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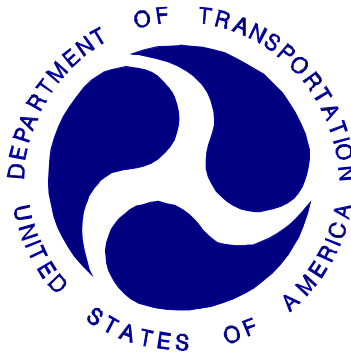
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

TOYOTA MOTOR CORPORATION
2008 SCION xD
5-DOOR WAGON

NHTSA NUMBER: M85113

CALSPAN TEST NUMBER: 8806-NCAP-14

CALSPAN CORPORATION
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September 20, 2007

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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16. Abstract A frontal load cell barrier test of a 2008 Scion xD 5-Door Wagon was performed at Calspan Corporation's crash test facility in Buffalo, New York, on September 20, 2007. The impact velocity was 56.17 kph and the temperature at the barrier face was 21°C. The maximum post-test vehicle crush was 341 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	462.3	502.6
Maximum Thorax Acceleration (3 ms Clip)		g's	60 g's	49.2	57.2
Chest Displacement		mm	-76 mm	-25.9	-33.3
Left Femur Force		Newtons	-10000 N	-7442	-3839
Right Femur Force		Newtons	-10000 N	-6062	-419
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. 1200 New Jersey Ave SE Washington, DC 20590		
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.17 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 56.17 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 56.17 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 161 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 2008 Scion xD 5-Door Wagon at a velocity of 56.2 kph. The test was performed at Calspan on September 20, 2007. 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	462.3	60.2	67.0	49.2	64.0	67.0	-25.9	-7442	-6062
Passenger	502.6	61.8	97.8	57.2	74.2	78.5	-33.3	-3839	-419

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

TEST NOTES	
Data Channel	Anomalies
V1P1 Left Lower Tibia Fz	Channel saturated
V1P2 Head CG Red z	Channel did not record properly
V1P2 Right Foot Aft x	Channel saturated at 57 msec
V1 Left Rear #1x	Wire cut at 100 msec
V1 Right Caliper #5x	Data inaccurate after 29 msec
Load Cells A1-D5	Channels did not record properly during test

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: M85113 Test Mode: 56.3 kph Frontal Barrier
 Test Date: September 20, 2007 Time: 13:46 Temperature: 21 °C
 Vehicle Make/Model/Body Style: 2008 Scion xD 5-Door Wagon
 Vehicle Test Weight: 1390 kg Impact Velocity: 56.17 kph (55.5 – 57.1 kph)
 Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 341 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:	Face into airbag and back of head to head restraint	Face into airbag and back of head to head restraint
Abdomen Contact:	Airbag	Airbag
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee bolster	Glove Box Door
Right Knee Contact:	Knee bolster	Glove Box Door

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed / Operable – No tools required	Closed / Operable – No tools required
Rear Door Opening	Closed / Operable – No tools required	Closed / Operable – No tools required
Hatch/Other Door Opening	Closed / Operable – No tools required	
Front Seat Track Shift (mm)	0	0
Front Seat Back Failure	None	None
Glazing Damage	Windshield damage on right front side due to passenger airbag	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	995	915	1030	980

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	860	860
Lap belt length as measured on ATD	mm	915	900
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	200	205

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2008 Scion xD 5-Door Wagon

NHTSA No. : M85113 ; VIN: JTKKU10448J000670 ; Color: Gray

Engine Data: 4 cylinders; - CID; 1.8 Liters; - cc

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

Transmission Data: 4 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; - No; X N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 8/28/07 ; Odometer Reading 108 km

Selling Dealer: West Herr Scion

Dealer Address: 4141 Southwestern Blvd., Orchard Park, NY 14127

TEST VEHICLE OPTIONS:

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

X ABS; X Tilt Wheel; - Stability Control - Traction Control - 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: Toyota Motor Corporation

Date of Manufacture 06/07

GVWR: 1635 kg; GAWR: 896 kg FRONT; 826 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) = 383.0 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 42.8 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 =	371.0	356.0	60.5	727.0
Rear =	236.0	239.0	39.5	475.0
Total Delivered Weight (UDW) =				1202.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	1202.0	kg
Rated Cargo/Luggage Weight (RCLW)	=	42.8	kg
Weight of 2 p.572 Dummies @ 76 each	=	152.0	kg
TARGET TEST WEIGHT	=	1396.8	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 36.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	411.5	392.5	57.8	804.0
Rear =	294.0	292.0	42.2	586.0
Total Vehicle Test Weight (ATW) =				1390.0

Weight of Ballast Secured in Vehicle Trunk Area¹ = _____ kg

Vehicle Components Removed for Weight Reduction: Muffler, Bumper and Bumper Frame, Outboard Mirrors.

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG ²
AS DELIVERED:	699	707	712	713	972.1
FULLY LOADED:	688	697	685	687	-
AS TESTED:	688	698	690	693	1037.1

Vehicle's Wheel Base: 2460 mm

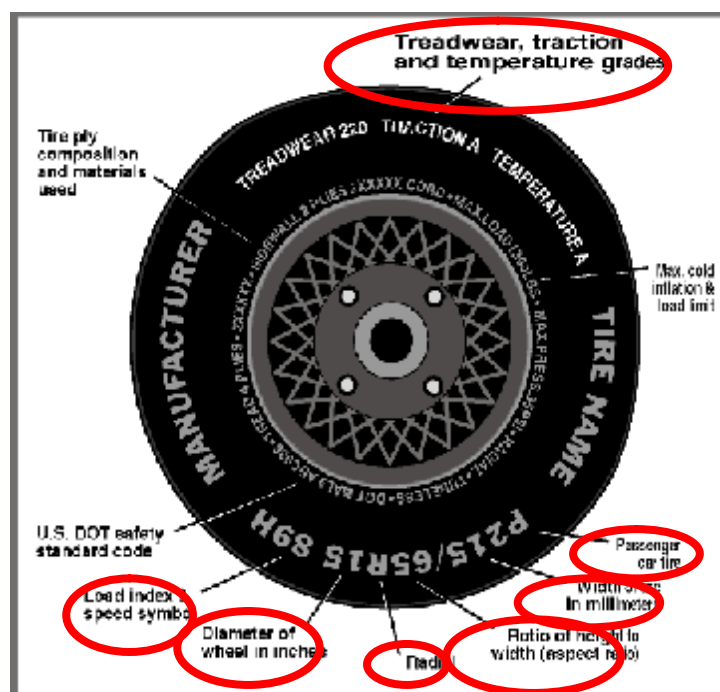
¹Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

²Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2008 Scion xD 5-Door Wagon

NHTSA Test No.: M85113 Test Date: September 20, 2007



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	350	350
Cold Pressure (from tire placard - kPa)*	230	230
Recommended Tire Size (from tire placard)	P195/60R16	P195/60R16
Tire size on Vehicle	P195/60R16	P195/60R16
Tire Manufacturer	Dunlop	Dunlop
Tire Name	SP Sport 5000	SP Sport 5000
Tire Type	P	P
Tire Width (mm)	195	195
Ratio of Height to Width (aspect ratio)	60	60
Radial	Yes	Yes
Wheel Diameter	16	16
Load Index & Speed Symbol	89H	89H
Treadwear	340	340
Traction Grade	A	A
Temperature Grade	A	A

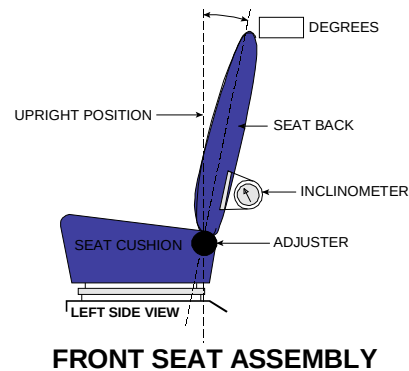
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2008 Vehicle Model: Scion xD Body Style : 5-Door Wagon

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: * 89 deg

Measurement instructions: * Seat back was placed in the 6th detent from the forward most position
(forward most position = 0 detent). Angle measurement was from the headrest rail.

Seat back angle for passenger's seat: * 89 deg

Measurement instructions: * Seat back was placed in the 6th detent from the forward most position
(forward most position = 0 detent). Angle measurement was from the headrest rail.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Seat was placed in the 9th detent from a total of 17 detents. Total
travel is 240 mm and seat was placed in mid-position 120 mm from forward most position.

Positioning of the passenger's seat: Seat was placed in the 9th detent from a total of 17 detents. Total
travel is 240 mm and seat was placed in mid-position 120 mm from forward most position.

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 42.0 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 = 38.6 to 39.5 liters

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

3.3 One-Third of Useable Capacity = 14.0 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.

The fuel pump will pump fuel when the ignition is in the 'ON' position

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: Steering column was placed at 28 degrees from horizontal which is the
center of travel (Full down = 26.5 deg, Full upward = 29.0 deg). No telescoping feature.

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: Placed in the uppermost detent from a total of 4 detents as per
instructions from manufacturer.

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

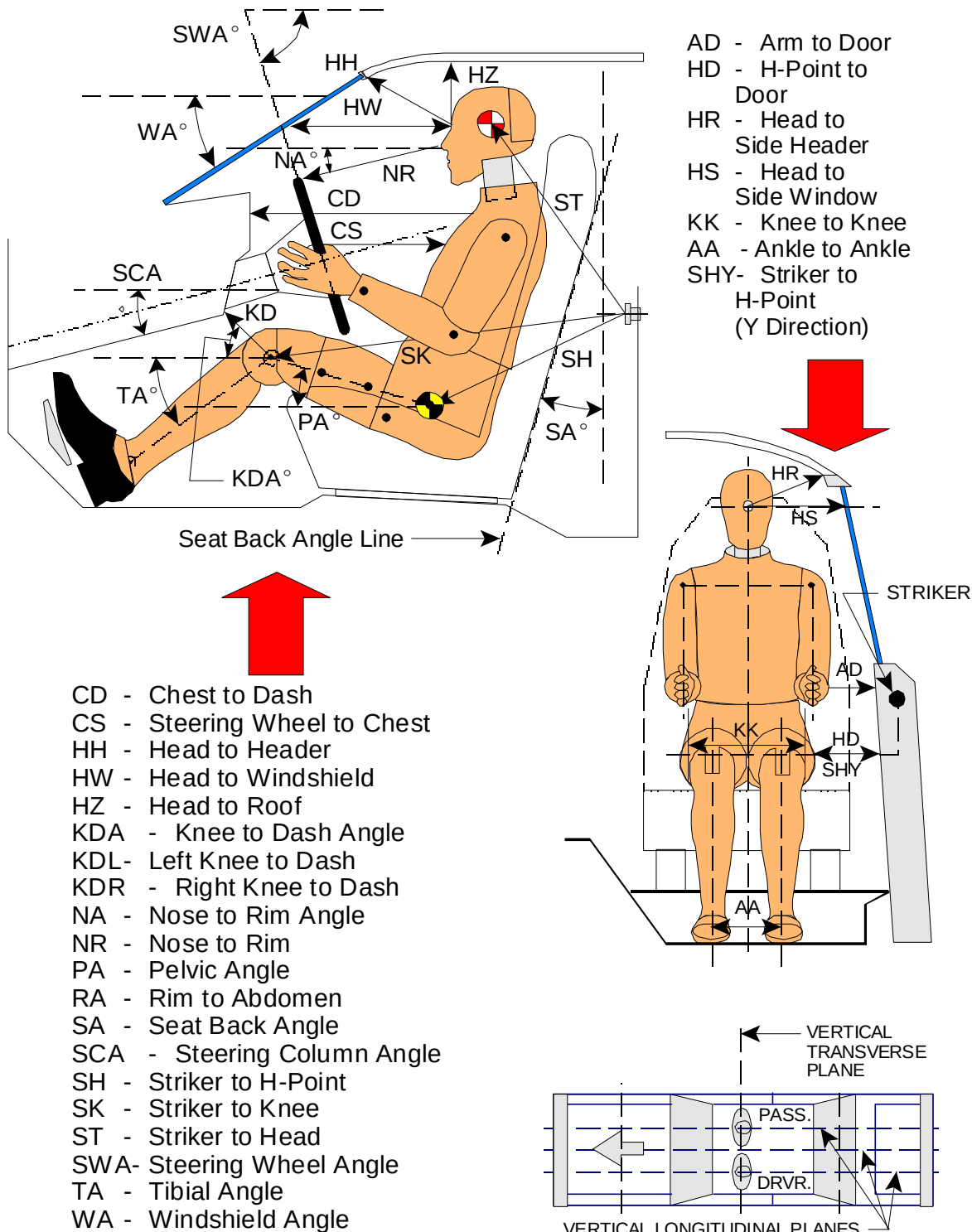
Does vehicle owner's manual describe how to deactivate ADLs? - Yes; - No; X N/A

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.)

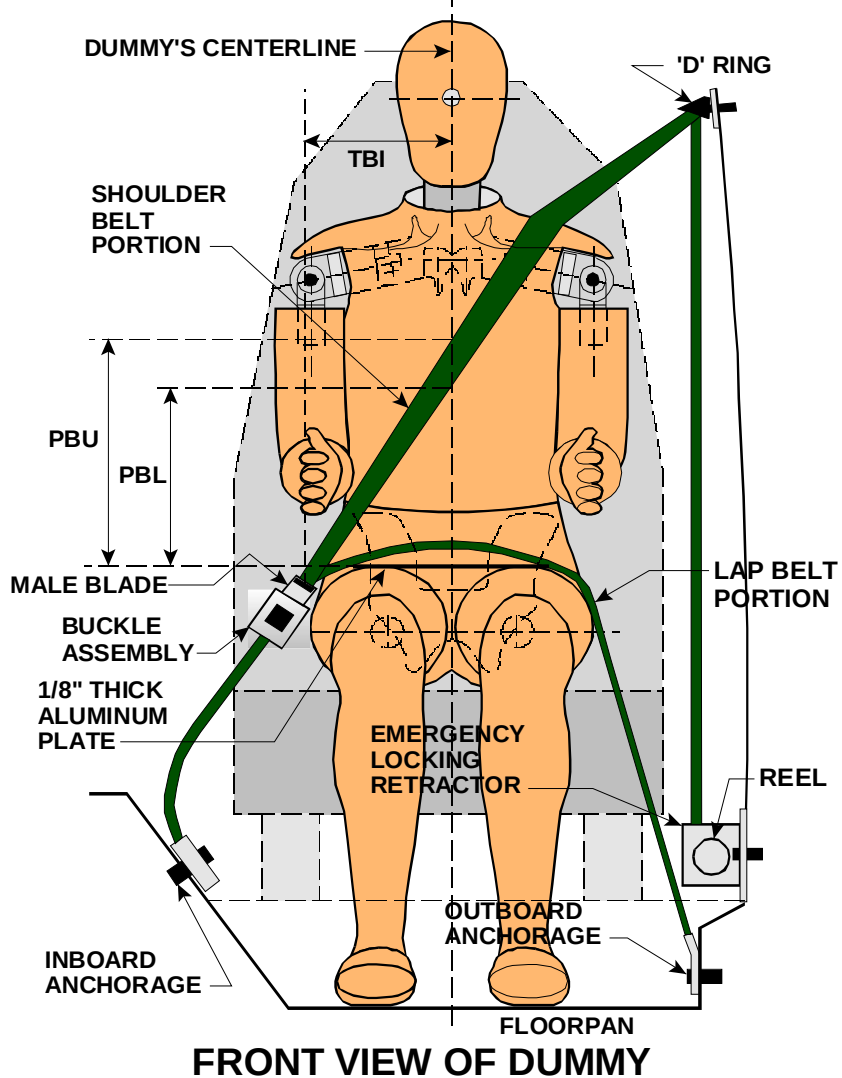
	DRIVER (Serial #064)			PASS. (Serial #061)		
WA ⁰	27.5 deg.			N/A		
SWA ⁰	61 deg.			N/A		
SCA ⁰	29 deg.			N/A		
SA ⁰	89 deg. **			89 deg. **		
HZ	195			185		
HH	383			393		
HW	592			615		
HR	215			205		
NR	412	Angle	18.5 deg.	N/A		
CD	552			512		
CS	315			N/A		
RA	199			N/A		
KDL	125	Angle (KDA)	25 deg.	165		
KDR	150			165	Angle (KDA)	27 deg.
PA ⁰	22.1 deg.			22.6 deg.		
TA ⁰	56 deg.			55 deg.		
KK	282			192		
AA	345			232		
ST	465	Angle	20 deg.	455	Angle	17 deg.
SK	655	Angle	102 deg.	650	Angle	102 deg.
SH	320	Angle	140 deg.	312	Angle	145 deg.
SHY	230			240		
HS	323			307		
HD	141			133		
AD	91			95		

Dimensions in millimeters

** Measured from the head rest post

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

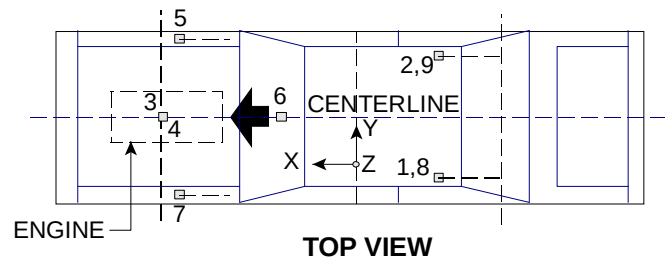
SEAT BELT POSITIONING DATA



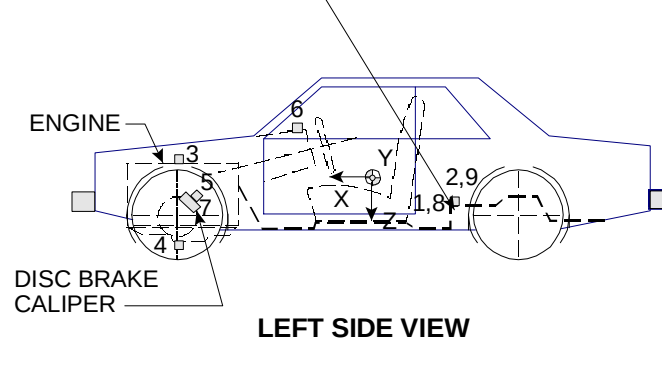
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	340	340
PBL-- Top surface of alum. plate to belt lower edge	265	260
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	1321	-615	407
2	Right Rear Seat Cross Member X	1342	624	405
3	Top of Engine Block	3377	401	829
4	Bottom of Engine	2808	478	282
5	Disc Brake Caliper @ Right Side	3022	701	451
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3016	-741	405
8	Left Rear Seat Cross Member Z	1321	-615	407
9	Right Rear Seat Cross Member Z	1342	624	405

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.

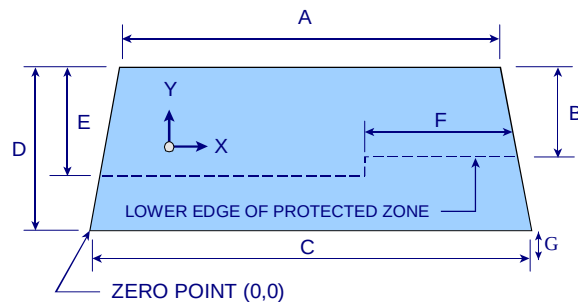
FMVSS 212 REQUIREMENTS:

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	2009	2009	100.0%
LEFT SIDE	2009	2009	100.0%
TOTAL	4018	4018	100.0%



DIMENSIONS (mm)	
A	1123
B	521
C	1365
D	765
E	510
F	452
G	60

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS: None

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

	COORDINATES	
	X	Y
1.		
2.		
3.		
4.		

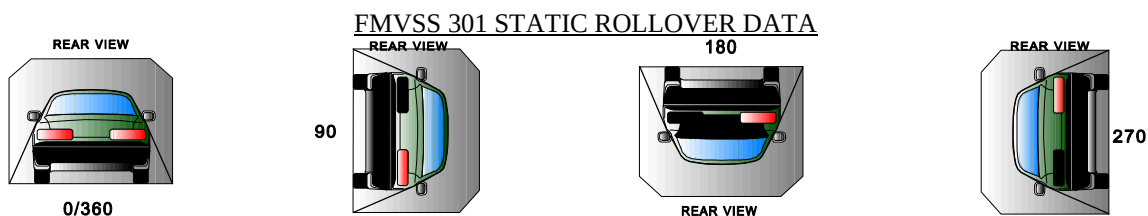
DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: _____ M85113 _____ TEST DATE: _____ September 20, 2007
VEHICLE MAKE/MODEL: _____ 2008 Scion xD 5-Door Wagon _____
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	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
90° - 180°	1	minutes	02	seconds	5	minutes	6	minutes	2	seconds	7	minutes
180°-270°	0	minutes	59	seconds	5	minutes	5	minutes	59	seconds	6	minutes
270°-360°	1	minutes	06	seconds	5	minutes	6	minutes	6	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:

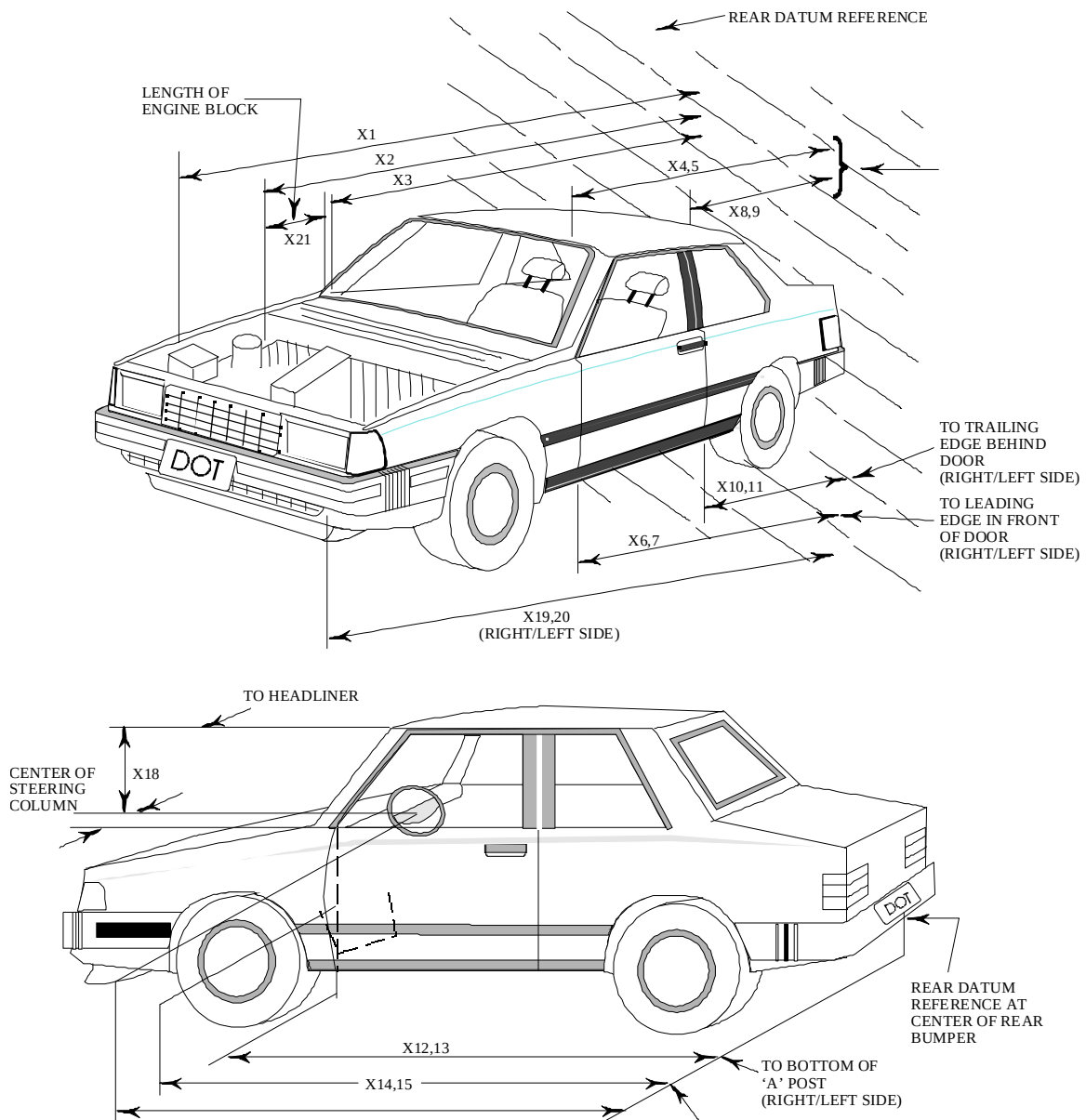
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

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.: M85113 TEST DATE: September 20, 2007
VEHICLE MAKE/MODEL: 2008 Scion xD 5-Door Wagon

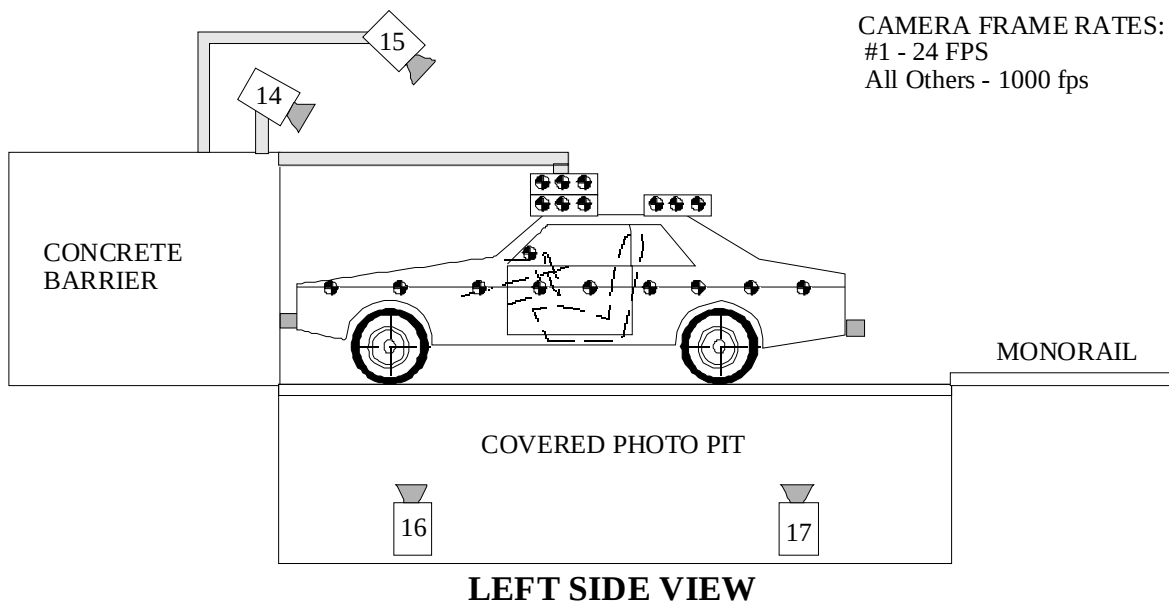
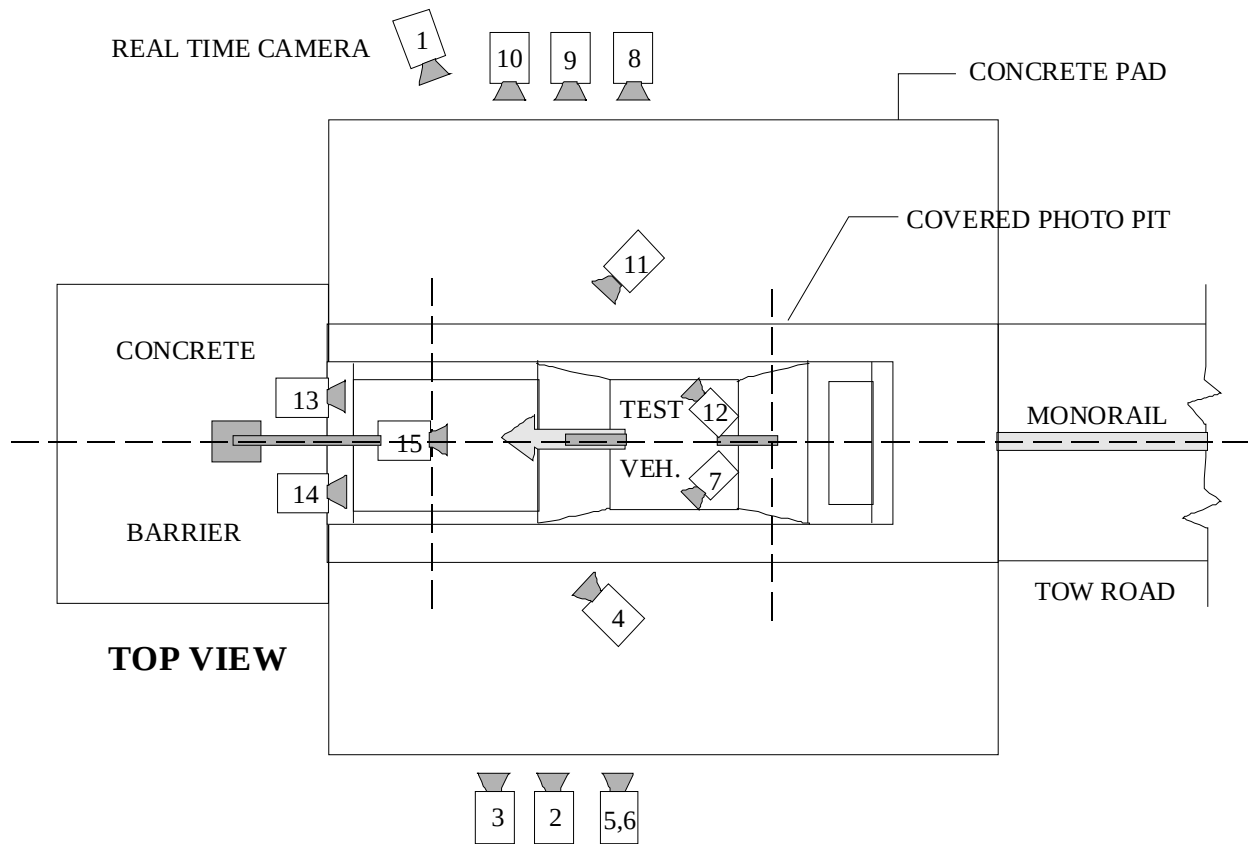
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	3924	3583	341
X2	Rear Surface of Vehicle to Front of Engine	3576	3307	269
X3	Rear Surface of Vehicle to Firewall	3211	3049	162
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	2736	2733	3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	2735	2734	1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	2688	2686	2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	2678	2677	1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	1691	1686	5
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	1692	1689	3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	1677	1674	3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	1675	1674	1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	2831	2830	1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	2831	2830	1
X14	Rear Surface of Vehicle to Firewall, Right Side	3197	3144	53
X15	Rear Surface of Vehicle to Firewall, Left Side	3191	3150	41
X16	Rear Surface of Vehicle to Steering Column	2299	2369	-70
X17	Center of Steering Column to "A" Post	280	284	-4
X18	Center of Steering Column to Headliner	443	453	-10
X19	Rear Surface of Vehicle to Right Side of Front Bumper	3845	3512	333
X20	Rear Surface of Vehicle to Left Side of Front Bumper	3844	3521	323
X21	Length of Engine Block	240	240	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2537	2534	3
CD	Rear Surface of Vehicle to Center of Dash Panel	2563	2523	40
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2509	2509	0

All Dimensions in mm

NHTSA TEST No.: M85113 TEST DATE: September 20, 2007
VEHICLE MAKE/MODEL: 2008 Scion xD 5-Door Wagon

	Elements	Pre-Test (mm)
1	Total length	3924
2	Total Width	1692
3	Bumper Top Height	647
4	Bumper Bottom Height	506
5	Longitudinal Member Top Height	580
6	Distance Between Longitudinal Members	1000
7	Longitudinal Member Width	59
8	Engine top height	914
9	Engine bottom height	227
10	Engine and gearbox width	561
11	Front bumper-engine distance	348
12	Front shock absorber fixing height	950
13	Bonnet leading edge height	813
14	Front shock absorber fixing width	1124
15	Front bumper – front axle distance	787
16	Front axle – A pillar distance	861
17	A-pillar – B pillar distance	571
18	B-pillar – rear axle distance	1030
19	B-pillar – C Pillar distance	1006
20	Roof sill bottom height	1492
21	Roof sill top height	1541
22	Floor sill bottom height	275
23	Floor sill top height	358

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



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

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

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	6166	1625	985	-2.6	5767	24	1000
3	Left Side View	8150	860	965	-1.9	7751	50	1000
4	Driver and Interior View	5046	2555	2040	-8.3	-	50	500
5	Steering Column (Bottom)	5476	1835	1205	-4.0	5077	24-70	1000
6	Steering Column (Top)	5476	1835	1805	-9.5	5077	28-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	6096	1695	965	0	5697	24	500
9	Right Side View	8340	1050	995	-2.6	7941	50	1000
10	Right Passenger View	7910	1425	1200	-2.4	7511	50	1000
11	Passenger and Interior View	7086	2735	1995	-10.1	-	50	500
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-41.9	-	24	500
14	Driver Front View	620	-92	1987	-41.3	-	25	500
15	Windshield View	0	-530	3374	-53.4	-	25	500
16	Pit View of Engine	0	615	-3048	90	-	12.5	500
17	Pit View of Fuel Tank	0	2450	-3048	90	-	12.5	500

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

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

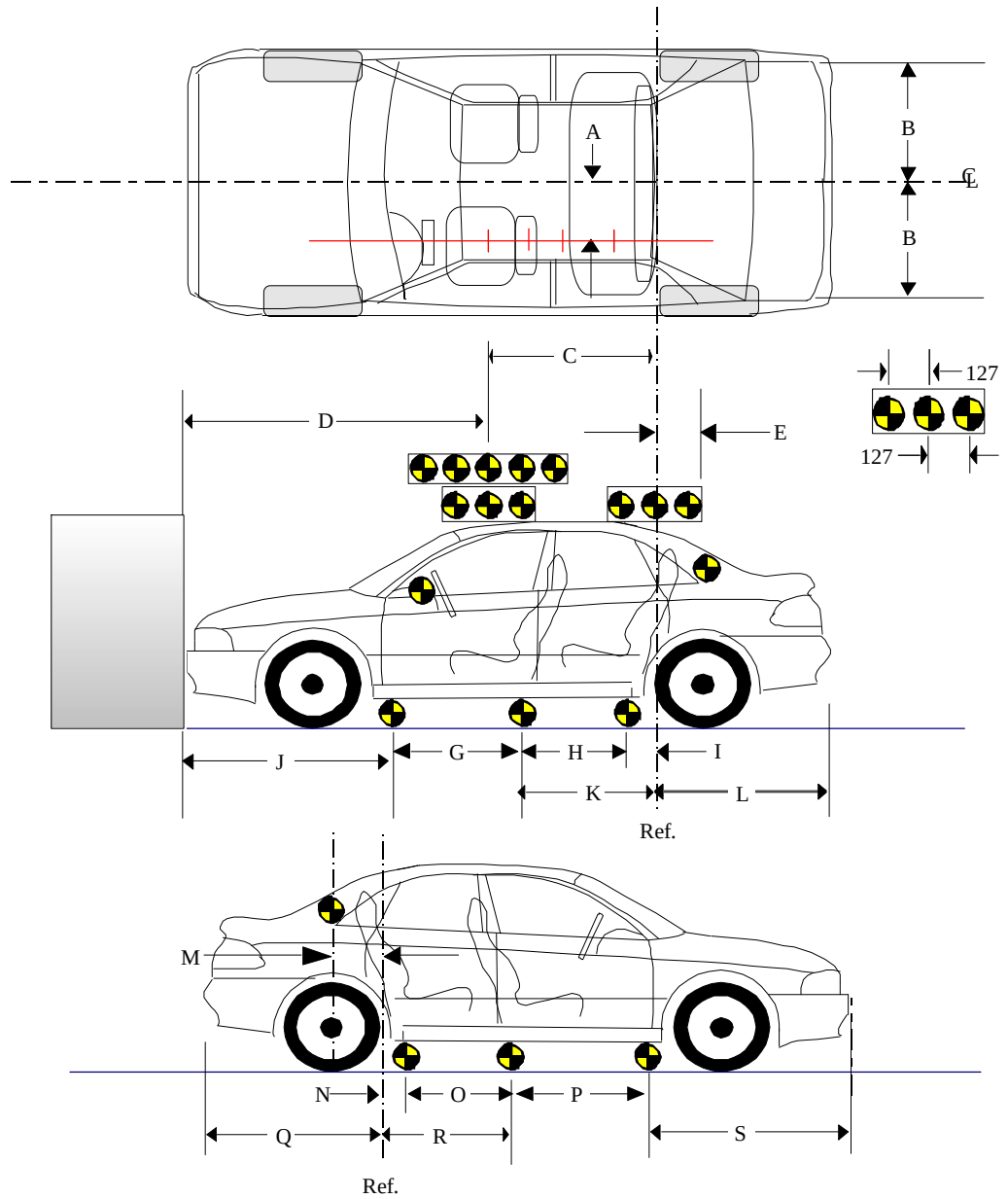
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

(Dimensions in millimeters)

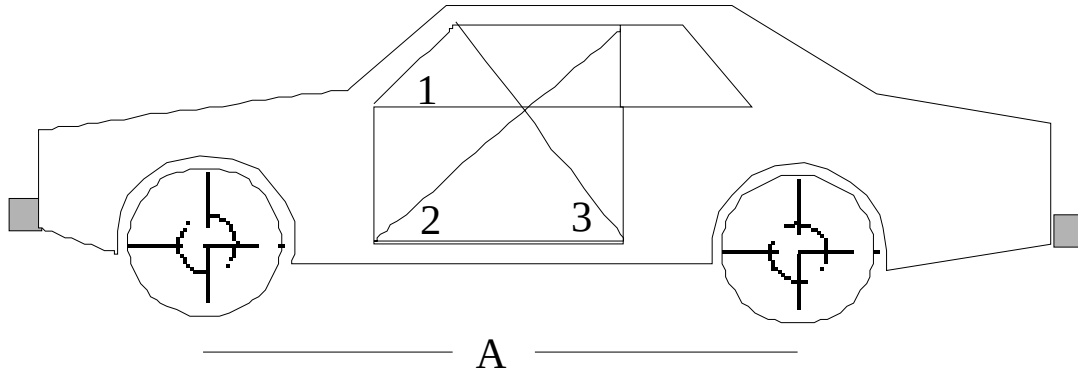
A	323
B	713
C	1219
D	1684
E	421
F	1425
G	807
H	810
I	101
J	1207
K	911
L	1000
M	416
N	103
O	809
P	806
Q	999
R	912
S	1208



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



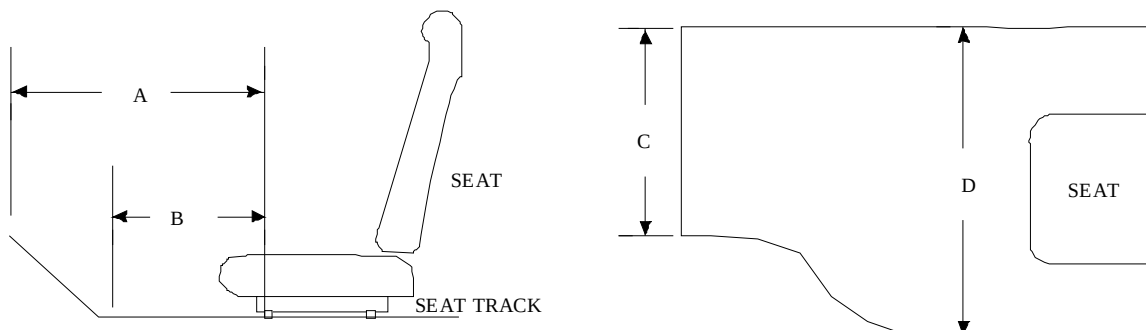
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	959	1366	1082	957	1376	1069
AFTER TEST	956	1366	1085	954	1375	1072
DIFFERENCE	3	0	-3	3	1	-3

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2462	2459
AFTER TEST	2402	2435
DIFFERENCE	60	24

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	664	631	33
B	470	463	7
C	488	494	-6
D	488	487	1

PASSENGER

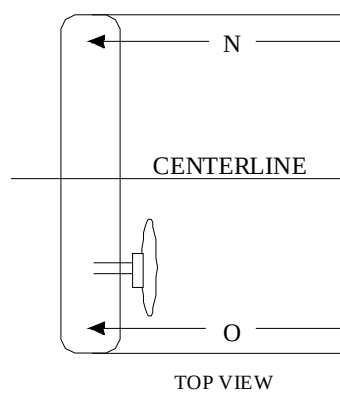
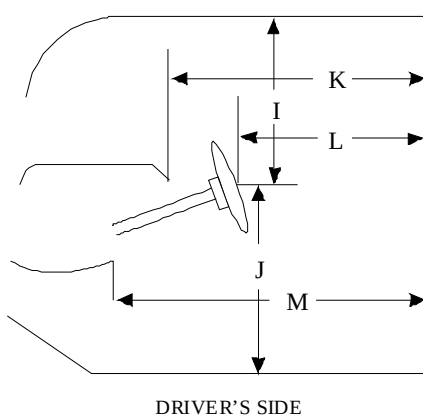
Measurement	Pre-Test	Post-Test	Difference
A	638	620	18
B	459	456	3
C	491	490	1
D	481	479	2

Units = mm

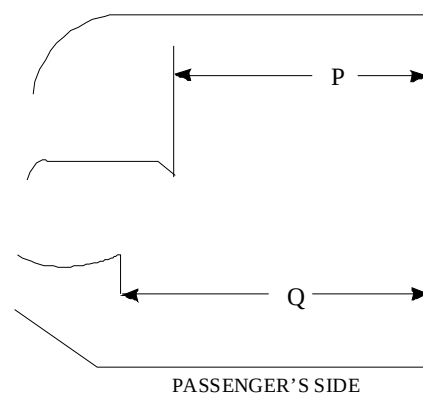
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



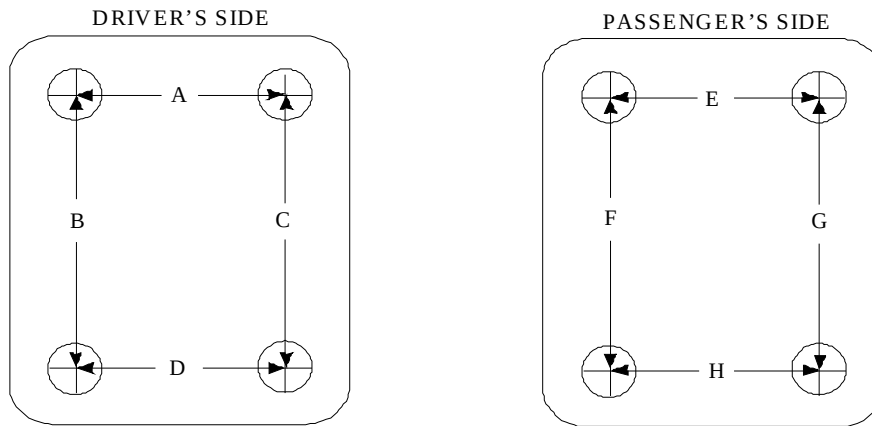
Measurement	Pre-Test	Post-Test	Difference
I	443	453	-10
J	686	684	2
K	784	788	-4
L	556	626	-70
M	795	800	-5
N	794	792	2
O	766	767	-1
P = K (PASS.)	884	886	-2
Q = M (PASS.)	799	817	-18

Units = mm

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

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

FLOORBOARD DEFORMATION



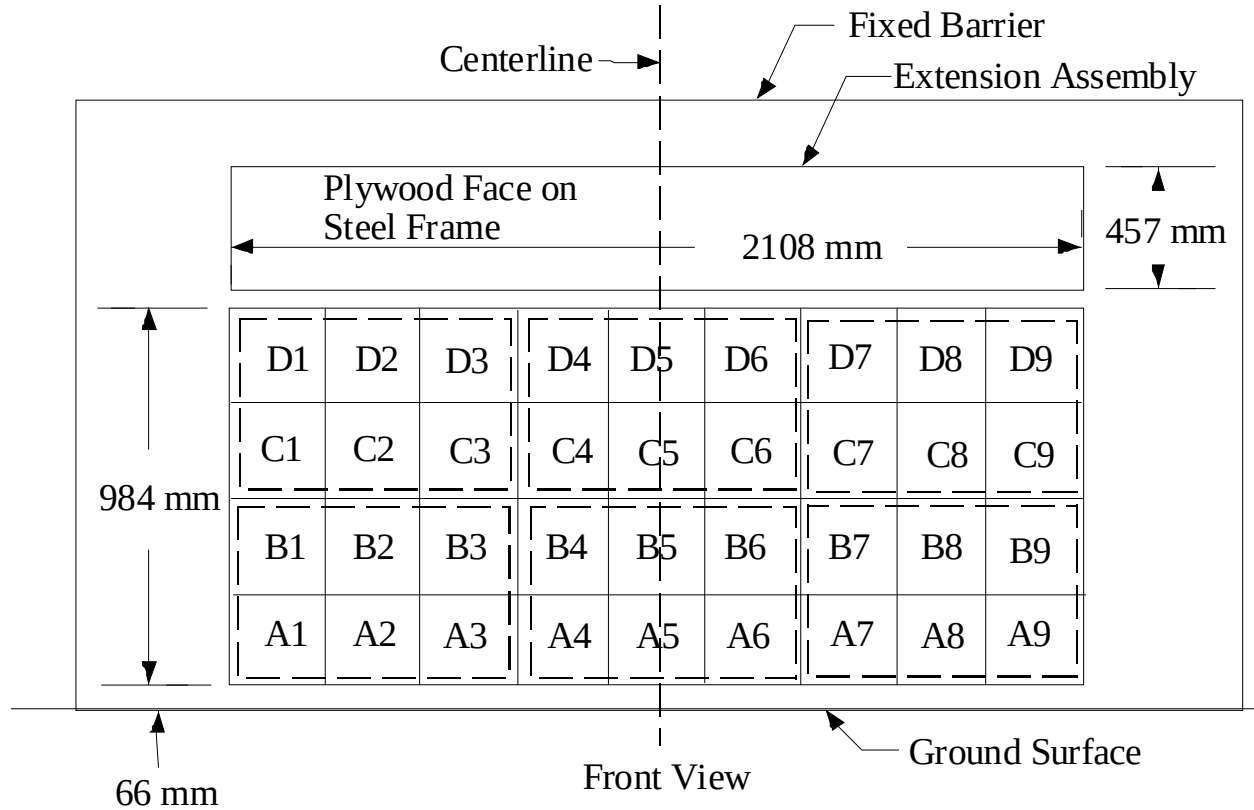
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	488	494	-6
B	248	245	3
C	249	250	-1
D	488	487	1
E	491	490	1
F	226	231	-6
G	195	200	-5
H	481	479	2

Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
 4 Rows
 9 Columns



Momentum plot could not be generated because Load Cells A1 thru D5 did not record properly during test

DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Scion xD 5-Door Wagon

NHTSA Test No.: M85113 VIN: JTKKU10448J000670

Model Year: 2008 Build Date: 06/07 Test Date: September 20, 2007

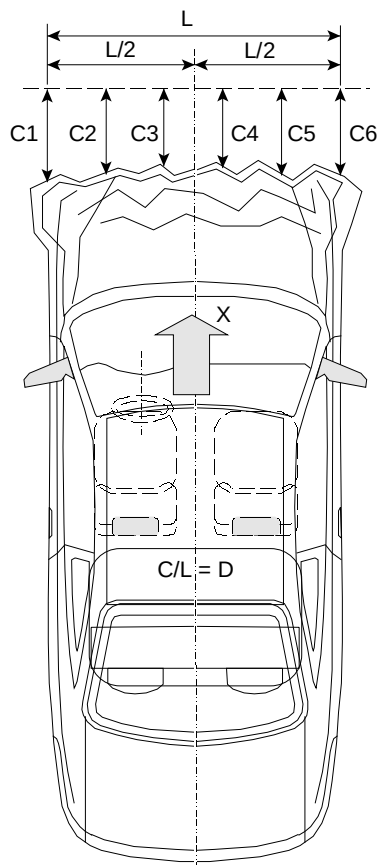
Vehicle Size Category: Wagon Test Weight: 1390 kg

Vehicle Wheelbase: 2460 mm; Front Overhang: 785 mm; Overall Width: 1692 mm

Collision Deformation Classification (CDC) Code: 12FDEW

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	3725	3513	212
C2 =	3863	3533	330
C3 =	3917	3580	337
C4 =	3918	3575	343
C5 =	3864	3519	345
C6 =	3723	3503	220



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1387 mm

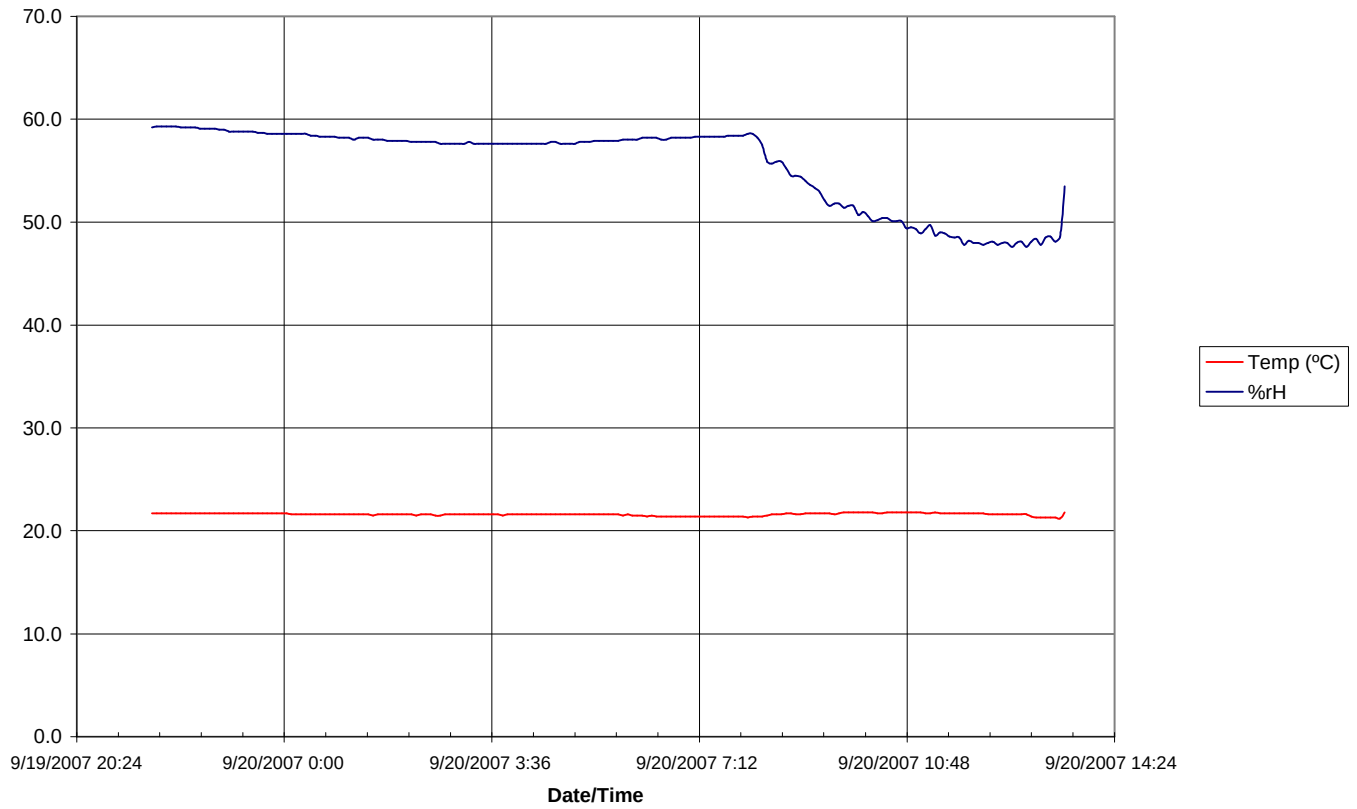
L2= 693.5 mm

L5= 277.4 mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: M85113 Vehicle: 2008 Scion xD 5-Door Wagon

2008 Scion xD M85113 Environmental Conditions



APPENDIX A
PHOTOGRAPHS

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A-52	Pre-Test Passenger Knee Bolster View	A-30
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Figure A-1: Load Cell Locations



Figure A-2: Vehicle Certification Placard

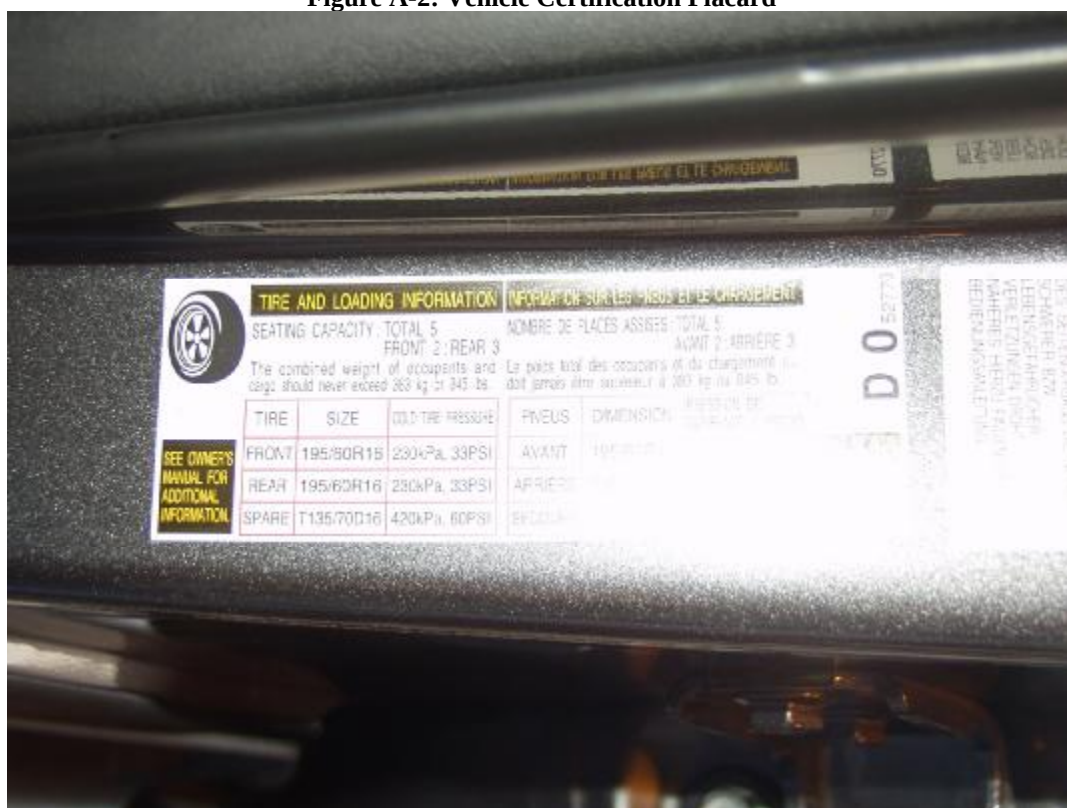


Figure A-3: Vehicle Tire Placard



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

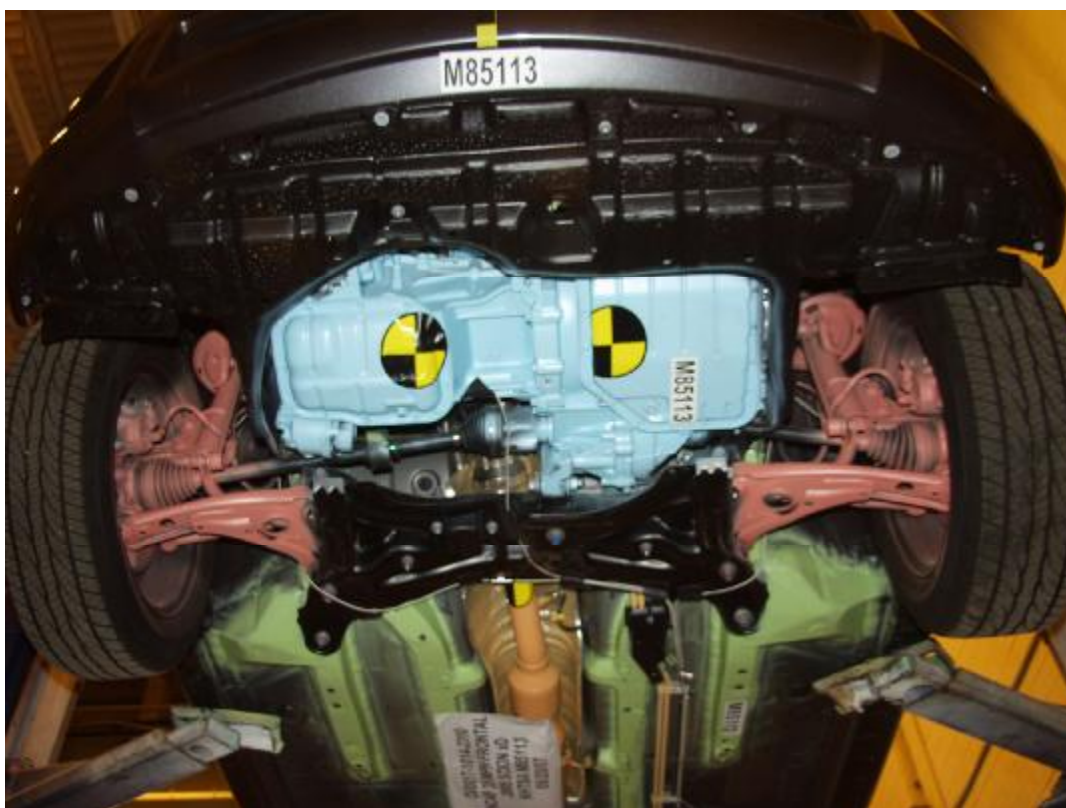


Figure A-24: Pre-Test Front Underbody View



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

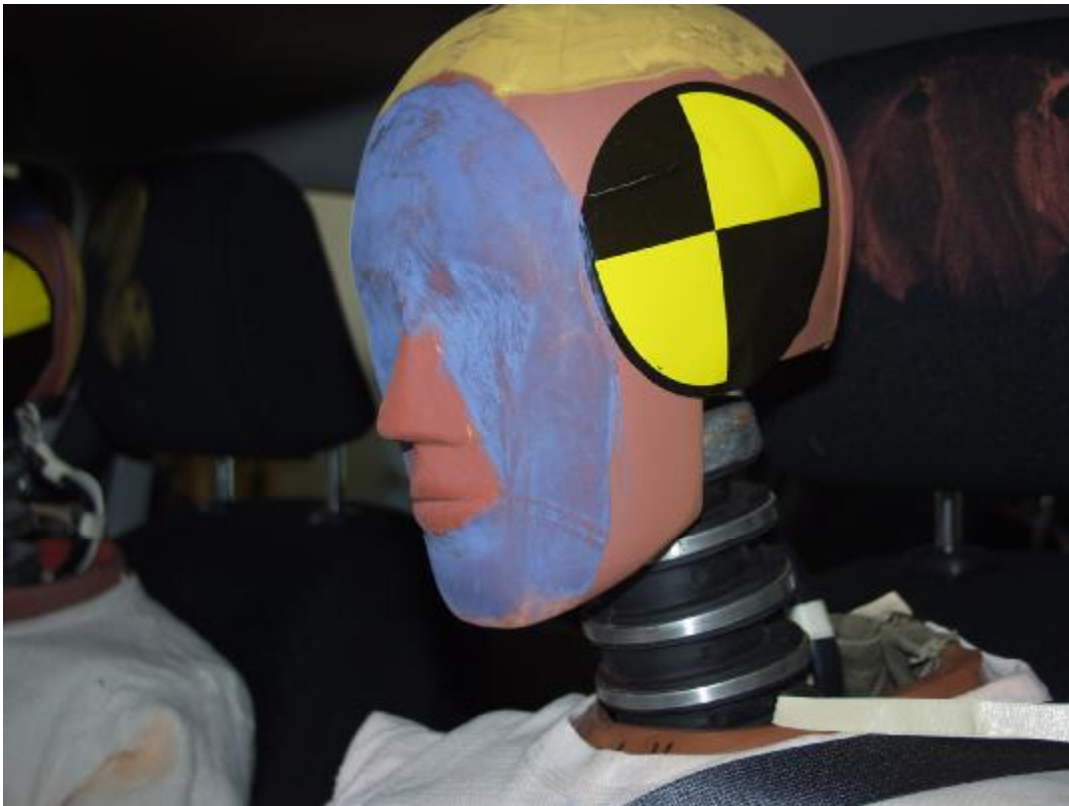


Figure A-42: Post-Test Driver Head View



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

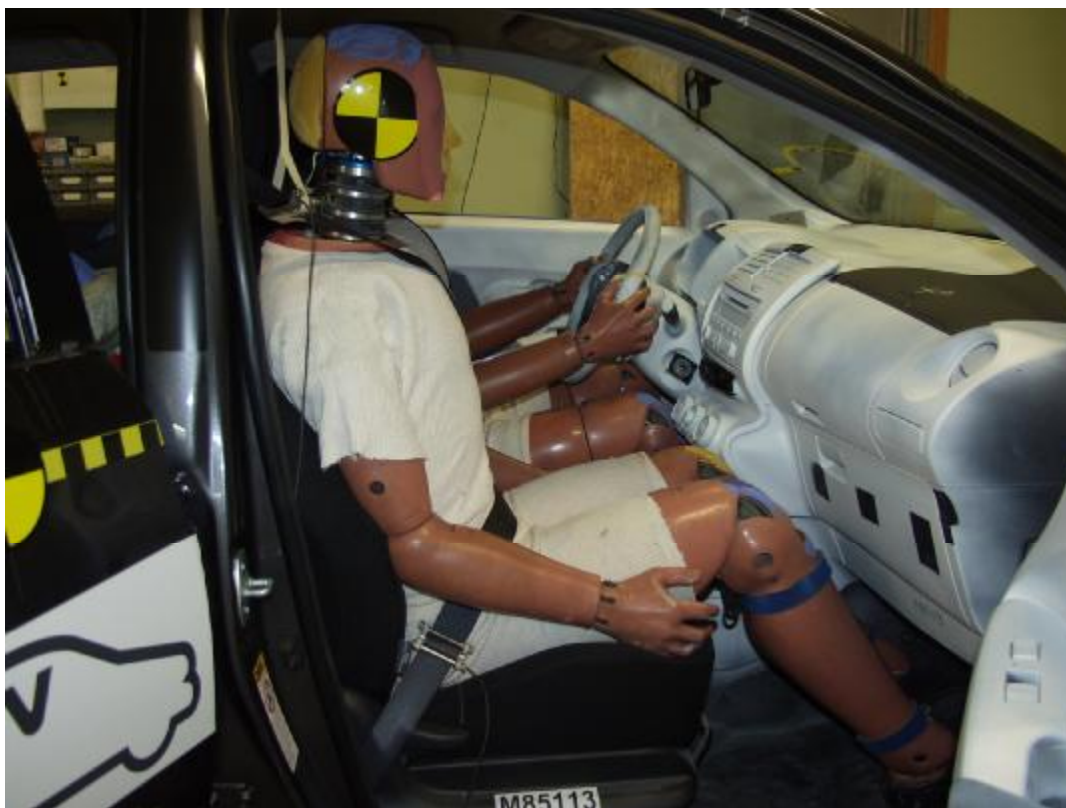


Figure A-48: Pre-Test Passenger and Interior View



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

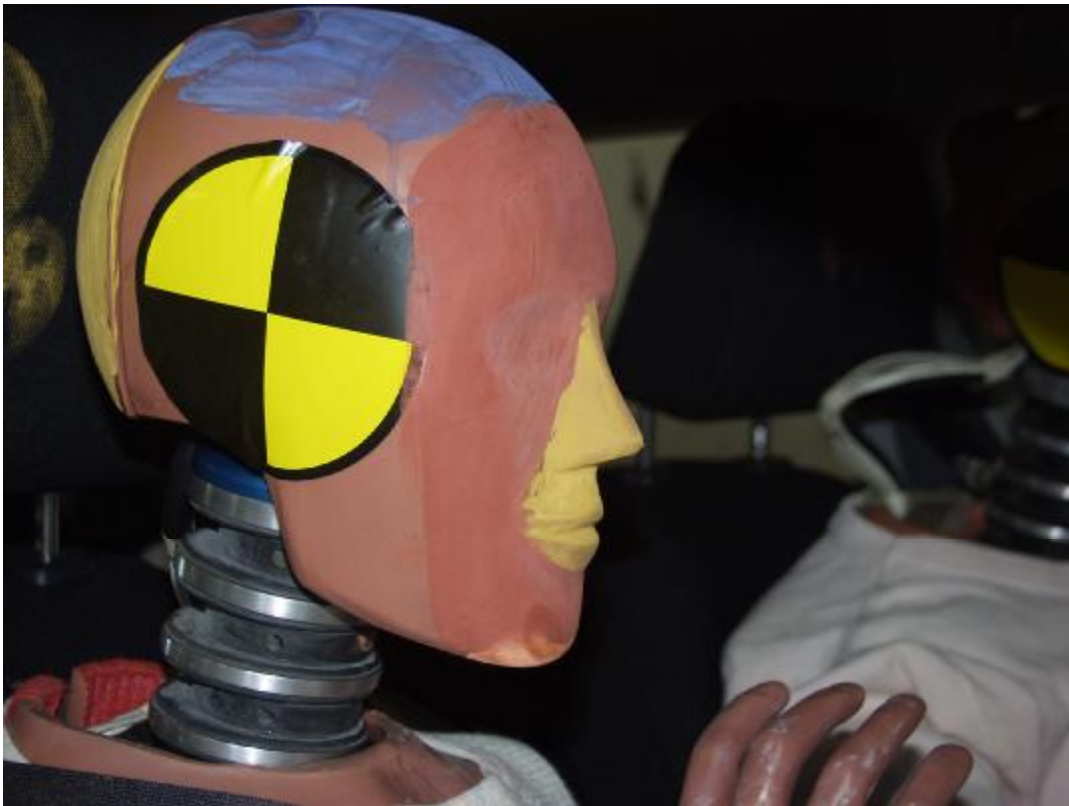


Figure A-56: Post-Test Passenger Head View



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°

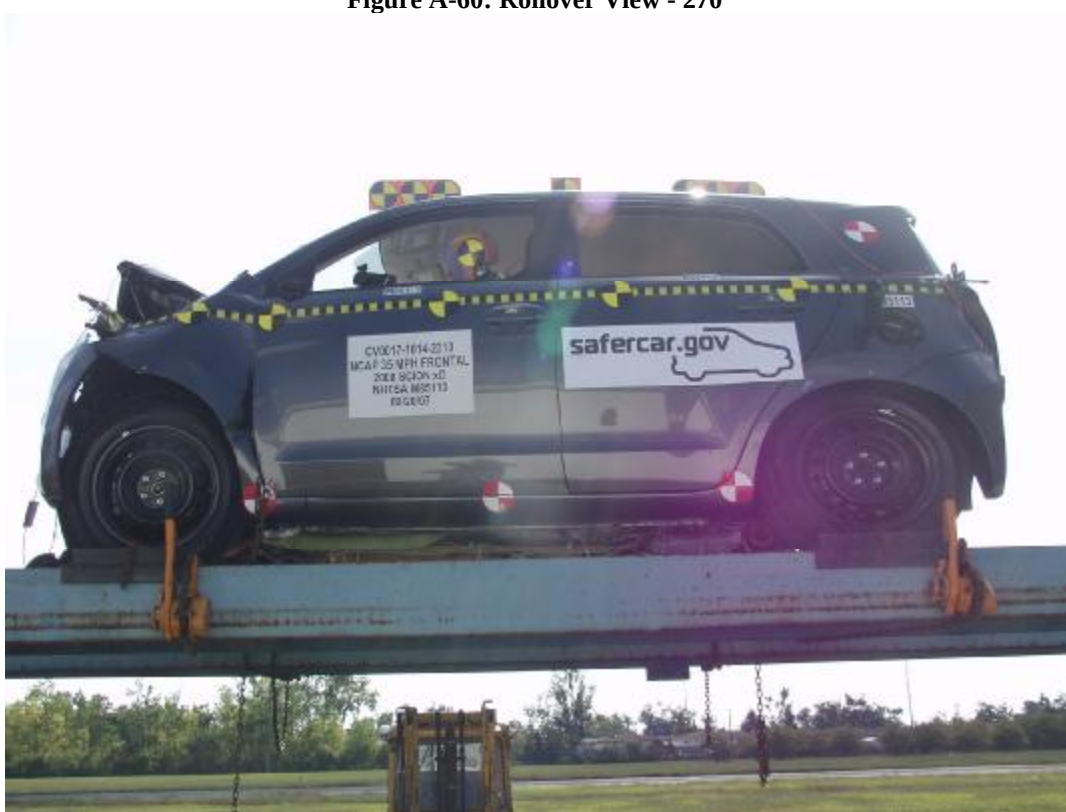


Figure A-61: Rollover View - 360°



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.: M85113

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

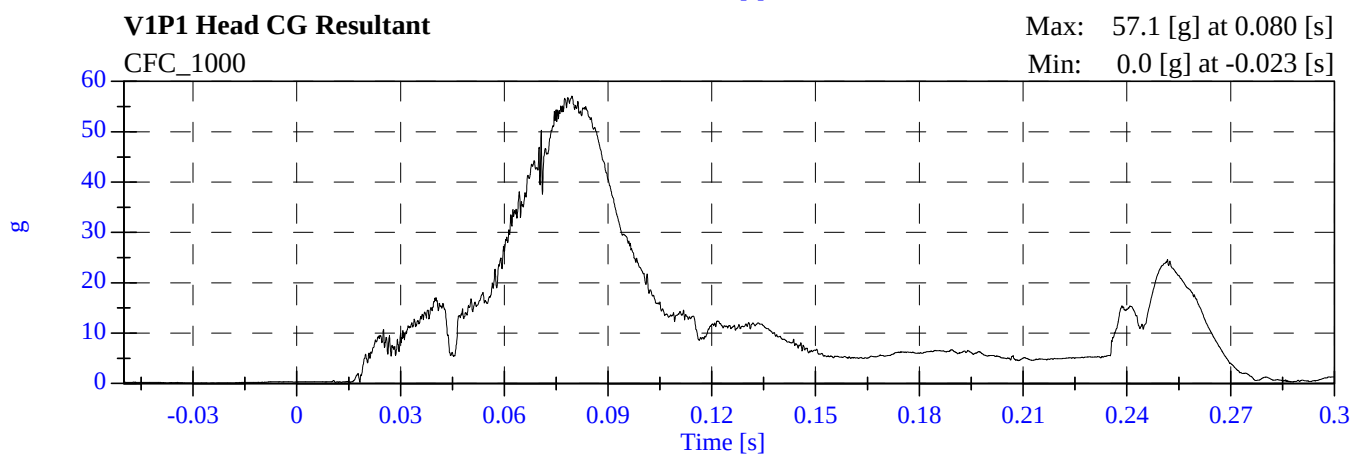
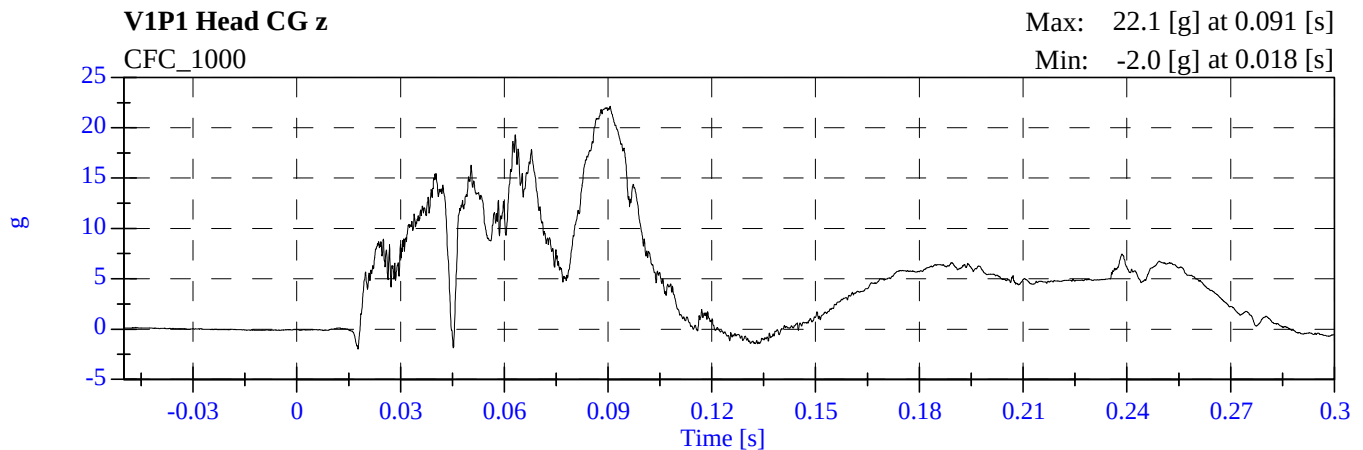
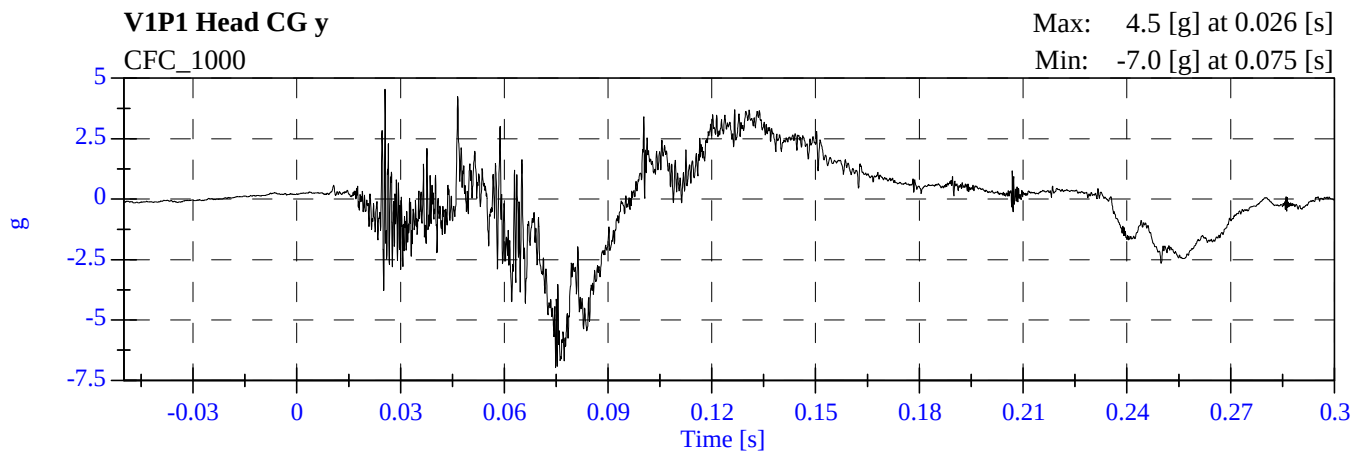
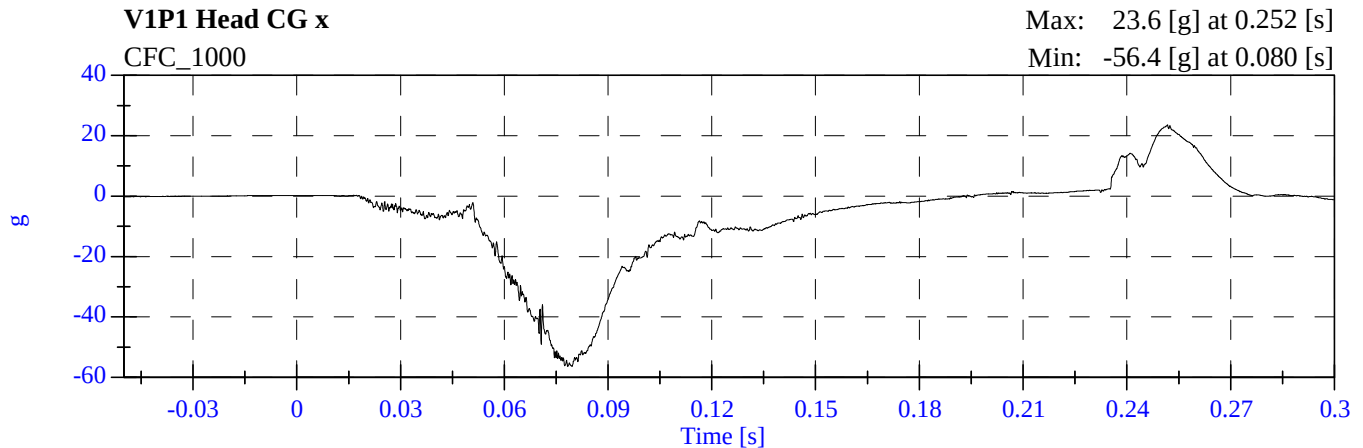
The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: www.nhtsa.dot.gov

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	

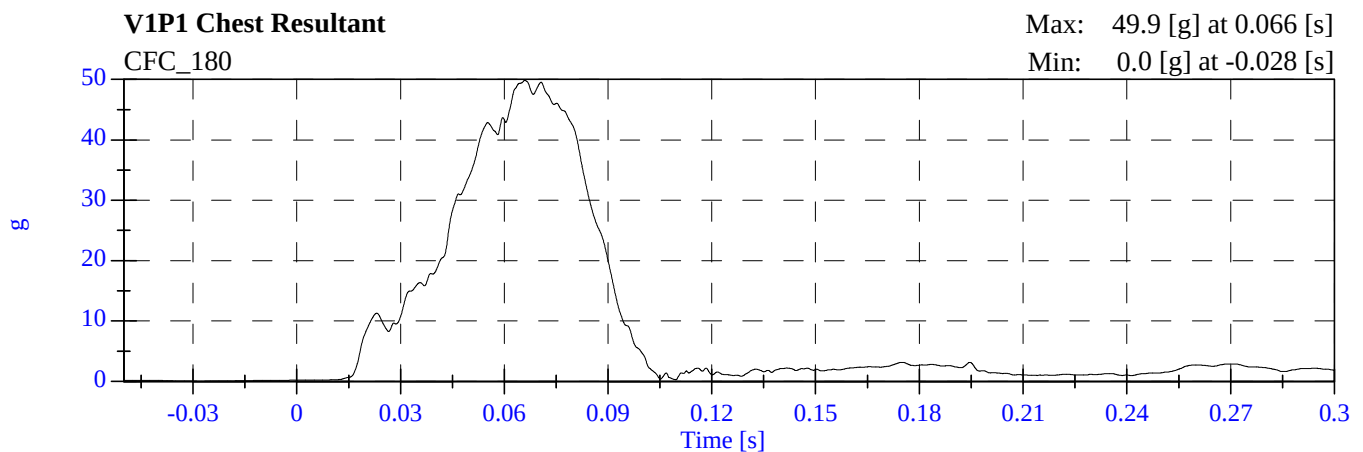
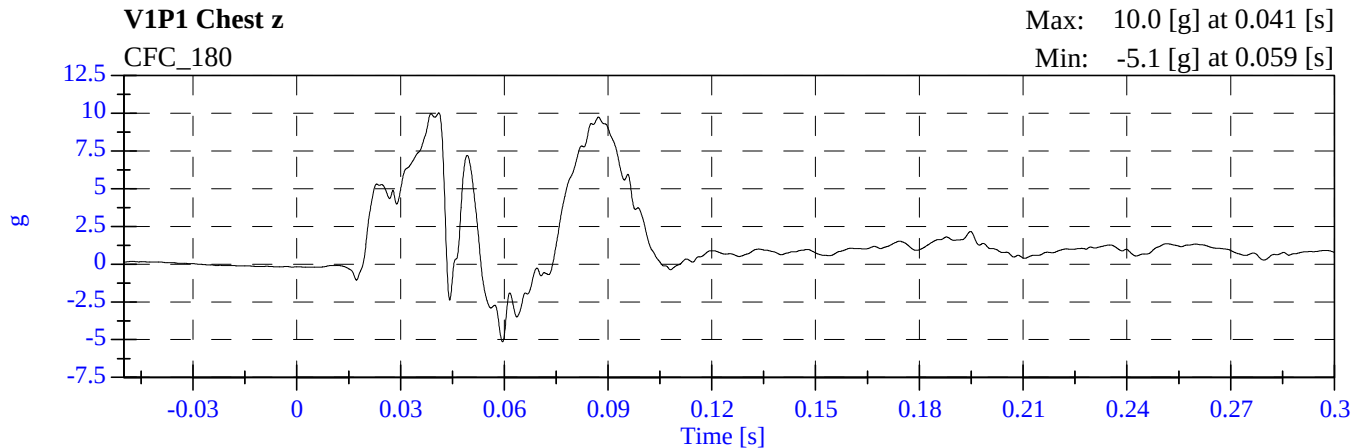
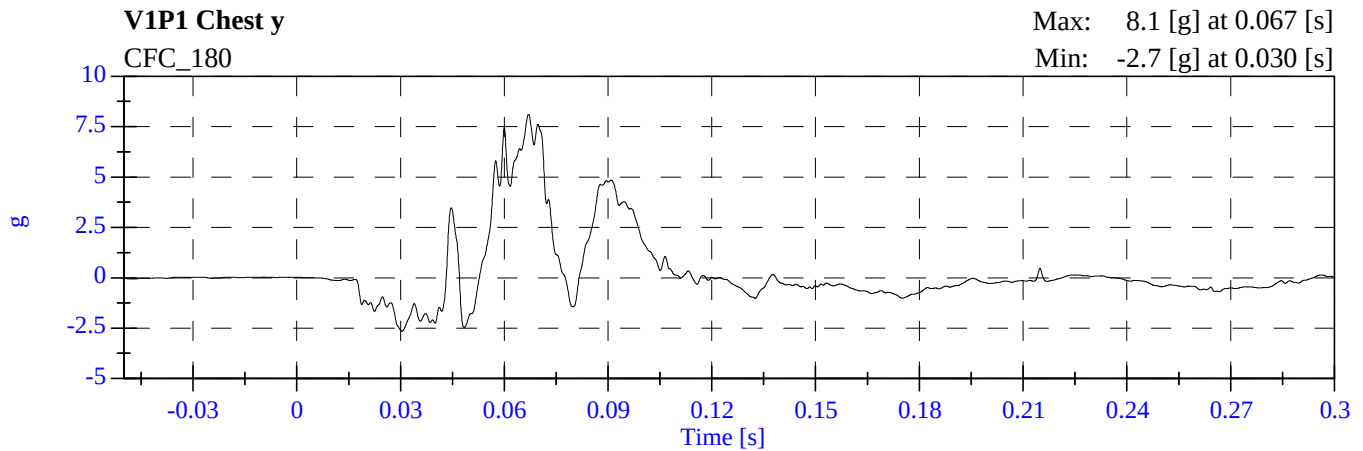
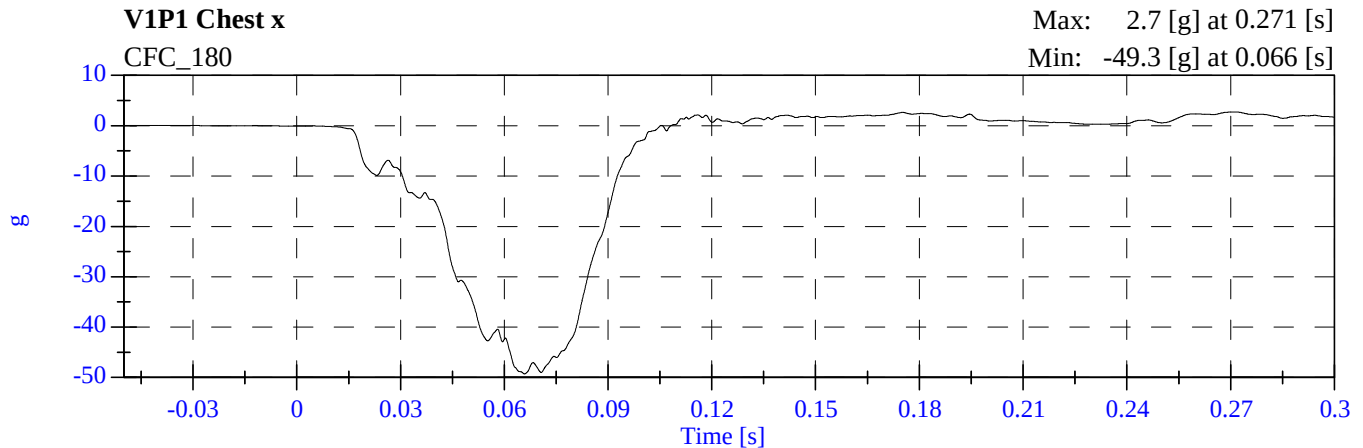
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Barrier Load Cell A2 Fx	Barrier Load Cell D7 Fx
Barrier Load Cell A3 Fx	Barrier Load Cell D8 Fx
Barrier Load Cell A4 Fx	Barrier Load Cell D9 Fx
Barrier Load Cell A5 Fx	
Barrier Load Cell A6 Fx	
Barrier Load Cell A7 Fx	
Barrier Load Cell A8 Fx	
Barrier 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	

TEST NOTES	
Data Channel	Anomalies
V1P1 Left Lower Tibia Fz	Channel saturated
V1P2 Head CG Red z	Channel did not record properly
V1P2 Right Foot Aft x	Channel saturated at 57 msec
V1 Left Rear #1x	Wire cut at 100 msec
V1 Right Caliper #5x	Data inaccurate after 29 msec
Load Cells A1-D5	Channels did not record properly during test

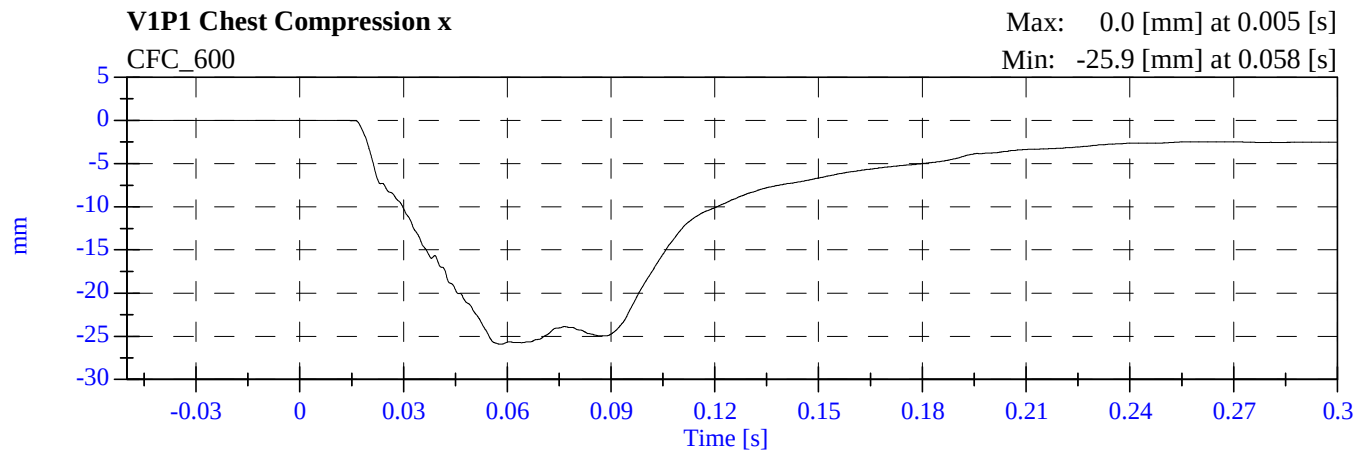
2008 NCAP Test 2 2008 Scion xD M85113 - September 20, 2007



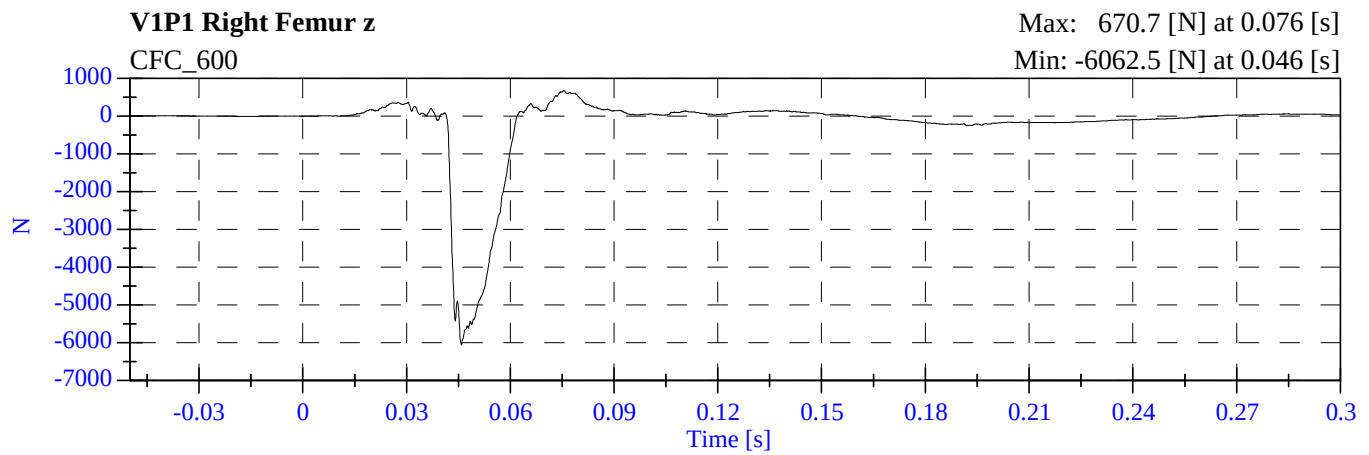
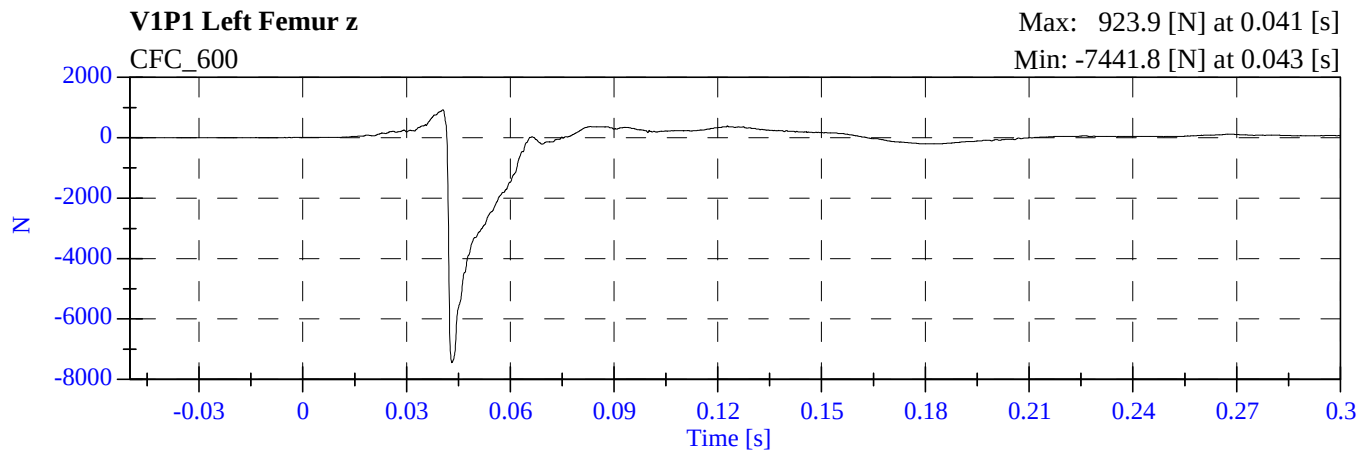
2008 NCAP Test 2 2008 Scion xD M85113 - September 20, 2007



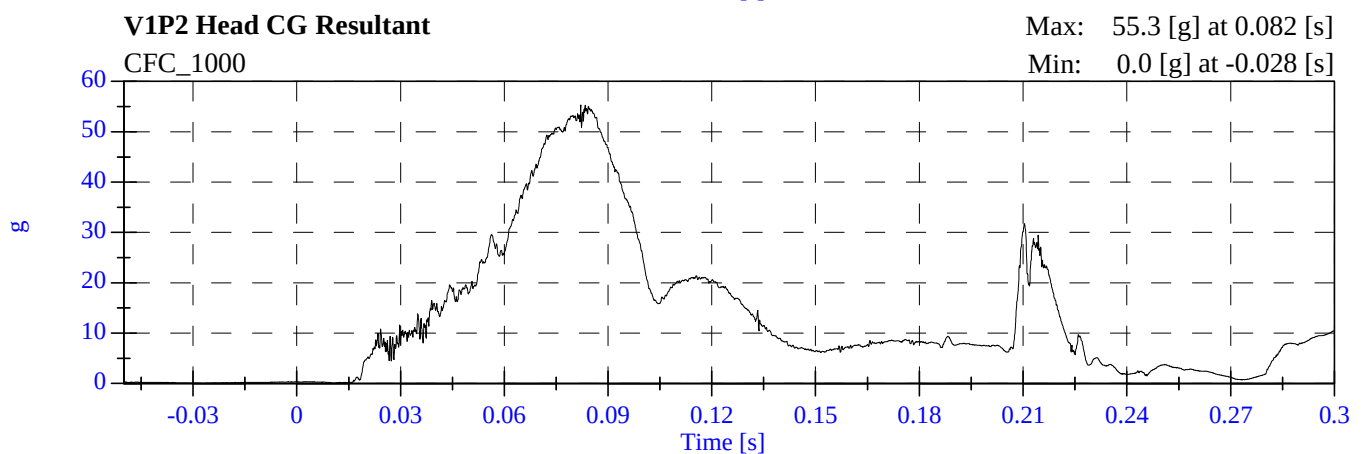
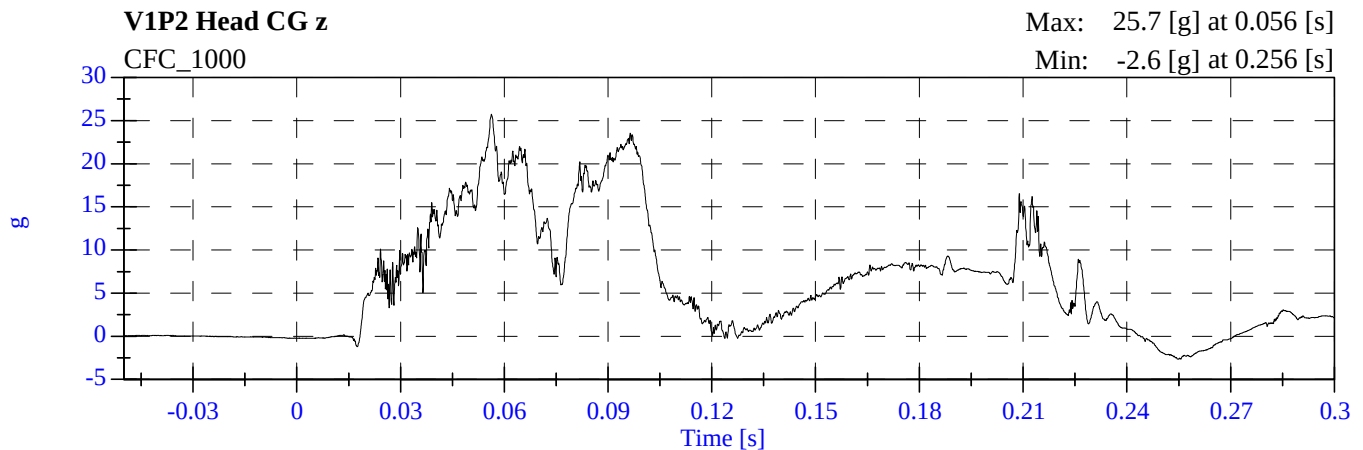
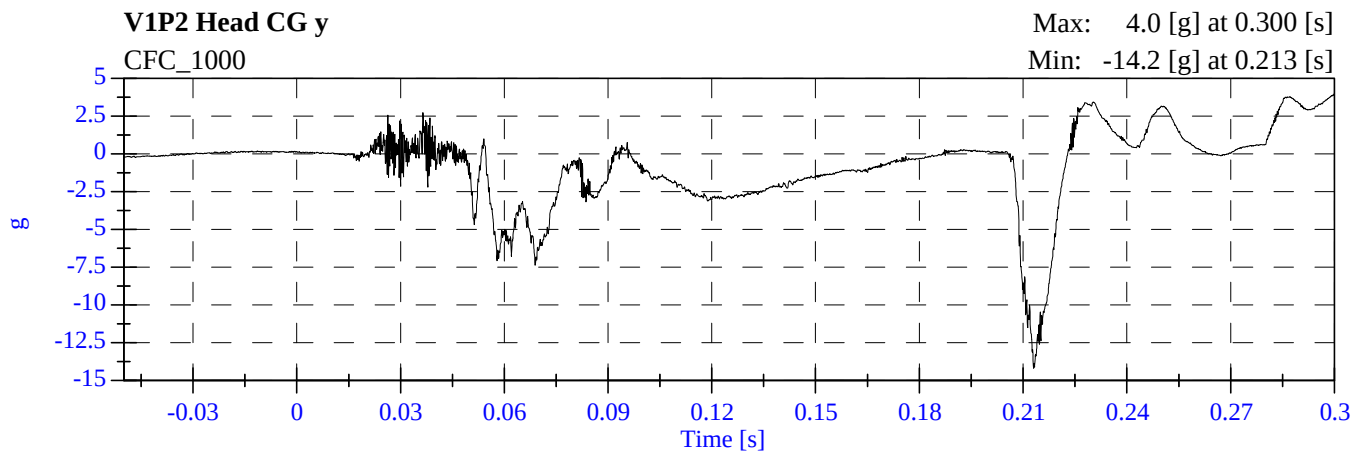
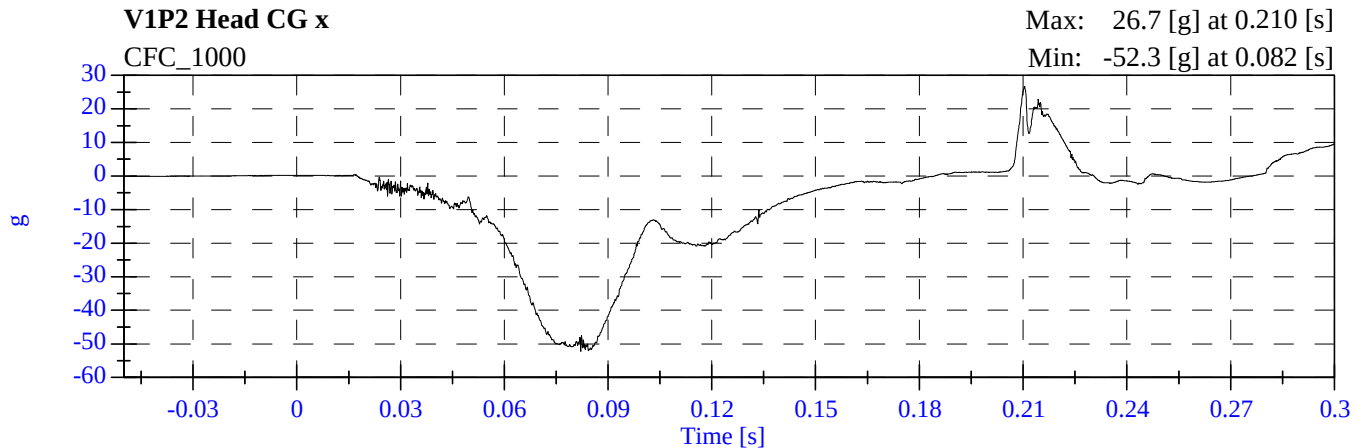
2008 NCAP Test 2 2008 Scion xD
M85113 - September 20, 2007



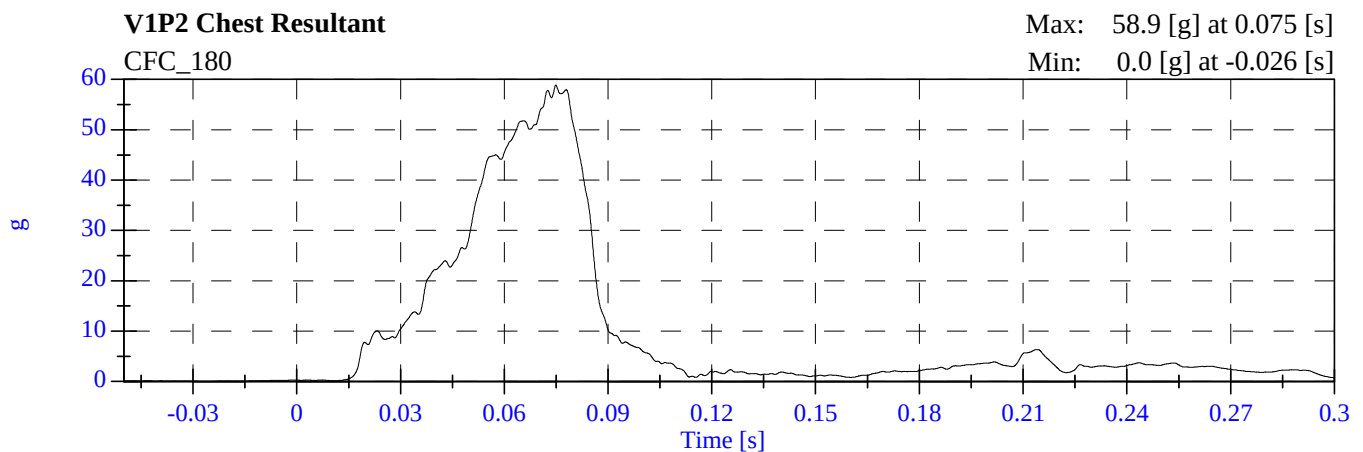
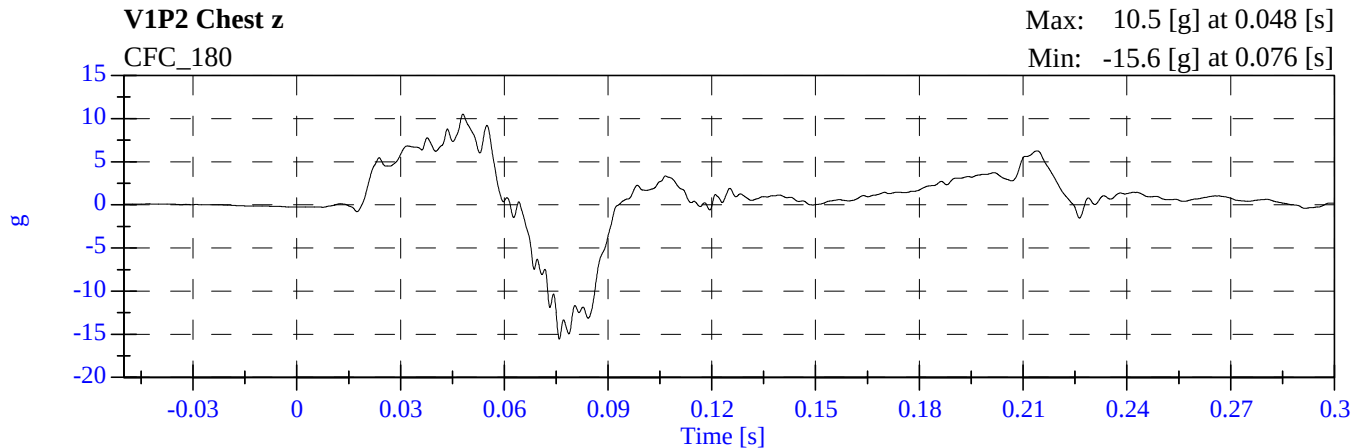
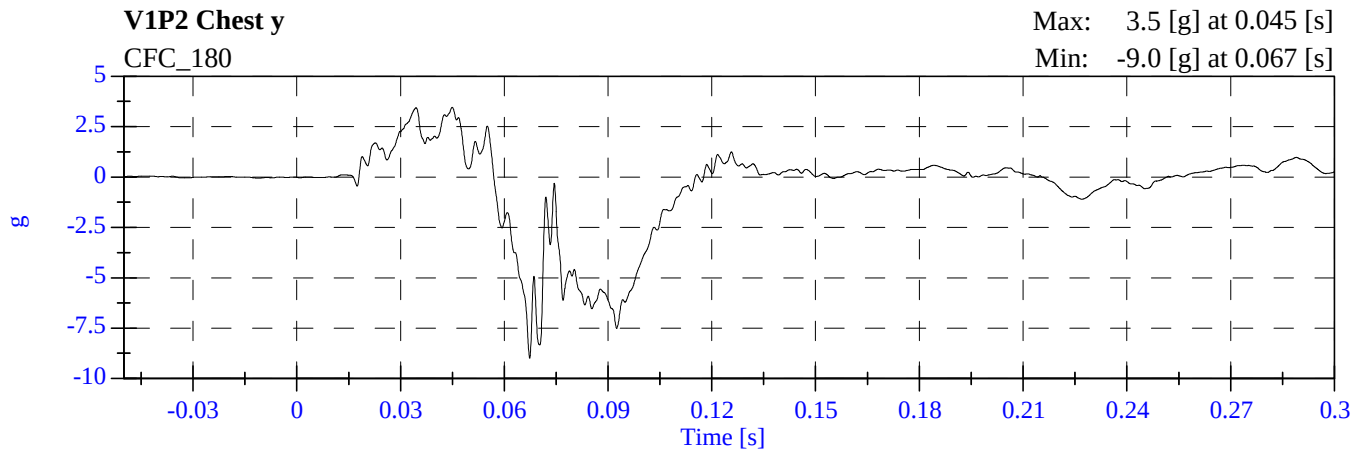
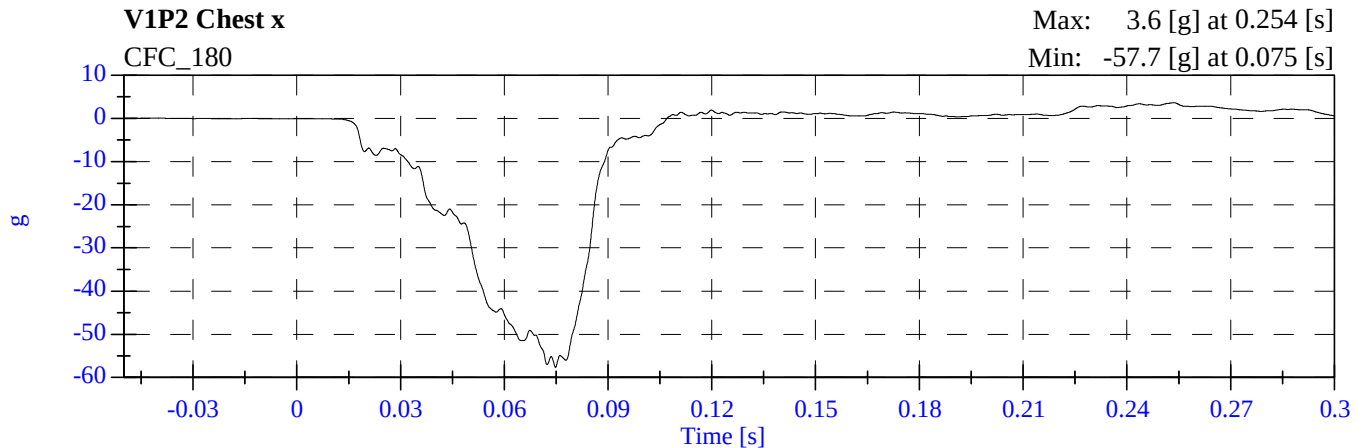
2008 NCAP Test 2 2008 Scion xD
M85113 - September 20, 2007



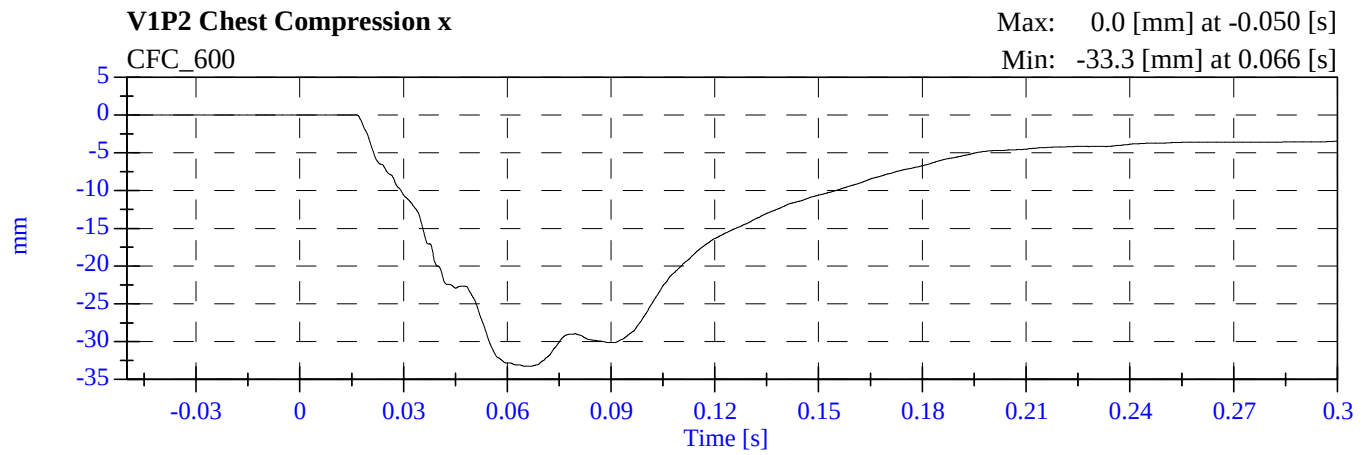
2008 NCAP Test 2 2008 Scion xD M85113 - September 20, 2007



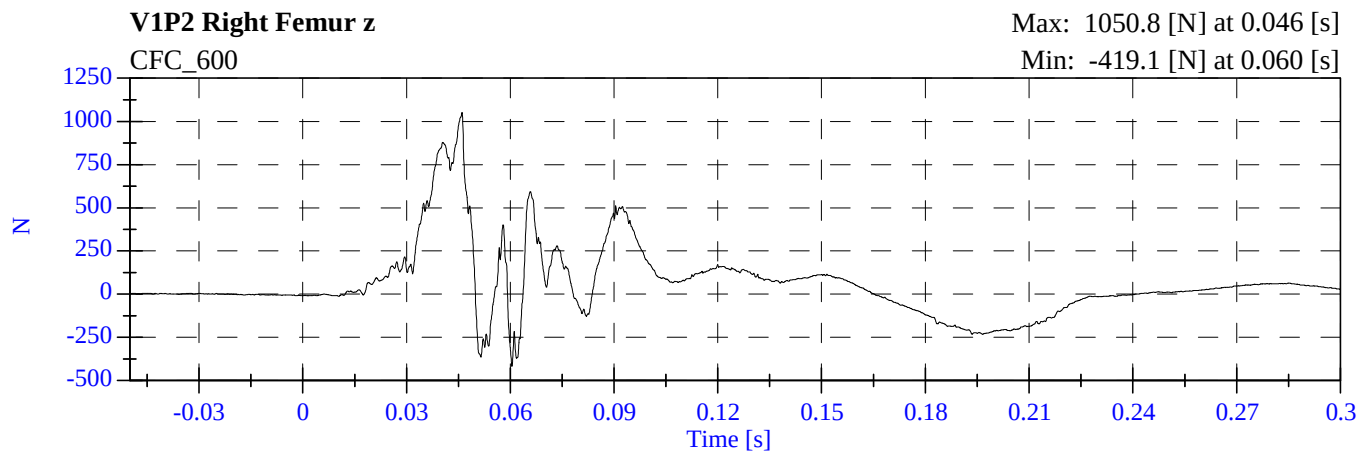
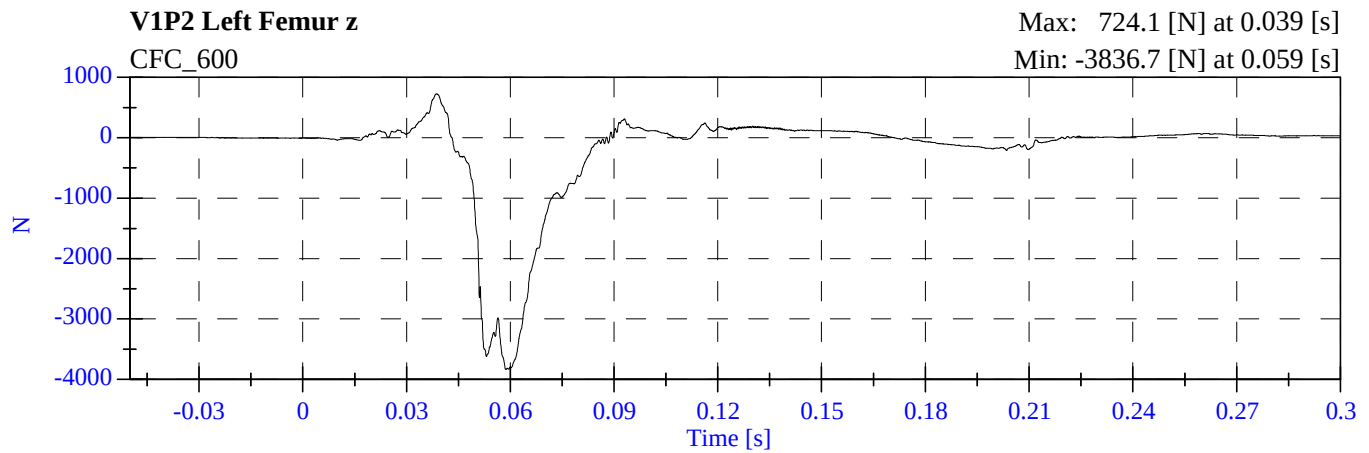
2008 NCAP Test 2 2008 Scion xD M85113 - September 20, 2007



2008 NCAP Test 2 2008 Scion xD
M85113 - September 20, 2007



2008 NCAP Test 2 2008 Scion xD
M85113 - September 20, 2007



APPENDIX C

PART 572E 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.

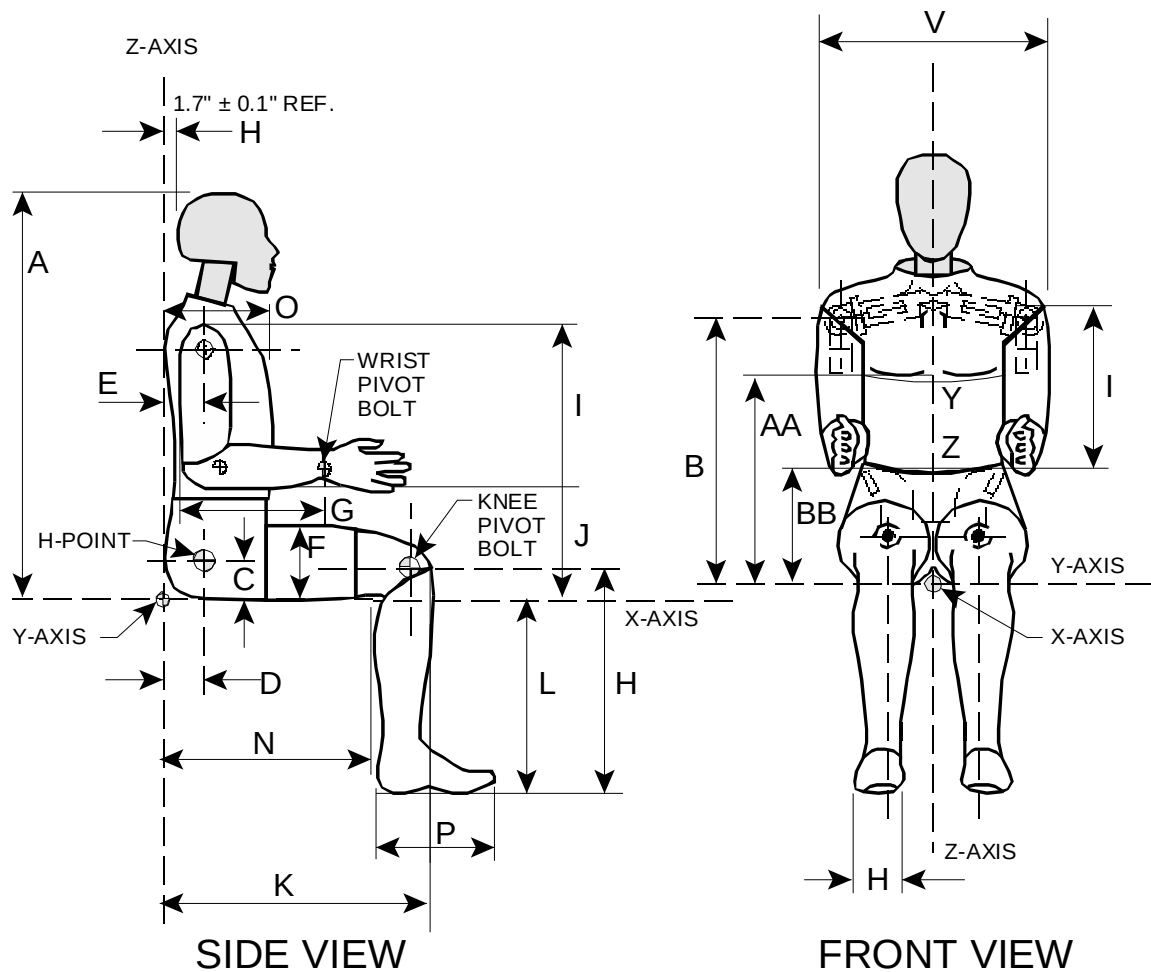
Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	064	8/16/07
#2/Right Front Passenger	061	8/16/07

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 8/6/07
Workfile 064H 08-6-07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	39
Peak Resultant Acceleration	225-275 G's	258.34
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	064	
Sequential Test Number	1	
Date	08/07/07	6 Axis Neck Transducer
Workfile	064NF 08-7-07	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	44.0
Impact Velocity		6.89 – 7.13 m/s	7.00
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.26
	20 ms	17.60 - 22.60 G's	21.57
	30 ms	12.50 - 18.50 G's	16.93
Max Pendulum G's Above 30 ms		29 G's Max	16.93
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.00
D Plane Rotation	Max	64 - 78 Deg	68.68
	Time	57 - 64 ms	59.60
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	94.31
	Time	47 - 58 ms	52.00
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	115.10
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	99.70

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	8/7/07	6 Axis Neck Transducer
Workfile	064NE 8/7/07	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	44.0
Impact Velocity		5.94 – 6.19 m/s	6.08
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.34
	20 ms	14.00 - 19.00 G's	16.51
	30 ms	11.00 - 16.00 G's	13.99
Max Pendulum G's Above 30 ms		22 G's Max	13.99
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	45.00
D Plane Rotation	Max	81 - 106 Deg	95.06
	Time	72 - 82 ms	78.10
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-67.83
	Time	65 - 79 ms	72.70
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	158.50
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	141.50

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 8/9/07
Workfile 064T 8/9/07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	40.0
Pendulum Velocity	6.58 – 6.83 m/s	6.78
Maximum Deflection	63.50 – 72.64 mm	67.27
Maximum Resistive Force	5159.9 – 5893.9 N	5849.23
Internal Hysteresis	69 - 85 %	73.02

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 064
Sequential Test Number 1
Date 8/16/07
Workfile 064LF 064RF 8/16/07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5555.56
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5347.63

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Sequential Test Number 1
Date 8/16/07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			36.0
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 8/6/07
Workfile 061H 08/06/07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	39.0
Peak Resultant Acceleration	225-275 G's	270.53
Peak Lateral Acceleration	15 G's Max	14.86
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	8/15/07	6 Axis Neck Transducer
Workfile	061NF1 08/15/07	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	35.0
Impact Velocity		6.89 – 7.13 m/s	6.98
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.77
	20 ms	17.60 - 22.60 G's	22.31
	30 ms	12.50 - 18.50 G's	18.43
Max Pendulum G's Above 30 ms		29 G's Max	18.43
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	36.70
D Plane Rotation	Max	64 - 78 Deg	69.72
	Time	57 - 64 ms	57.30
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	102.99
	Time	47 - 58 ms	48.60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.20
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.40

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	8/15/07	6 Axis Neck Transducer
Workfile	061NE1 08/15/07	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	35.0
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.86
	20 ms	14.00 - 19.00 G's	17.83
	30 ms	11.00 - 16.00 G's	14.67
Max Pendulum G's Above 30 ms		22 G's Max	14.67
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.70
D Plane Rotation	Max	81 - 106 Deg	95.39
	Time	72 - 82 ms	76.90
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-66.37
	Time	65 - 79 ms	73.20
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	157.70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	138.20

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 08/09/07
Workfile 061T 08/9/07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	39.0
Pendulum Velocity	6.58 – 6.83 m/s	6.72
Maximum Deflection	63.50 – 72.64 mm	67.19
Maximum Resistive Force	5159.9 – 5893.9 N	5797.87
Internal Hysteresis	69 - 85 %	73.53

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 8/16/07
Workfile 061LF 061RF 8/16/07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5202.55
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.1
Relative Humidity	10% - 70%	36.0
Probe Velocity	2.07 – 2.13 m/s	2.13
Peak Knee Impact Force	4715.1 – 5782.7 N	5393.02

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Sequential Test Number 1
Date 8/16/07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			36.0
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	34.70
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	AC-J27517	20-Jun-07	20-Dec-07
	Y	ENDEVCO	AC-AAKB1	20-Jun-07	20-Dec-07
	Z	ENDEVCO	AC-AAK48	20-Jun-07	20-Dec-07
Head	X (R)	ENDEVCO	AC-P16194	20-Jun-07	20-Dec-07
	Y (R)	ENDEVCO	AC-J14688	20-Jun-07	20-Dec-07
	Z (R)	ENDEVCO	AC-P21399	20-Jun-07	20-Dec-07
Neck Load Cell	X	DENTON	LC-1912Fx	22-Jun-07	22-Dec-07
	Y	DENTON	LC-1912Fy	22-Jun-07	22-Dec-07
	Z	DENTON	LC-1912Fz	22-Jun-07	22-Dec-07
Neck Moment	X	DENTON	LC-1912Mx	22-Jun-07	22-Dec-07
	Y	DENTON	LC-1912My	22-Jun-07	22-Dec-07
	Z	DENTON	LC-1912Mz	22-Jun-07	22-Dec-07
Chest	X	ENDEVCO	AC-J23946	21-Jun-07	21-Dec-07
	Y	ENDEVCO	AC-AGAC4	21-Jun-07	21-Dec-07
	Z	ENDEVCO	AC-P16225	21-Jun-07	21-Dec-07
Chest	X (R)	ENTRAN	AC-M20	21-Jun-07	21-Dec-07
	Y (R)	ENDEVCO	AC-P15638	21-Jun-07	21-Dec-07
	Z (R)	ENDEVCO	AC-P16517	21-Jun-07	21-Dec-07
Chest Deflection	X	SERVO	DS-064	25-Jun-07	25-Dec-07
Pelvic	X	ENDEVCO	AC-AJ5R0	21-Jun-07	21-Dec-07
	Y	ENDEVCO	AC-J22036	21-Jun-07	21-Dec-07
	Z	ENDEVCO	AC-P32204	20-Jun-07	20-Dec-07

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	LC-1525	25-Jun-07	25-Dec-07
Right Femur Load Cell	Fz	DENTON	LC-1526	25-Jun-07	25-Dec-07
Left Upper Tibia	Mx	DENTON	LC-404Mx	19-Jul-07	18-Jan-08
	My	DENTON	LC-404My	19-Jul-07	18-Jan-08
Left Lower Tibia	Fz	DENTON	LC-396Fz	19-Jul-07	18-Jan-08
	Mx	DENTON	LC-396Mx	19-Jul-07	18-Jan-08
	My	DENTON	LC-396My	19-Jul-07	18-Jan-08
Right Upper Tibia	Mx	DENTON	LC-374Mx	20-Jul-07	19-Jan-08
	My	DENTON	LC-374My	20-Jul-07	19-Jan-08
Right Lower Tibia	Fz	DENTON	LC-372Fz	20-Jul-07	19-Jan-08
	Mx	DENTON	LC-372Mx	20-Jul-07	19-Jan-08
	My	DENTON	LC-372My	20-Jul-07	19-Jan-08
Left Foot Rear	X	ENDEVCO	AC-J33376	25-Jun-07	25-Dec-07
	Z	ENDEVCO	AC-P16899	25-Jun-07	25-Dec-07
Left Foot Front	Z	ENDEVCO	AC-P17912	25-Jun-07	25-Dec-07
Right Foot Rear	X	ENDEVCO	AC-J20209	25-Jun-07	25-Dec-07
	Z	ENDEVCO	AC-J14234	25-Jun-07	25-Dec-07
Right Foot Front	Z	ENDEVCO	AC-J14669	25-Jun-07	25-Dec-07
Lap Belt Load Cell		First Technology	LC-156	07-Sep-07	08-Mar-08
Shoulder Belt Load Cell		First Technology	LC-159	07-Sep-07	08-Mar-08

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-J20018	22-Jun-07	22-Dec-07
	Y	ENDEVCO	AC-P16755	22-Jun-07	22-Dec-07
	Z	ENDEVCO	AC-J14667	22-Jun-07	22-Dec-07
Head	X (R)	ENDEVCO	AC-J38127	22-Jun-07	22-Dec-07
	Y (R)	ENDEVCO	AC-ACCD0	18-Sep-07	19-Mar-08
	Z (R)	ENDEVCO	AC-CC92H	18-Sep-07	19-Mar-08
Neck Load Cell	X	DENTON	LC-1916Fx	22-Jun-07	22-Dec-07
	Y	DENTON	LC-1916Fy	22-Jun-07	22-Dec-07
	Z	DENTON	LC-1916Fz	22-Jun-07	22-Dec-07
Neck Moment	X	DENTON	LC-1916Mx	22-Jun-07	22-Dec-07
	Y	DENTON	LC-1916My	22-Jun-07	22-Dec-07
	Z	DENTON	LC-1916Mz	22-Jun-07	22-Dec-07
Chest	X	ENDEVCO	AC-AAKC6	22-Jun-07	22-Dec-07
	Y	ENDEVCO	AC-AAKD0	22-Jun-07	22-Dec-07
	Z	ENDEVCO	AC-J27470	22-Jun-07	22-Dec-07
Chest	X (R)	ENDEVCO	AC-J21988	22-Jun-07	22-Dec-07
	Y (R)	ENDEVCO	AC-J20027	22-Jun-07	22-Dec-07
	Z (R)	ENDEVCO	AC-J36741	22-Jun-07	22-Dec-07
Chest Deflection	X	SERVO	DS-061	25-Jun-07	25-Dec-07
Pelvic	X	ENTRAN	AC-99H30-Z13	21-Jun-07	21-Dec-07
	Y	ENTRAN	AC-01G18-F14	21-Jun-07	21-Dec-07
	Z	ENTRAN	AC-02I02I05-F06	21-Jun-07	21-Dec-07

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	LC-1532	25-Jun-07	25-Dec-07
Right Femur Load Cell	Fz	DENTON	LC-1533	25-Jun-07	25-Dec-07
Left Upper Tibia	Mx	DENTON	LC-93Mx	20-Jul-07	19-Jan-08
	My	DENTON	LC-93My	26-Jun-07	26-Dec-07
Left Lower Tibia	Fz	DENTON	LC-093Fz	20-Jul-07	19-Jan-08
	Mx	DENTON	LC-093Mx	20-Jul-07	19-Jan-08
	My	DENTON	LC-093My	20-Jul-07	19-Jan-08
Right Upper Tibia	Mx	DENTON	LC-115Mx	27-Jul-07	26-Jan-08
	My	DENTON	LC-115My	27-Jul-07	26-Jan-08
Right Lower Tibia	Fz	DENTON	LC-116Fz	27-Jul-07	26-Jan-08
	Mx	DENTON	LC-116Mx	27-Jul-07	26-Jan-08
	My	DENTON	LC-116My	27-Jul-07	26-Jan-08
Left Foot Rear	X	ENDEVCO	AC-J18662	25-Jun-07	25-Dec-07
	Z	ENDEVCO	AC-J19927	25-Jun-07	25-Dec-07
Left Foot Front	Z	ENDEVCO	AC-J20030	25-Jun-07	25-Dec-07
Right Foot Rear	X	ENDEVCO	AC-J14190	18-Sep-07	19-Mar-08
	Z	ENDEVCO	AC-J19440	25-Jun-07	25-Dec-07
Right Foot Front	Z	ENDEVCO	AC-J20382	25-Jun-07	25-Dec-07
Lap Belt Load Cell		First Technology	LC-173	07-Sep-07	08-Mar-08
Shoulder Belt Load Cell		First Technology	LC-178	07-Sep-07	08-Mar-08

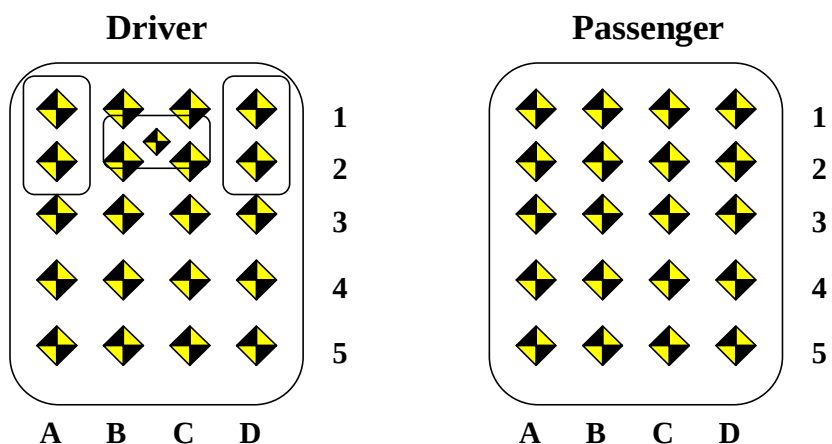
INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-FA2471	21-Apr-07	21-Oct-07
Right Rear Seat Crossmember X	ICS	AC-FA2490	21-Apr-07	21-Oct-07
Top of Engine	GS SENSORS	AC-9440-006	25-Apr-07	25-Oct-07
Bottom of Engine	ICS	AC-FA2481	21-Apr-07	21-Oct-07
Right Disc Brake Caliper	ICS	AC-FA2488	21-Apr-07	21-Oct-07
Left Disc Brake Caliper	ICS	AC-FA2485	08-Aug-07	07-Feb-08
Left Seat Rear Crossmember Z	ICS	AC-FA2493	25-Apr-07	25-Oct-07
Right Seat Rear Crossmember Z	ICS	AC-FA2491	21-Apr-07	21-Oct-07

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

DRIVER SIDE INTRUSION MEASUREMENTS



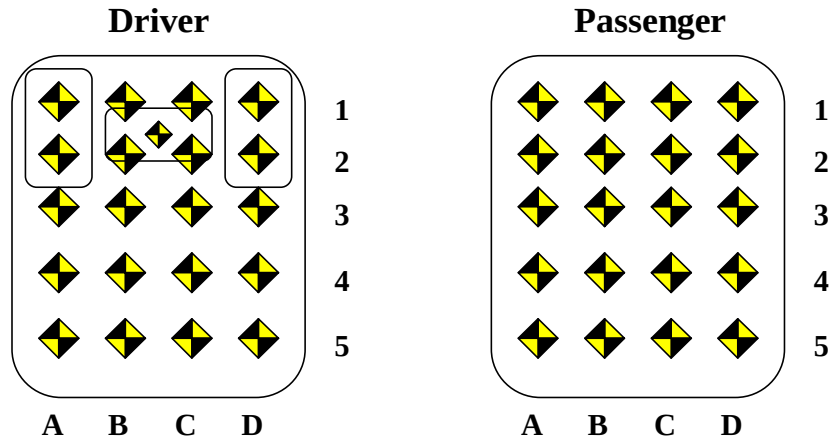
Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	2747	-566	433	2742	-571	442	5	5	-9
B1	2866	-429	436	2837	-416	469	29	-13	-33
C1	2871	-292	437	2817	-298	482	54	6	-45
D1	2872	-150	434	2824	-158	461	48	8	-27
A2	2710	-571	384	2707	-571	388	3	0	-4
B2	2770	-431	377	2763	-425	403	7	-6	-26
C2	2771	-288	381	2748	-289	407	23	1	-26
D2	2801	-151	378	2738	-153	381	63	2	-3
A3	2665	-572	327	2668	-577	333	-3	5	-6
B3	2669	-430	328	2667	-432	331	2	2	-3
C3	2667	-291	329	2664	-292	327	3	1	2
D3	2672	-154	318	2670	-155	312	2	1	6
A4	2597	-569	313	2601	-575	317	-4	6	-4
B4	2596	-429	317	2600	-432	318	-4	3	-1
C4	2597	-290	319	2598	-293	313	-1	3	6
D4	2600	-149	315	2600	-155	307	0	6	8
A5	2526	-567	318	2528	-570	324	-2	3	-6
B5	2528	-426	322	2529	-431	326	-1	5	-4
C5	2529	-289	321	2530	-296	324	-1	7	-3
D5	2534	-151	339	2535	-161	326	-1	10	13
BP	2741	-302	486	2791	-322	459	-50	20	27
G	2531	-467	760	2537	-468	760	-6	1	0
H	2525	-165	755	2543	-167	760	-18	2	-5
L	2299	-318	1003	2369	-312	993	-70	-6	10
AB	2203	-592	398	2203	-594	390	0	2	8

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	2830	153	454	2827	165	470	3	-12	-16
B1	2842	292	454	2824	295	470	18	-3	-16
C1	2832	433	451	2817	434	473	15	-1	-22
D1	2768	572	452	2761	577	456	7	-5	-4
A2	2746	153	395	2740	161	397	6	-8	-2
B2	2749	293	396	2740	292	399	9	1	-3
C2	2741	434	392	2735	435	399	6	-1	-7
D2	2739	574	393	2734	575	398	5	-1	-5
A3	2655	155	338	2654	159	333	1	-4	5
B3	2658	292	340	2656	294	339	2	-2	1
C3	2662	438	342	2659	439	342	3	-1	0
D3	2665	573	346	2658	576	344	7	-3	2
A4	2596	157	324	2594	157	314	2	0	10
B4	2597	291	324	2596	296	320	1	-5	4
C4	2601	438	326	2599	437	323	2	1	3
D4	2605	575	325	2608	578	327	-3	-3	-2
A5	2526	159	320	2525	164	304	1	-5	16
B5	2531	294	322	2526	298	321	5	-4	1
C5	2535	437	322	2533	440	322	2	-3	0
D5	2538	571	321	2542	578	324	-4	-7	-3
R	2545	248	766	2546	247	770	-1	1	-4
S	2561	549	762	2604	544	786	-43	5	-24
AB	2203	594	402	2202	596	396	1	-2	6

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

AB = Front outboard seat anchor bolt