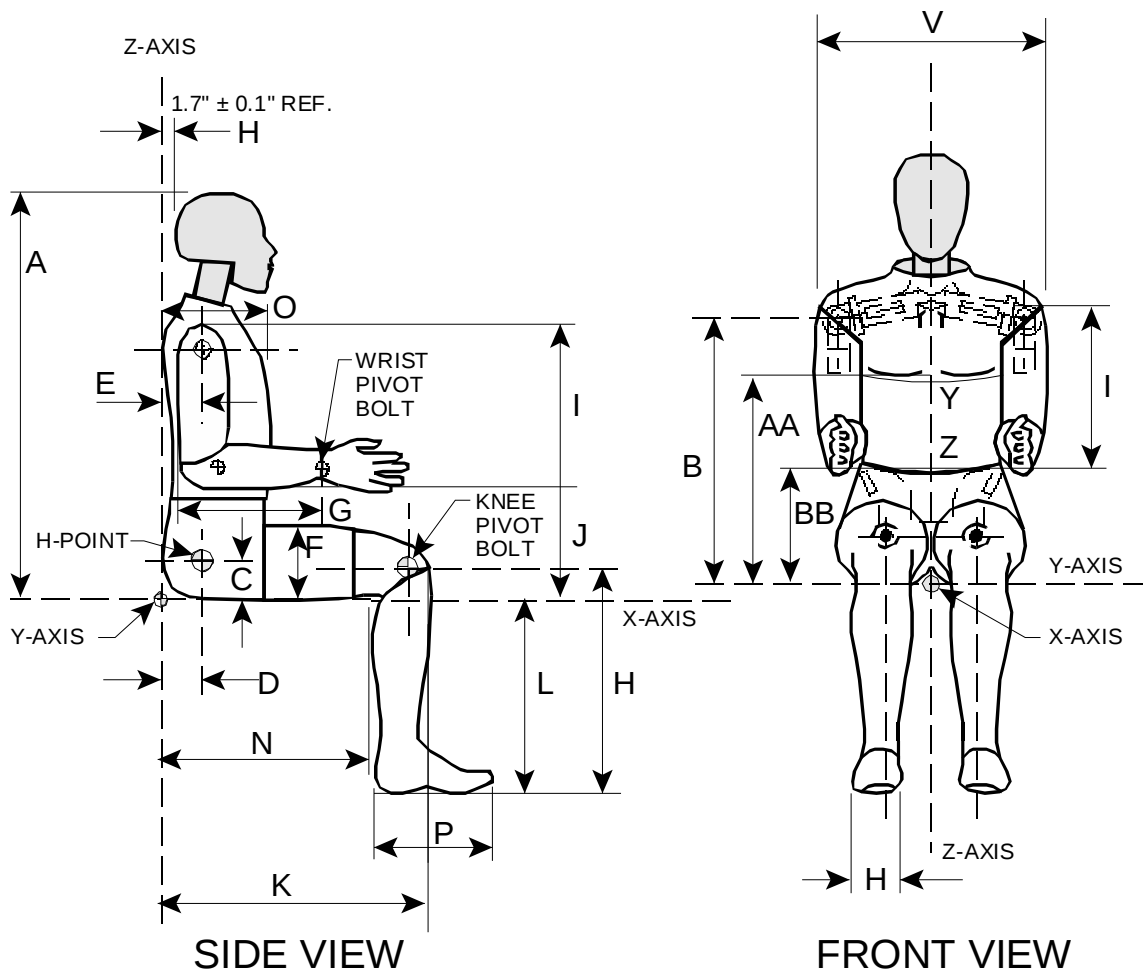
Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	150	8/4/2006
#2/Right Front Passenger	142	8/4/2006

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 150
Sequential Test Number 1
Date July 31, 2006
Workfile 150H 07-31-2006.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Peak Resultant Acceleration	225-275 G's	268.54
Peak Lateral Acceleration	15 G's Max	7.06
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	August 01, 2006	6 Axis Neck Transducer
Workfile	150NF 08-01-06.dat	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	50.0
Impact Velocity		6.89 – 7.13 m/s	6.99
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.66
	20 ms	17.60 - 22.60 G's	21.08
	30 ms	12.50 - 18.50 G's	18.16
Max Pendulum G's Above 30 ms		29 G's Max	18.16
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	35.80
D Plane Rotation	Max	64 - 78 Deg	64.32
	Time	57 - 64 ms	58.80
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	93.00
	Time	47 - 58 ms	48.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.90
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.10

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	1	
Date	August 01, 2006	6 Axis Neck Transducer
Workfile	150NE 08-01-06.dat	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	50.0
Impact Velocity		5.94 – 6.19 m/s	5.97
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	17.65
	20 ms	14.00 - 19.00 G's	17.40
	30 ms	11.00 - 16.00 G's	15.48
Max Pendulum G's Above 30 ms		22 G's Max	16.56
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.10
D Plane Rotation	Max	81 - 106 Deg	82.36
	Time	72 - 82 ms	77.20
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-71.35
	Time	65 - 79 ms	74.50
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	160.80
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	144.30

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date August 04, 2006
Workfile 150T 08-04-06.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Pendulum Velocity	6.58 – 6.83 m/s	6.77
Maximum Deflection	63.50 – 72.64 mm	65.18
Maximum Resistive Force	5159.9 – 5893.9 N	5823.33
Internal Hysteresis	69 - 85 %	69.67

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 150
Sequential Test Number 1
Date August 02, 2006
Workfile 150LF 08-02-06.dat; 150RF 08-02-06.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	4944.39
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	4737.28

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
Sequential Test Number 1
Date August 03, 2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			50.0
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	34.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Thigh Clearance	F	5.5 - 6.1 in	6.0
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6
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	8.2
Buttock Knee Length	K	22.8 - 23.8 in	23.5
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.5
Buttock Popliteal Length	N	17.8 - 18.8 in	18.5
Chest Depth	O	8.4 - 9.0 in	9.0
Foot Length	P	9.9 - 10.5 in	10.2
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	4.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.1
Waist Circumference	Z	32.9 - 34.1 in	33.8

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 142
Sequential Test Number 1
Date July 31, 2006
Workfile 142H 07-31-06.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Peak Resultant Acceleration	225-275 G's	248.06
Peak Lateral Acceleration	15 G's Max	13.26
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	142	
Sequential Test Number	1	
Date	August 01, 2006	6 Axis Neck Transducer
Workfile	142NF 08-01-06.dat	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	50.0
Impact Velocity		6.89 – 7.13 m/s	6.99
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.84
	20 ms	17.60 - 22.60 G's	21.18
	30 ms	12.50 - 18.50 G's	17.63
Max Pendulum G's Above 30 ms		29 G's Max	17.63
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	34.90
D Plane Rotation	Max	64 - 78 Deg	64.08
	Time	57 - 64 ms	60.90
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	89.06
	Time	47 - 58 ms	49.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	118.80
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.10

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	142	
Sequential Test Number	1	
Date	August 02, 2006	6 Axis Neck Transducer
Workfile	142NF 08-02-06.dat	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	50.0
Impact Velocity		5.94 – 6.19 m/s	5.97
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.38
	20 ms	14.00 - 19.00 G's	17.90
	30 ms	11.00 - 16.00 G's	15.77
Max Pendulum G's Above 30 ms		22 G's Max	15.77
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.00
D Plane Rotation	Max	81 - 106 Deg	81.16
	Time	72 - 82 ms	76.30
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-73.50
	Time	65 - 79 ms	71.30
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	157.30
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	148.00

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 142
Sequential Test Number 1
Date August 03, 2006
Workfile 142T 08-03-06.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Pendulum Velocity	6.58 – 6.83 m/s	6.71
Maximum Deflection	63.50 – 72.64 mm	64.04
Maximum Resistive Force	5159.9 – 5893.9 N	5440.18
Internal Hysteresis	69 - 85 %	70.83

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 142
Sequential Test Number 1
Date August 02, 2006
Workfile 142LF 08-02-06.dat; 142RF 08-02-06.dat

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5075.18
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	50.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5351.09

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 142
Sequential Test Number 1
Date August 03, 2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			50.0
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	34.9
Shoulder Pivot Height	B	19.9 - 20.5 in	20.3
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
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	13.5
Elbow Rest Height	J	7.5 - 8.3 in	8.1
Buttock Knee Length	K	22.8 - 23.8 in	23.5
Popliteal Height	L	16.9 - 17.9 in	17.7
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Buttock Popliteal Length	N	17.8 - 18.8 in	18.6
Chest Depth	O	8.4 - 9.0 in	8.9
Foot Length	P	9.9 - 10.5 in	10.3
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	4.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.9
Waist Circumference	Z	32.9 - 34.1 in	33.2

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 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-J19996	19-Apr-06	19-Oct-06
	Y	ENDEVCO	AC-J14381	19-Apr-06	19-Oct-06
	Z	ENDEVCO	AC-J19547	19-Apr-06	19-Oct-06
Head	X (R)	ENDEVCO	AC-AJ4P7	19-Apr-06	19-Oct-06
	Y (R)	ENDEVCO	AC-J27366	18-Apr-06	18-Oct-06
	Z (R)	ENDEVCO	AC-P16676	07-Jul-06	06-Jan-07
Neck Load Cell	X	DENTON	LC-157Fx	21-Apr-06	21-Oct-06
	Y	DENTON	LC-157Fy	21-Apr-06	21-Oct-06
	Z	DENTON	LC-157Fz	21-Apr-06	21-Oct-06
Neck Moment	X	DENTON	LC-157Mx	21-Apr-06	21-Oct-06
	Y	DENTON	LC-157My	21-Apr-06	21-Oct-06
	Z	DENTON	LC-157Mz	21-Apr-06	21-Oct-06
Chest	X	ENDEVCO	AC-J20083	20-Apr-06	20-Oct-06
	Y	ENTRAN	AC-04J04J07-M02	20-Apr-06	20-Oct-06
	Z	ENDEVCO	AC-J19223	20-Apr-06	20-Oct-06
Chest	X (R)	ENDEVCO	AC-P35817	10-Jul-06	09-Jan-07
	Y (R)	ENDEVCO	AC-P35790	10-Jul-06	09-Jan-07
	Z (R)	ENDEVCO	AC-P39574	10-Jul-06	09-Jan-07
Chest Deflection	X	SERVO	DS-150	13-Apr-06	13-Oct-06
Pelvic	X	ENDEVCO	AC-J21985	19-Apr-06	19-Oct-06
	Y	ENDEVCO	AC-AAMW5	19-Apr-06	19-Oct-06
	Z	ENDEVCO	AC-AJ5P9	19-Apr-06	19-Oct-06

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-1527	21-Apr-06	21-Oct-06
Right Femur Load Cell	Fz	DENTON	LC-1528	21-Apr-06	21-Oct-06
Left Upper Tibia	Mx	DENTON	LC-263Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-263My	24-Apr-06	24-Oct-06
Left Lower Tibia	Fz	DENTON	LC-174Fz	24-Apr-06	24-Oct-06
	Mx	DENTON	LC-174Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-174My	24-Apr-06	24-Oct-06
Right Upper Tibia	Mx	DENTON	LC-274Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-274My	24-Apr-06	24-Oct-06
Right Lower Tibia	Fz	Denton	LC-185Fz	24-Apr-06	24-Oct-06
	Mx	DENTON	LC-185Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-185My	24-Apr-06	24-Oct-06
Left Foot Rear	X	ENDEVCO	AC-P14914	20-Apr-06	20-Oct-06
	Z	ENDEVCO	AC-AGRP4	20-Apr-06	20-Oct-06
Left Foot Front	Z	ENDEVCO	AC-AJ4G1	20-Apr-06	20-Oct-06
Right Foot Rear	X	ENDEVCO	AC-J36723	20-Apr-06	20-Oct-06
	Z	ENDEVCO	AC-J27496	20-Apr-06	20-Oct-06
Right Foot Front	Z	ENDEVCO	AC-J35747	20-Apr-06	20-Oct-06
Lap Belt Load Cell		First Technology	LC-159	11-Jul-06	10-Jan-07
Shoulder Belt Load Cell		First Technology	LC-173	11-Jul-06	10-Jan-07

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 142)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENTRAN	AC-02A16-A09	19-Apr-06	19-Oct-06
	Y	ENTRAN	AC-02I0210-N20	19-Apr-06	19-Oct-06
	Z	ENDEVCO	AC-J19244	17-Apr-06	17-Oct-06
Head	X (R)	ENDEVCO	AC-P16591	18-Jul-06	17-Jan-07
	Y (R)	ENDEVCO	AC-P16286	18-Jul-06	17-Jan-07
	Z (R)	ENDEVCO	AC-J23996	17-Apr-06	17-Oct-06
Neck Load Cell	X	DENTON	LC-280Fx	21-Apr-06	21-Oct-06
	Y	DENTON	LC-280Fy	21-Apr-06	21-Oct-06
	Z	DENTON	LC-280Fz	21-Apr-06	21-Oct-06
Neck Moment	X	DENTON	LC-280Mx	21-Apr-06	21-Oct-06
	Y	DENTON	LC-280My	21-Apr-06	21-Oct-06
	Z	DENTON	LC-280Mz	21-Apr-06	21-Oct-06
Chest	X	ENTRAN	AC-03E03D16-F16	16-May-06	15-Nov-06
	Y	ENTRAN	AC-05H31-Z04	15-May-06	14-Nov-06
	Z	ENTRAN	AC-04J04I20-Z04	16-May-06	15-Nov-06
Chest	X (R)	ENTRAN	AC-03E03E21-M02	15-May-06	14-Nov-06
	Y (R)	ENTRAN	AC-01G18-F08	16-May-06	15-Nov-06
	Z (R)	ENTRAN	AC-03F03E29-N04	16-May-06	15-Nov-06
Chest Deflection	X	SERVO	DS-142	05-Apr-06	05-Oct-06
Pelvic	X	ENTRAN	AC-00L13-F10	19-Apr-06	19-Oct-06
	Y	ENTRAN	AC-03F03F09-N06	19-Apr-06	19-Oct-06
	Z	ENTRAN	AC-03E03E21-M06	19-Apr-06	19-Oct-06

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 142)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-1523	21-Apr-06	21-Oct-06
Right Femur Load Cell	Fz	DENTON	LC-1524	21-Apr-06	21-Oct-06
Left Upper Tibia	Mx	DENTON	LC-265Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-265My	24-Apr-06	24-Oct-06
Left Lower Tibia	Fz	DENTON	LC-178Fz	24-Apr-06	24-Oct-06
	Mx	DENTON	LC-178Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-178My	24-Apr-06	24-Oct-06
Right Upper Tibia	Mx	DENTON	LC-200Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-200My	24-Apr-06	24-Oct-06
Right Lower Tibia	Fz	DENTON	LC-128Fz	24-Apr-06	24-Oct-06
	Mx	DENTON	LC-128Mx	24-Apr-06	24-Oct-06
	My	DENTON	LC-128My	24-Apr-06	24-Oct-06
Left Foot Rear	X	ENDEVCO	AC-AJ7G1	17-Apr-06	17-Oct-06
	Z	ENDEVCO	AC-J20084	17-Apr-06	17-Oct-06
Left Foot Front	Z	ENDEVCO	AC-J20004	17-Apr-06	17-Oct-06
Right Foot Rear	X	ENDEVCO	AC-J27079	18-Apr-06	18-Oct-06
	Z	ENDEVCO	AC-ACCE6	18-Apr-06	18-Oct-06
Right Foot Front	Z	ENDEVCO	AC-AAMP6	18-Apr-06	18-Oct-06
Lap Belt Load Cell		First Technology	LC-178	11-Jul-06	10-Jan-07
Shoulder Belt Load Cell		First Technology	LC-180	11-Jul-06	10-Jan-07

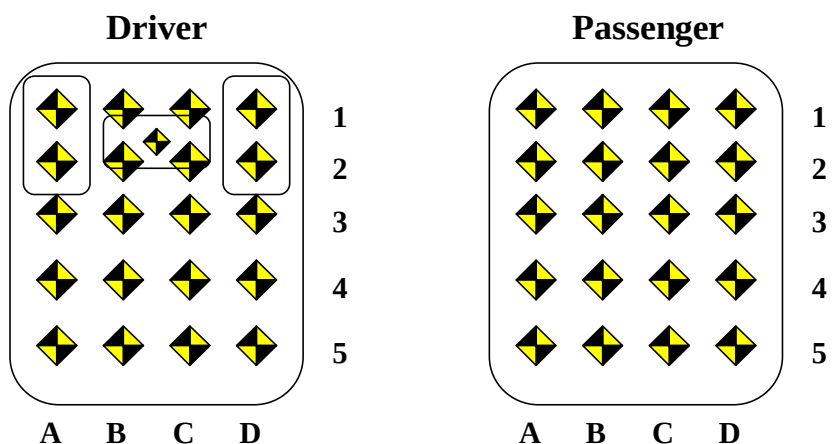
INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-FGP19	11-Jul-06	10-Jan-07
Right Rear Seat Crossmember X	GS SENSORS	AC-9440-046	11-Jul-06	10-Jan-07
Top of Engine	ICS	AC-FGP35	11-Jul-06	10-Jan-07
Bottom of Engine	ICS	AC-FGP03	26-Jul-06	25-Jan-07
Right Disc Brake Caliper	GS SENSORS	AC-9440-032	03-Apr-06	03-Oct-06
Left Disc Brake Caliper	GS SENSORS	AC-9440-045	26-Jul-06	25-Jan-07
Left Seat Rear Crossmember Z	ICS	AC-FGP29	11-Jul-06	10-Jan-07
Right Seat Rear Crossmember Z	GS SENSORS	AC-9440-023	11-Jul-06	10-Jan-07

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

DRIVER SIDE INTRUSION MEASUREMENTS



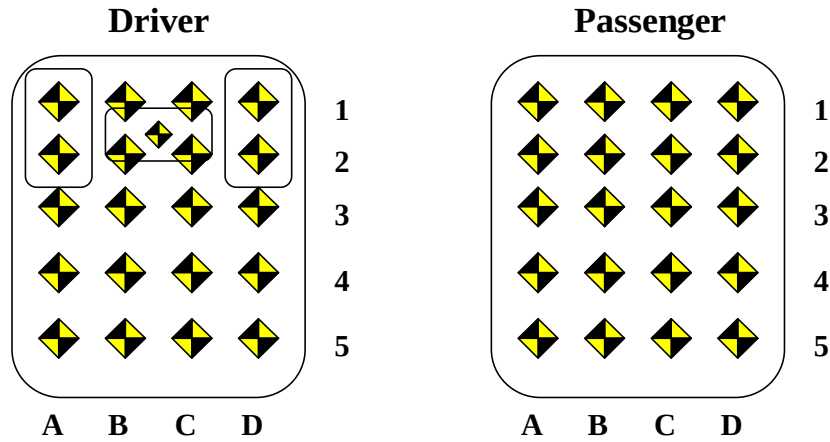
Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	4154	-673	-686	4143	-647	-712	11	-26	26
B1	4221	-550	-685	4192	-515	-722	29	-35	37
C1	4232	-333	-687	4237	-398	-737	-5	65	50
D1	4186	-256	-687	4108	-262	-740	78	6	53
A2	4122	-674	-608	4118	-647	-629	4	-27	21
B2	4144	-548	-612	4137	-524	-632	7	-24	20
C2	4144	-336	-615	4126	-407	-645	18	71	30
D2	4127	-251	-624	4086	-236	-660	41	-15	36
A3	4060	-672	-561	4060	-649	-576	0	-23	15
B3	4054	-550	-561	4054	-529	-570	0	-21	9
C3	4047	-341	-573	4043	-409	-573	4	68	0
D3	4042	-254	-579	4018	-222	-599	24	-32	20
A4	3960	-673	-552	3964	-652	-566	-4	-21	14
B4	3957	-554	-553	3958	-532	-555	-1	-22	2
C4	3954	-341	-553	3953	-413	-551	1	72	-2
D4	3951	-253	-564	3945	-232	-567	6	-21	3
A5	3862	-676	-554	3862	-655	-565	0	-21	11
B5	3858	-550	-553	3860	-532	-560	-2	-18	7
C5	3859	-339	-551	3856	-417	-553	3	78	2
D5	3858	-250	-565	3850	-236	-563	8	-14	-2
BP	4021	-437	-723	3980	-452	-747	41	15	24
G	3765	-585	-1056	3756	-578	-1076	9	-7	20
H	3758	-289	-1054	3738	-284	-1077	20	-5	23
L	3572	-437	-1258	3566	-475	-1287	6	38	29
AB	3482	-722	-597	3482	-722	-597	0	0	0

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	4086	268	-738	4031	271	-797	55	-3	59
B1	4127	366	-668	4061	375	-729	66	-9	61
C1	4140	573	-664	4105	573	-715	35	0	51
D1	4138	680	-664	4125	672	-701	13	8	37
A2	4047	269	-722	3989	282	-772	58	-13	50
B2	4067	364	-618	4007	371	-679	60	-7	61
C2	4076	573	-612	4050	573	-656	26	0	44
D2	4073	673	-608	4065	671	-643	8	2	35
A3	4002	267	-703	3948	284	-747	54	-17	44
B3	4003	362	-574	3989	364	-610	14	-2	36
C3	4006	571	-560	4002	569	-578	4	2	18
D3	4007	672	-555	4008	673	-577	-1	-1	22
A4	3911	267	-664	3890	292	-691	21	-25	27
B4	3912	357	-559	3906	358	-570	6	-1	11
C4	3907	569	-551	3904	569	-567	3	0	16
D4	3906	672	-550	3908	671	-570	-2	1	20
A5	3808	270	-620	3798	272	-631	10	-2	11
B5	3804	353	-560	3804	356	-571	0	-3	11
C5	3807	566	-553	3808	570	-567	-1	-4	14
D5	3807	669	-552	3805	672	-571	2	-3	19
R	3754	304	-1053	3737	315	-1081	17	-11	28
S	3765	606	-1053	3751	619	-1082	14	-13	29
AB	3468	720	-598	3468	720	-598	0	0	0

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

AB = Front outboard seat anchor bolt