REPORT NUMBER: CAL-07-07

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

KIA MOTORS CORPORATION
2007 KIA RONDO
FIVE DOOR WAGON

NHTSA NUMBER: M70504

CALSPAN TEST NUMBER: 8806-NCAP-07

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

December 19, 2006

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code: NVS-111
400 Seventh Street, SW, Room No. 5311
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9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-06-D-00024
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh, SW, Room 5311 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report December, 2006 *14. Sponsoring Agency Code* NVS-111

15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 2007 Kia Rondo Five Door Wagon was performed at Calspan Corporation's crash test facility in Buffalo, New York, on December 19, 2006.

The impact velocity was 55.84 kph and the temperature at the barrier face was 20°C. The maximum post-test vehicle crush was 436 mm. The test vehicle was equipped with 3-point restraint systems with torso belt pretensioners and force limiters, knee bolsters, adjustable 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 (061)**	**Passenger (064)**
Head Injury Criteria (HIC - 36 ms)	-	1000	500.8	306.4
Maximum Thorax Acceleration (3 ms Clip)	g's	60 g's	40.4	36.9
Chest Displacement	mm	-76 mm	-33.2	-33.4
Left Femur Force	Newtons	-10000 N	-5241.1	-3407.8
Right Femur Force	Newtons	-10000 N	-3905.0	-4638.6

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 55.84 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 55.84 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 55.84 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 14 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. 061) and the right-front passenger (position 2) ATD (Serial No.064) were calibrated two tests (M75304 and M70507) previous to this test where they did not exceed FMVSS 208 head, chest or 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 130 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 Kia Rondo Five Door Wagon at a velocity of 55.84 kph. The test was performed at Calspan on December 19, 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	500.8	61.3	97.3	40.4	58.7	61.7	-33.2	-5241.1	-3905.0
Passenger	306.4	76.5	112.5	36.9	74.5	77.5	-33.4	-3407.8	-4638.6

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

TEST NOTES	
Data Channel	Anomalies
V1P1 Left Lower Tibia Mx	Questionable Data
V1P1 Left Foot Aft z	Channel Opened at 48 ms
Barrier Load Cell A1 Fx	Did Not Record
Barrier Load Cell A9 Fx	Did Not Record
Barrier Load Cell B1 Fx	Did Not Record
Barrier Load Cell B2 Fx	Did Not Record
Barrier Load Cell B5 Fx	Did Not Record
Barrier Load Cell B9 Fx	Did Not Record
Barrier Load Cell C1 Fx	Did Not Record
Barrier Load Cell C9 Fx	Did Not Record
Barrier Load Cell D1 Fx	Did Not Record
Barrier Load Cell D2 Fx	Did Not Record
Barrier Load Cell D5 Fx	Did Not Record
Barrier Load Cell D6 Fx	Did Not Record
Barrier Load Cell D7 Fx	Did Not Record
Barrier Load Cell D8 Fx	Did Not Record
Barrier Load Cell D9 Fx	Did Not Record

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: M70504 Test Mode: 56.3 kph Frontal Barrier
Test Date: December 19, 2006 Time: 13:10 Temperature: 20 °C
Vehicle Make/Model/Body Style: 2007 Kia Rondo Five Door Wagon
Vehicle Test Weight: 1751.0 kg Impact Velocity: 55.84 kph (55.5 – 57.1 kph)
Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 436 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 force limiter, airbag, knee bolster and adjustable head restraint	Three point safety belt with torso belt pretensioner and force limiter, airbag, knee bolster and adjustable head restraint
Head Contact:	The face to the center of the airbag and the back of the head to the left of the center of the head restraint	The face to the top center of the airbag and the back of the head to the center of the head restraint
Abdomen Contact:	-	-
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee Bolster	Knee Bolster
Right Knee Contact:	Knee Bolster	Knee Bolster

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed, 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	-	Closed, latched and operable without tools
Front Seat Track Shift (mm)	0	0
Front Seat Back Failure	None	None
Glazing Damage	The windshield cracked during contact from the passenger airbag cover.	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	805	737	754	765

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	850	875
Lap belt length as measured on ATD	mm	860	700
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	1710	1575

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2007 Kia Rondo Five Door Wagon

NHTSA No. : M70504 ; VIN: KNAFG525677025835 ; Color: Black

Engine Data: 4 cylinders; - CID; 2.4 Liters; - cc

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

Transmission Data: 4 speeds; - Manual; X Automatic; X 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: 12/1/2006 ; Odometer Reading 103 km

Selling Dealer: West-Herr Kia

Dealer Address: 5140 Camp Road Hamburg, NY 14075

TEST VEHICLE OPTIONS:

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

X ABS; X Tilt Wheel; X Stability Control X 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:	-	-	-	-	X

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Kia Motors Corporation

Date of Manufacture 09/06

GVWR: 2030 kg; GAWR: 1140 kg FRONT; 1180 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) = 375.0 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 34.8 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 =	458.5	467.0	58.9	925.5
Rear =	335.0	309.5	41.1	644.5
			Total Delivered Weight (UDW) =	1570.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	1570.0	kg
Rated Cargo/Luggage Weight (RCLW) =	34.8	kg
Weight of 2 p.572 Dummies @ 76 each =	152	kg
TARGET TEST WEIGHT =	1756.8	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 29.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	498.0	508.0	57.5	1006.0
Rear =	386.0	359.0	42.5	745.0
			Total Vehicle Test Weight (ATW) =	1751.0

Weight of Ballast Secured in Vehicle Trunk Area[1] = 0 kg

Vehicle Components Removed for Weight Reduction: Spare tire, rear head restraints, rear floor mats, jack.

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG[2]
AS DELIVERED:	705	708	700	705	1111.7
FULLY LOADED:	694	695	680	685	-
AS TESTED:	697	698	681	687	1152.2

Vehicle's Wheel Base: 2708 mm

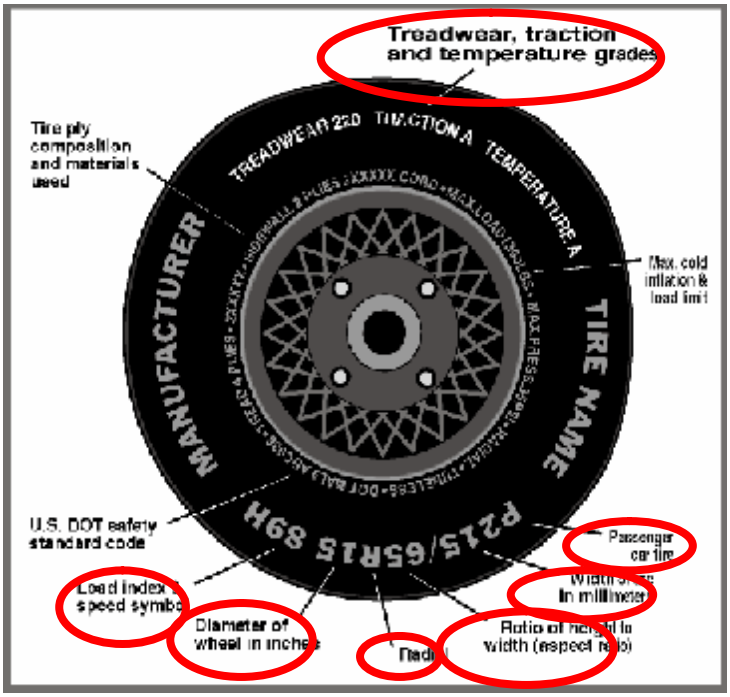
[1]Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

[2]Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2007 Kia Rondo Five Door Wagon

NHTSA Test No.: M70504 Test Date: December 19, 2006



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	300	300
Cold Pressure (from tire placard - kPa)*	220	220
Recommended Tire Size (from tire placard)	P205/60R16	P205/60R16
Tire size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Hankook	Hankook
Tire Name	Optimo H418	Optimo H418
Tire Type	Passenger	Passenger
Tire Width (mm)	205	205
Ratio of Height to Width (aspect ratio)	60	60
Radial	Yes	Yes
Wheel Diameter	16	16
Load Index & Speed Symbol	91S	91S
Treadwear	400	400
Traction Grade	A	A
Temperature Grade	A	A

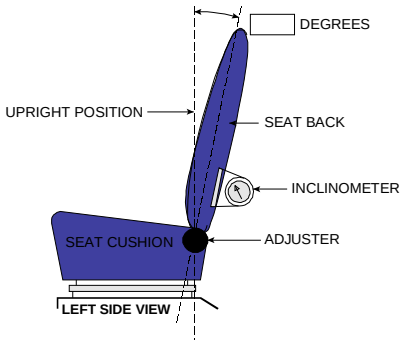
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2007 Vehicle Model: Kia Rondo Body Style : Five 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.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 22°

Measurement instructions: The seatback is placed in detent 9 from the full forward position. The resulting torso angle is 22° which gave an angle of 3.5° on the outboard head restraint post.

Seat back angle for passenger's seat: 22°

Measurement instructions: The same as the driver's seat.

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: The seat has a total travel of 268 mm. The test position is 134 mm forward of full rearward position. This results in the seat track being positioned in detent 11 of 0-24 detents.

Positioning of the passenger's seat: The seat travel is 240 mm. The test position is 120 mm from the full rearward position. This results in the seat track being positioned in detent 12 of 0-24 detents.

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 60 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 = 55.2 to 56.4 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 56.0 liters

3.3 One-Third of Useable Capacity = 20.0 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.
When the ignition is turned to the 'ON' position for a few seconds and while the engine is running.

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 is adjustable from 24.4° to 30°. The test position is mid-angle 27.2°.

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: There are 5 detents numbered 0 (top) to 4. The test position is detent 2.

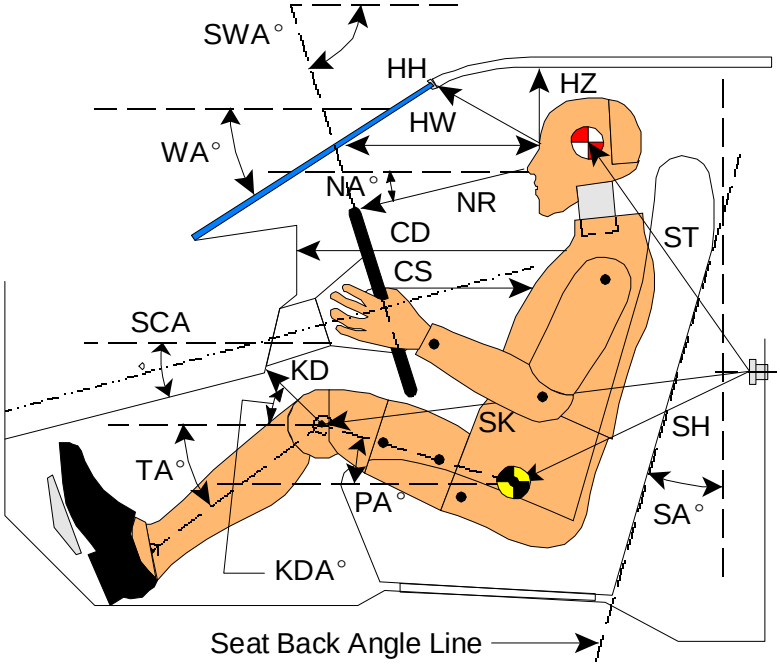
6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? - Yes; X No;

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

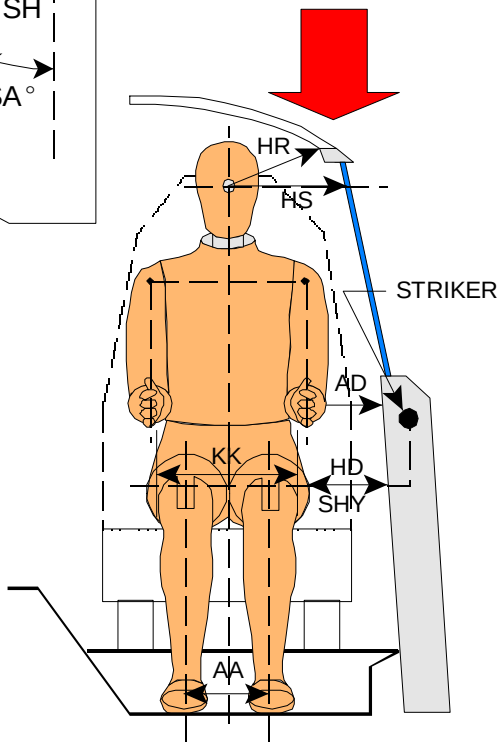
Comments: Test vehicle was not equipped with automatic door locks

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

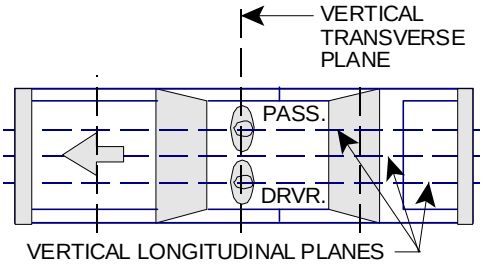
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
AA - Ankle to Ankle
SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



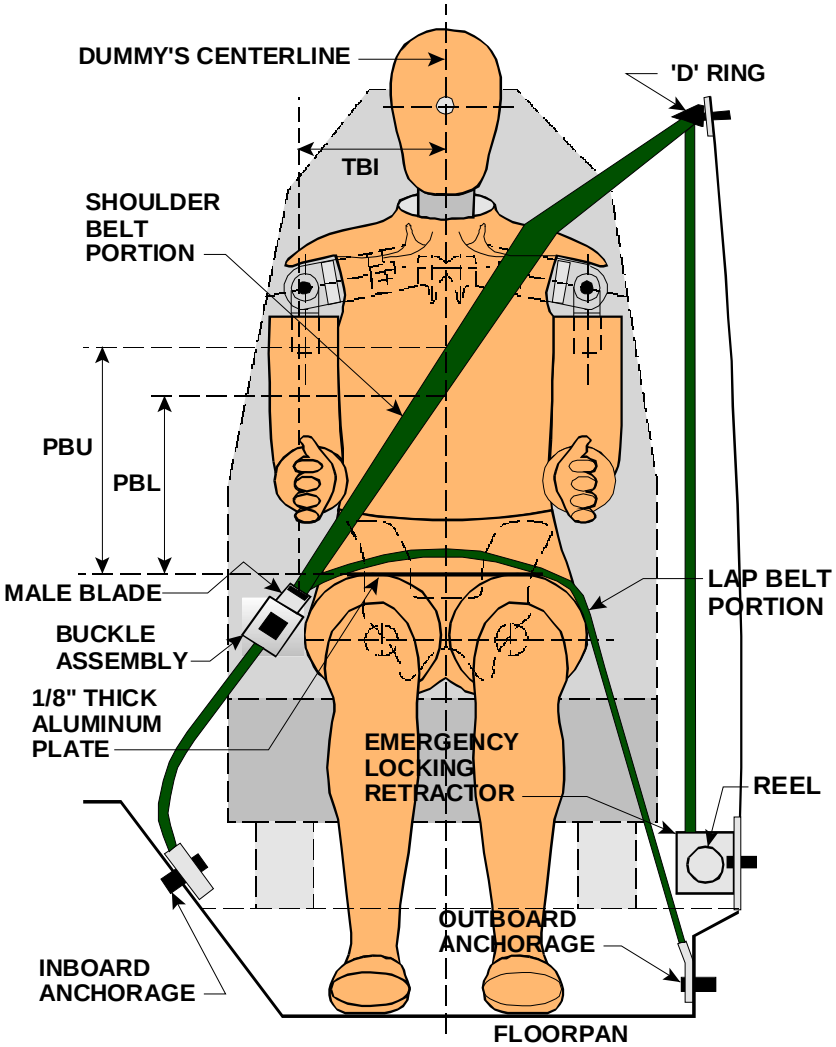
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA^O	29.0 deg.			N/A		
SWA^O	62.8 deg.			N/A		
SCA^O	27.2 deg.			N/A		
SA^O	22 deg.			22 deg.		
HZ	218			205		
HH	360			345		
HW	625			633		
HR	225			216		
NR	410	Angle	15 deg.	N/A		
CD	535			548		
CS	292			N/A		
RA	188			N/A		
KDL	140	Angle (KDA)	30 deg.	112		
KDR	150			118	Angle (KDA)	41 deg.
PA^O	22.0 deg.			23.2 deg.		
TA^O	60.0 deg.			47.9 deg.		
KK	310			268		
AA	300			225		
ST	550	Angle	9 deg.	558	Angle	5 deg.
SK	588	Angle	91 deg.	591	Angle	93 deg.
SH	243	Angle	112 deg.	228	Angle	117 deg.
SHY	234			225		
HS	308			302		
HD	150			155		
AD	115			125		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

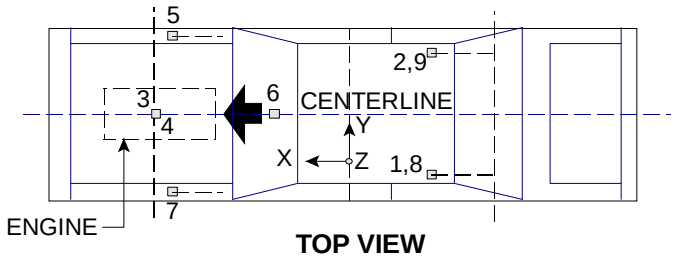


FRONT VIEW OF DUMMY

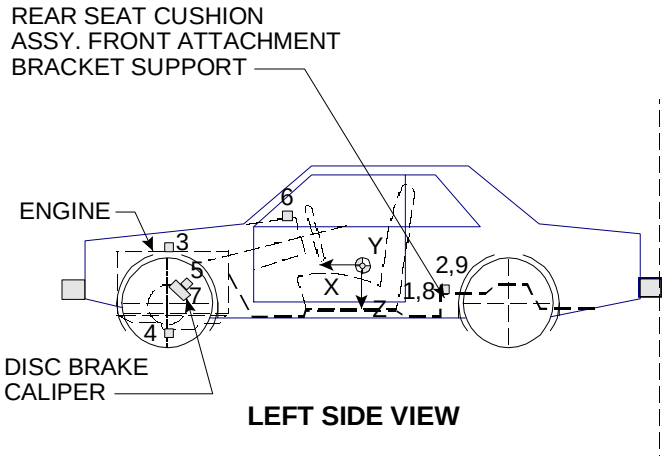
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	320	330
PBL-- Top surface of alum. plate to belt lower edge	240	250
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

VEHICLE ACCELEROMETER LOCATIONS



TOP VIEW



LEFT SIDE VIEW

		PRE-TEST LENGTH (mm)		
No.	LOCATION	X	Y	Z
1	Left Rear Seat Cross Member X	1429	-636	396
2	Right Rear Seat Cross Member X	1434	651	398
3	Top of Engine Block	3796	-12	836
4	Bottom of Engine	3716	189	241
5	Disc Brake Caliper @ Right Side	3603	649	319
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3604	-655	318
8	Left Rear Seat Cross Member Z	1429	-636	396
9	Right Rear Seat Cross Member Z	1434	651	398

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.

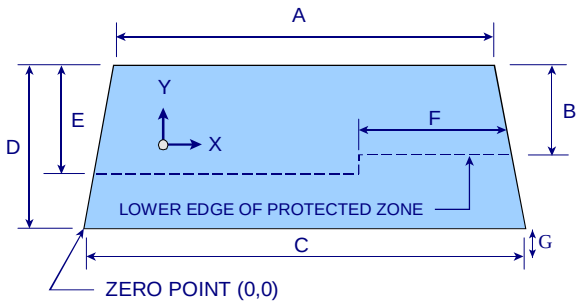
FMVSS 212 REQUIREMENTS:

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: 20ºC.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2190.0	2190.0	100.0%
LEFT SIDE	2190.0	2190.0	100.0%
TOTAL	4380	4380	100.0%



FRONT VIEW OF WINDSHIELD

DIMENSIONS (mm)	
A	1160
B	570
C	1480
D	870
E	570
F	520
G	20

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.: M70504 TEST DATE: December 19, 2006

VEHICLE MAKE/MODEL: 2007 Kia Rondo Five Door Wagon

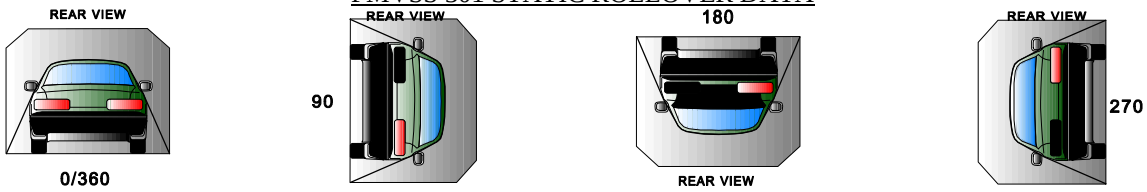
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

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

FMVSS 301 STATIC ROLLOVER DATA



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	
0º - 90º	1	minutes	06	seconds	5	minutes	6	minutes	6	seconds	7	minutes
90º - 180º	1	minutes	07	seconds	5	minutes	6	minutes	7	seconds	7	minutes
180º-270º	1	minutes	01	seconds	5	minutes	6	minutes	1	seconds	7	minutes
270º-360º	1	minutes	12	seconds	5	minutes	6	minutes	12	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:

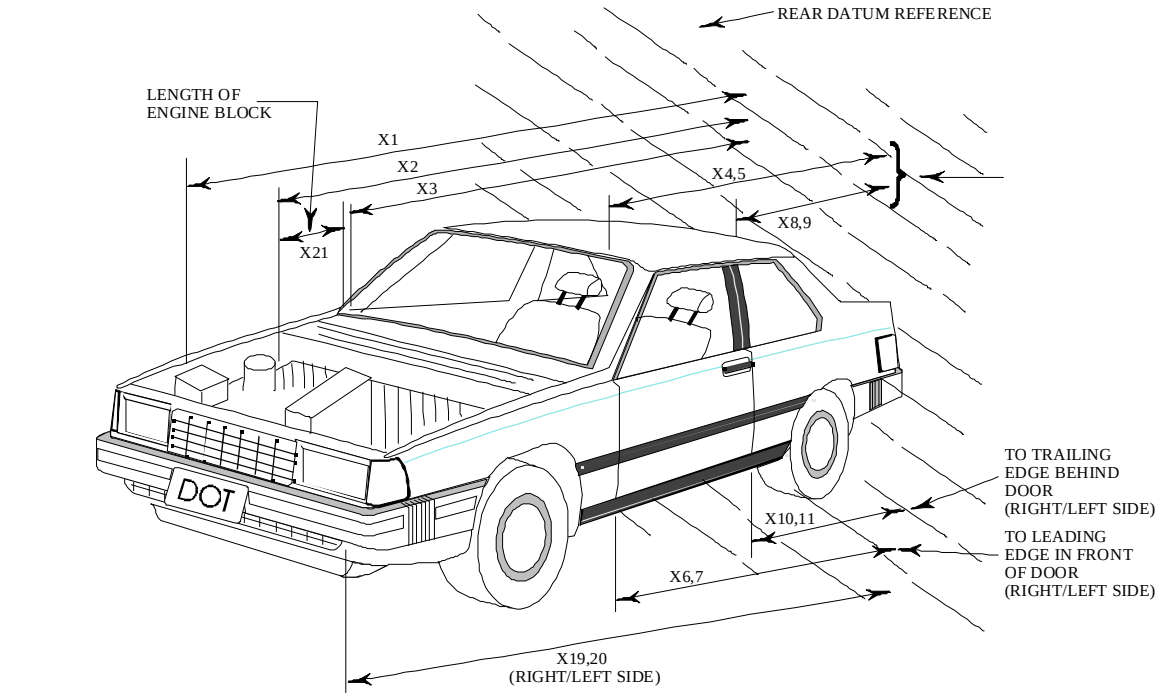
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0º - 90º	0	0	0	N/A
90º - 180º	0	0	0	N/A
180º-270º	0	0	0	N/A
270º-360º	0	0	0	N/A

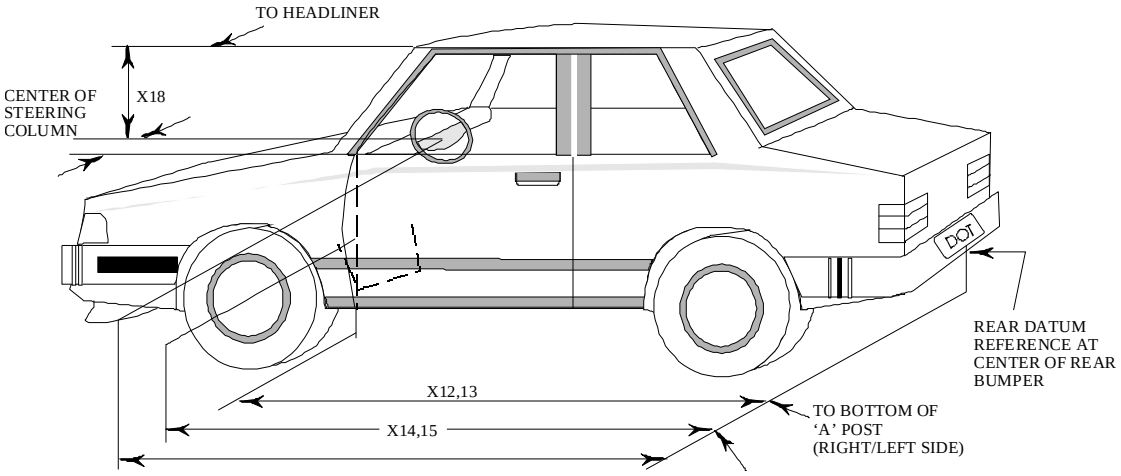
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS





DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: M70504 TEST DATE: December 19, 2006

VEHICLE MAKE/MODEL: 2007 Kia Rondo Five Door Wagon

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4549	4123	426
X2	Rear Surface of Vehicle to Front of Engine	4100	3839	261
X3	Rear Surface of Vehicle to Firewall	3661	3616	45
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3094	3093	1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3092	3093	-1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3098	3096	2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3095	3097	-2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2101	2100	1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2100	2101	-1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2125	2125	0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2123	2127	-4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3292	3291	1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3291	3291	0
X14	Rear Surface of Vehicle to Firewall, Right Side	3680	3619	61
X15	Rear Surface of Vehicle to Firewall, Left Side	3680	3558	122
X16	Rear Surface of Vehicle to Steering Column	2715	2731	-16
X17	Center of Steering Column to "A" Post	354	356	-2
X18	Center of Steering Column to Headliner	468	465	3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4481	4045	436
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4480	4103	377
X21	Length of Engine Block	456	456	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2891	2887	4
CD	Rear Surface of Vehicle to Center of Dash Panel	2996	2989	7
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2888	2887	1

All Dimensions in mm

DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

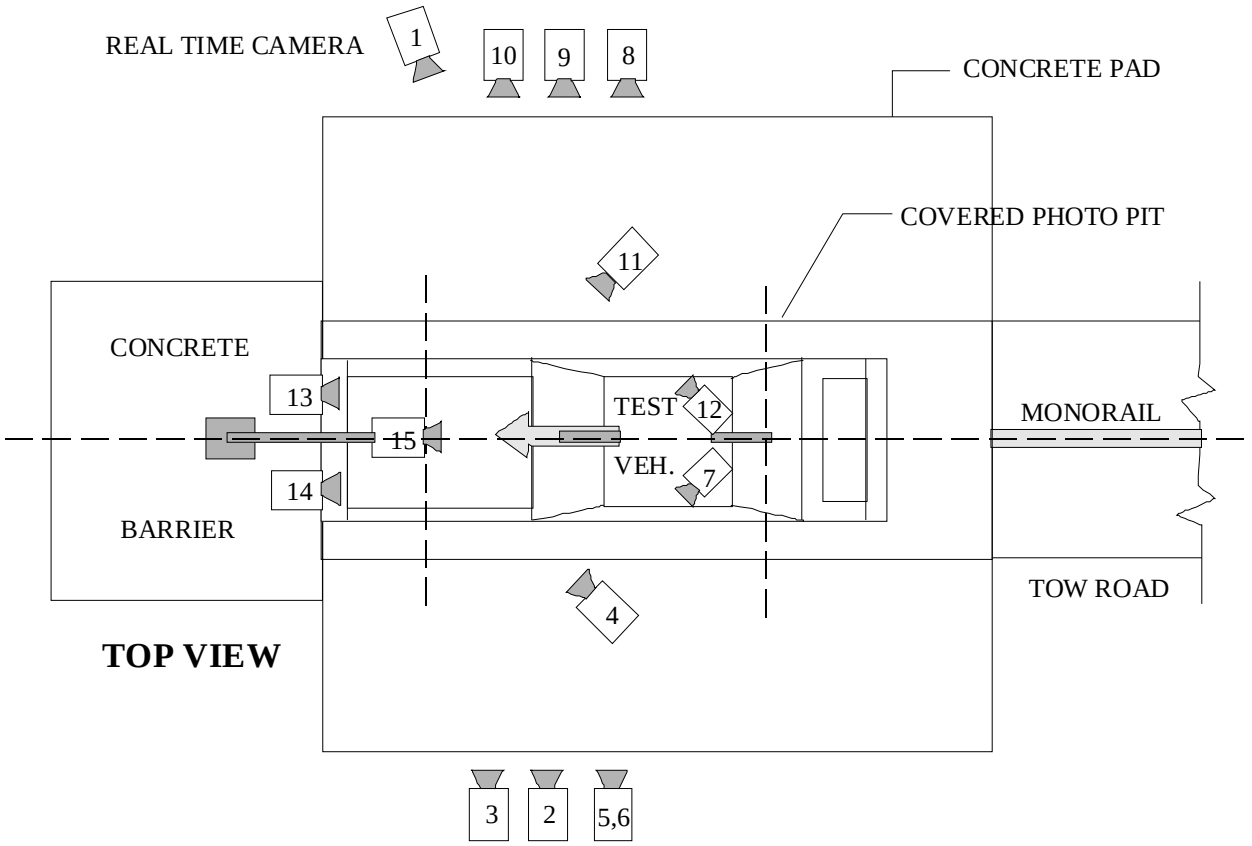
NHTSA TEST No.: M70504 TEST DATE: December 19, 2006

VEHICLE MAKE/MODEL: 2007 Kia Rondo Five Door Wagon

TARGET VEHICLE STRUCTURAL MEASUREMENTS

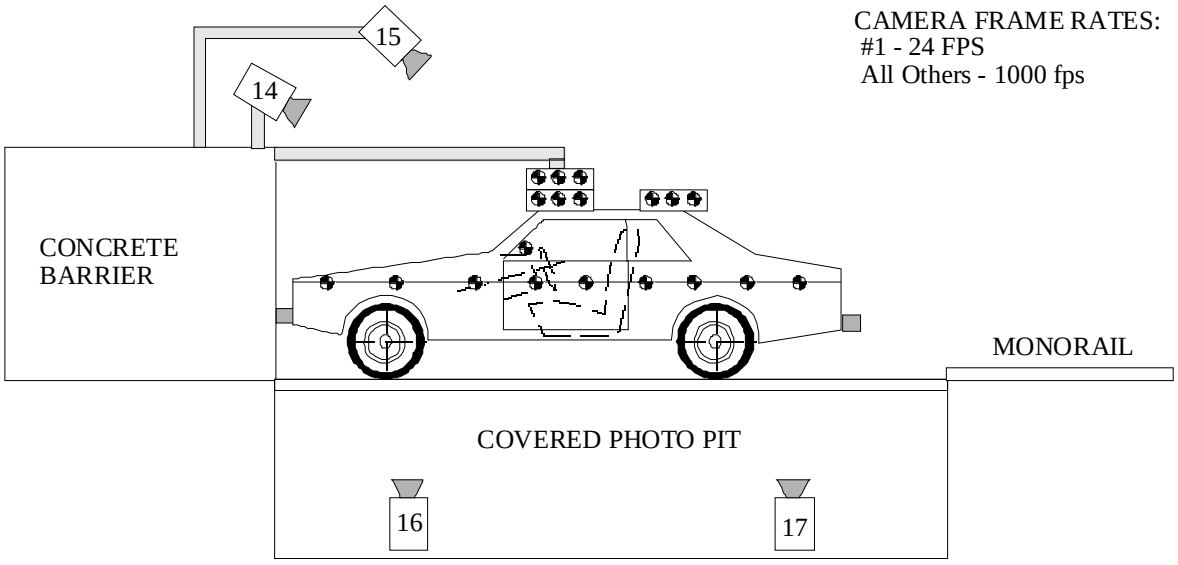
	Elements	Pre-Test (mm)
1	Total length	4549
2	Total Width	1805
3	Bumper Top Height	584
4	Bumper Bottom Height	420
5	Longitudinal Member Top Height	536
6	Distance Between Longitudinal Members	1090
7	Longitudinal Member Width	77
8	Engine top height	867
9	Engine bottom height	175
10	Engine and gearbox width	685
11	Front bumper-engine distance	449
12	Front shock absorber fixing height	878
13	Bonnet leading edge height	792
14	Front shock absorber fixing width	1178
15	Front bumper – front axle distance	933
16	Front axle – A pillar distance	1023
17	A-pillar – B pillar distance	425
18	B-pillar – rear axle distance	1261
19	B-pillar – C Pillar distance	1089
20	Roof sill bottom height	1503
21	Roof sill top height	1599
22	Floor sill bottom height	208
23	Floor sill top height	333

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



TOP VIEW

CAMERA FRAME RATES:
#1 - 24 FPS
All Others - 1000 fps



LEFT SIDE VIEW

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

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)* X	Y	Z	ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	30
2	Overall Left Side	6897	1528	1087	-3	6432	24	1000
3	Left Side View	9267	730	1012	-3	8802	50	1000
4	Driver and Interior View	9739	2637	2060	-11	-	50	500
5	Steering Column (Bottom)	8264	1840	1206	-4	7799	24-70	1000
6	Steering Column (Top)	8264	1840	1820	-6	7799	28-70	1000
8	Overall Right Side	6725	1625	993	-5	4492	24	500
9	Right Side View	4957	1435	1016	-3	6922	28	1000
10	Right Passenger View	7387	2182	1306	-3	7797	52	1000
11	Passenger and Interior View	8262	1680	2009	-9	-	52	500
13	Passenger Front View	620	-92	1987	-39	-	28	500
14	Driver Front View	620	-92	1987	-32	-	28	500
15	Windshield View	0	-530	3374	-51	-	20	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	3135	-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

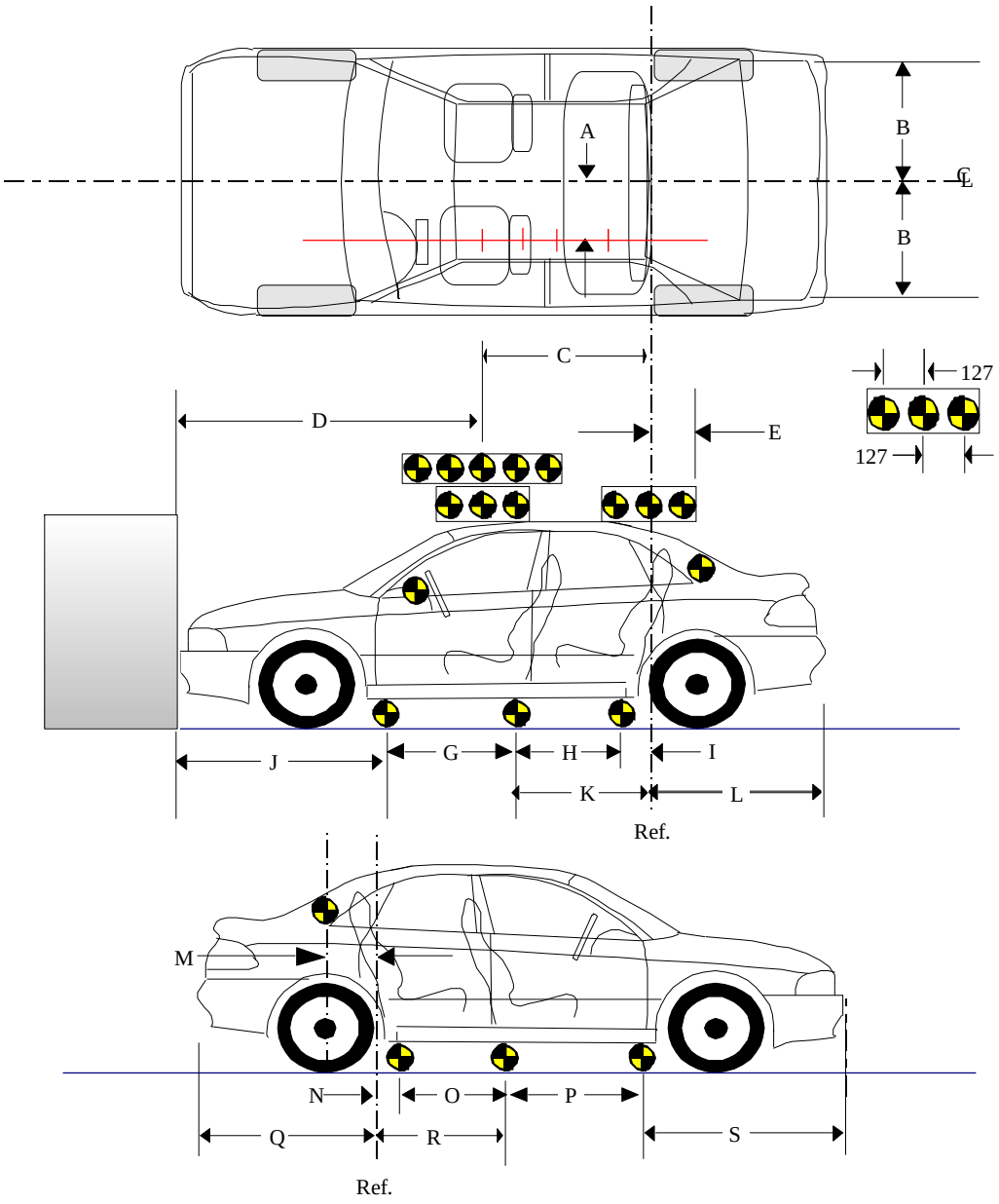
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

(Dimensions in millimeters)

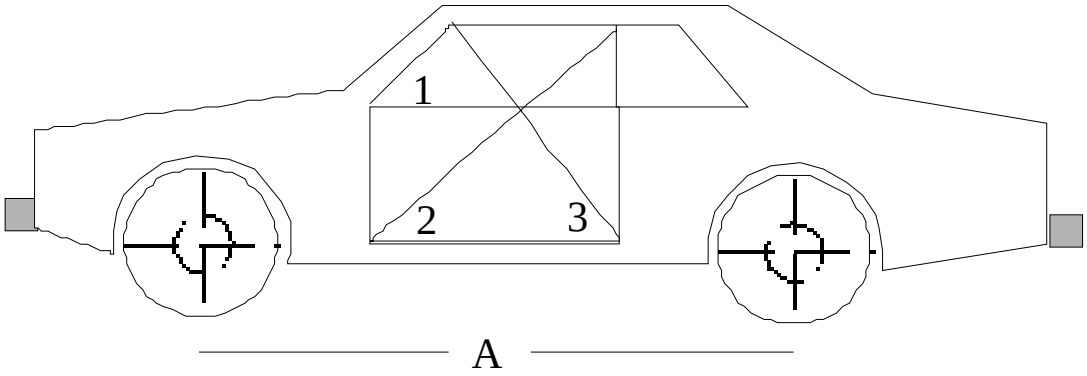
A	389
B	658
C	1222
D	2118
E	565
F	1685
G	900
H	902
I	131
J	1383
K	1033
L	1233
M	569
N	128
O	884
P	917
Q	1235
R	1012
S	1385



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



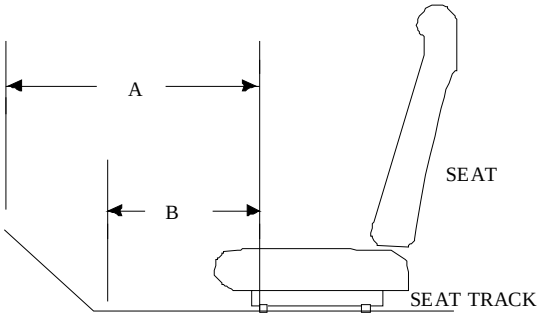
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	901	1489	1110	909	1493	1085
AFTER TEST	898	1490	1110	907	1493	1086
DIFFERENCE	3	-1	0	2	0	-1

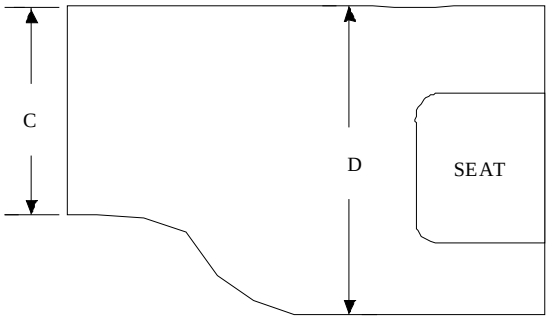
UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2708	2704
AFTER TEST	2616	2590
DIFFERENCE	92	114

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

STATIC FOOTWELL DEFORMATION





DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	700	635	65
B	556	525	31
C	497	460	37
D	488	483	5

PASSENGER

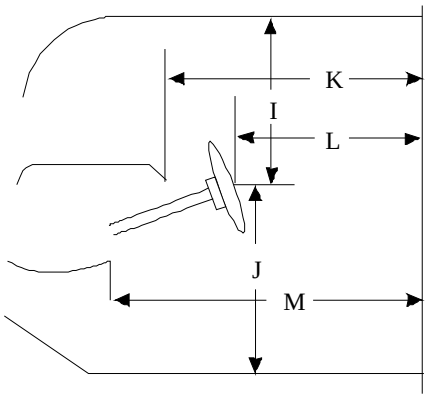
Measurement	Pre-Test	Post-Test	Difference
A	694	661	33
B	514	503	11
C	475	472	3
D	443	435	8

Units = mm

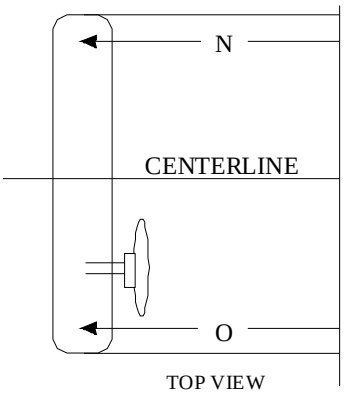
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

STATIC PASSENGER COMPARTMENT INTRUSION

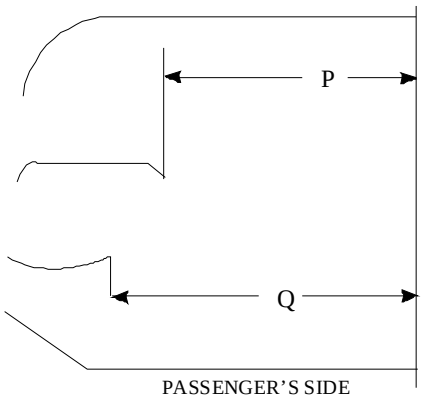


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



PASSENGER'S SIDE

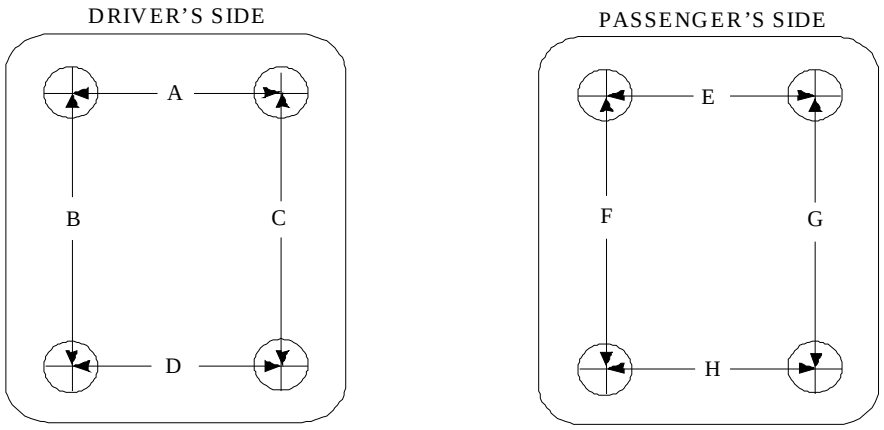
Measurement	Pre-Test	Post-Test	Difference
I	468	465	3
J	729	742	-13
K	729	722	7
L	511	526	-15
M	740	753	-13
N	685	681	4
O	684	682	2
P = K (PASS.)	864	858	6
Q = M (PASS.)	750	721	29

Units = mm

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

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon

FLOORBOARD DEFORMATION



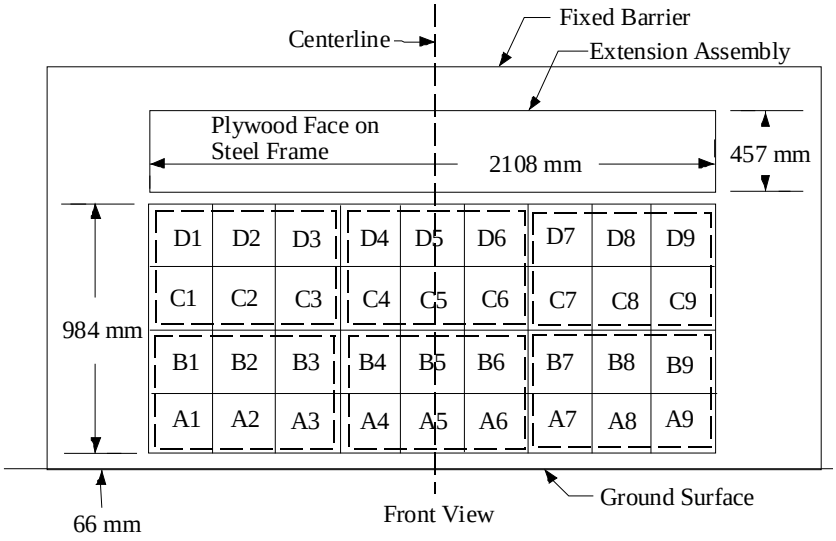
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	497	460	37
B	297	290	7
C	333	307	26
D	488	483	5
E	475	472	3
F	438	447	-9
G	415	414	1
H	443	435	8

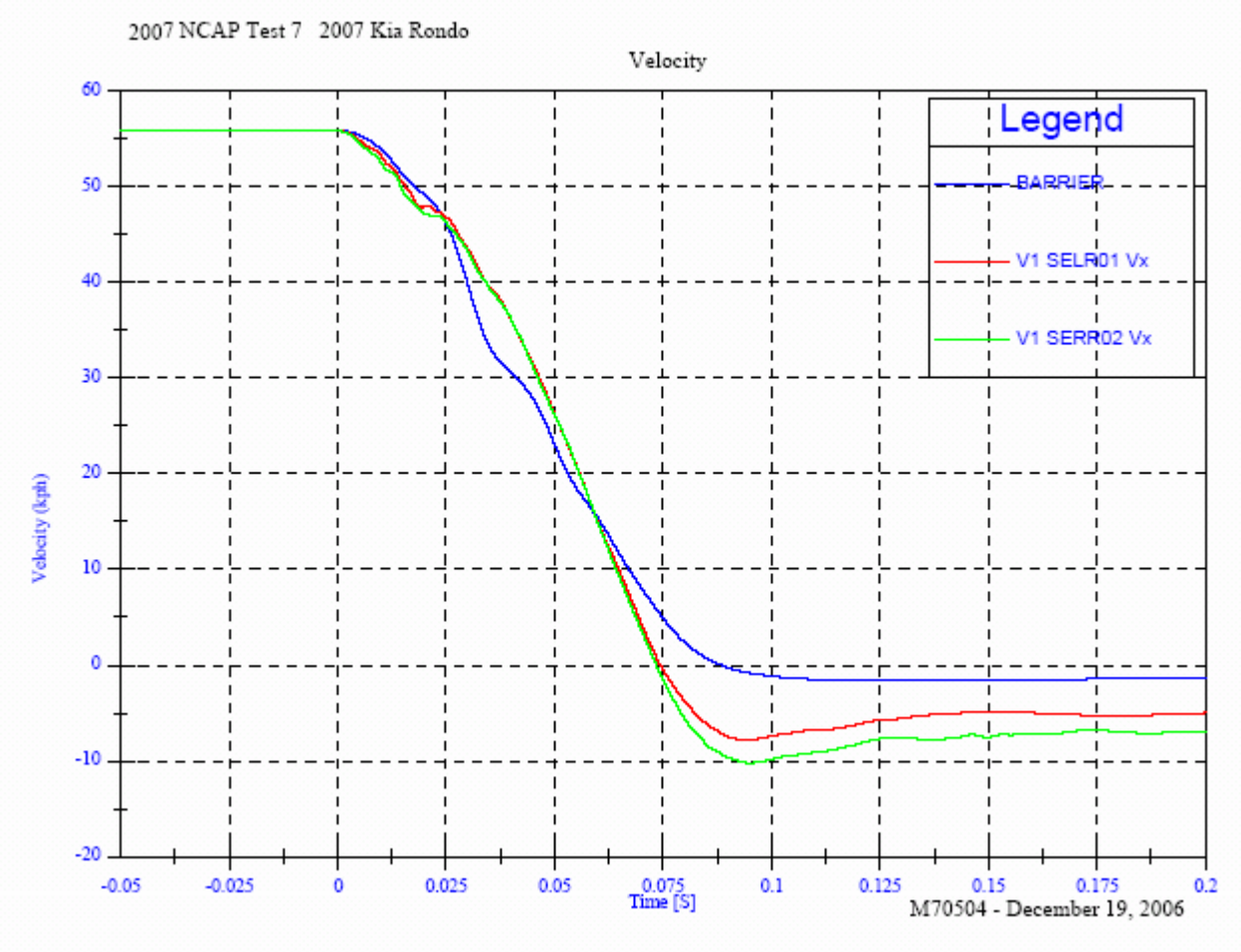
Units = mm

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: Kia Rondo Five Door Wagon

NHTSA Test No.: M70504 VIN: KNAFG525677025835

Model Year: 2007 Build Date: 09/06 Test Date: December 19, 2006

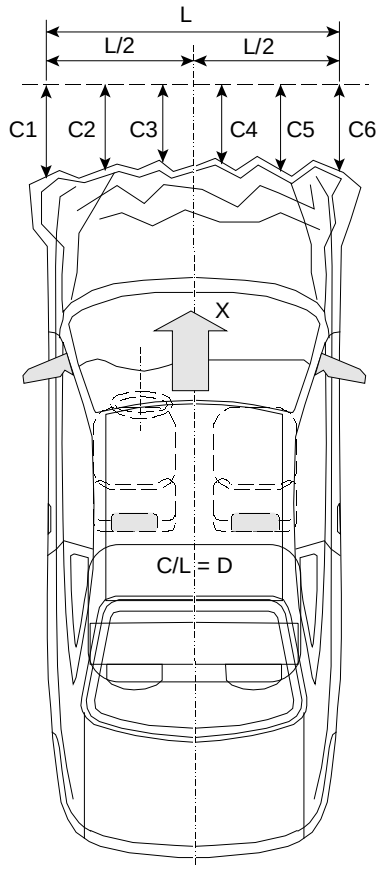
Vehicle Size Category: Midsize Station Wagon Test Weight: 1751.0 kg

Vehicle Wheelbase: 2708 mm; Front Overhang: 933 mm; Overall Width: 1805 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4409	4076	333
C2 =	4501	4112	389
C3 =	4548	4130	418
C4 =	4548	4115	433
C5 =	4501	4067	434
C6 =	4409	3981	428



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

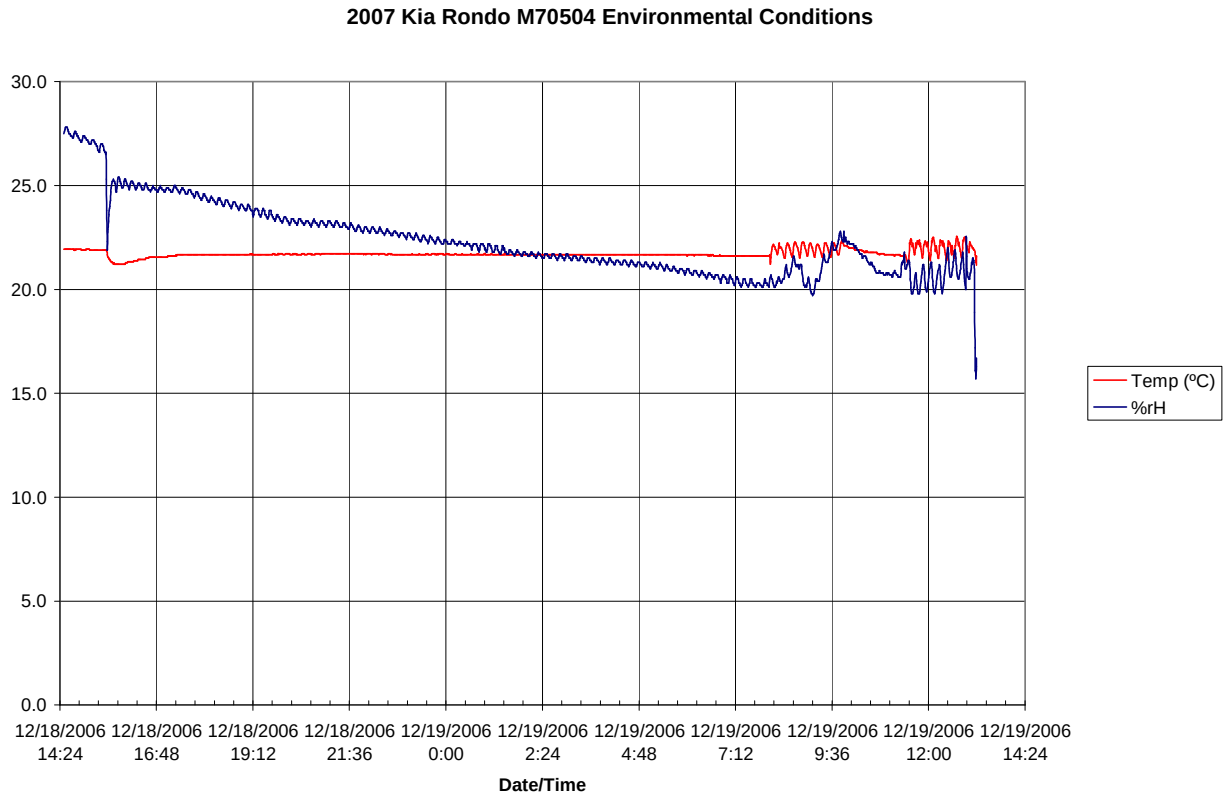
Length of Damaged Region: L1= 1344 mm

L2= 672.0 mm

L5= 268.8 mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: M70504 Vehicle: 2007 Kia Rondo Five Door Wagon



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

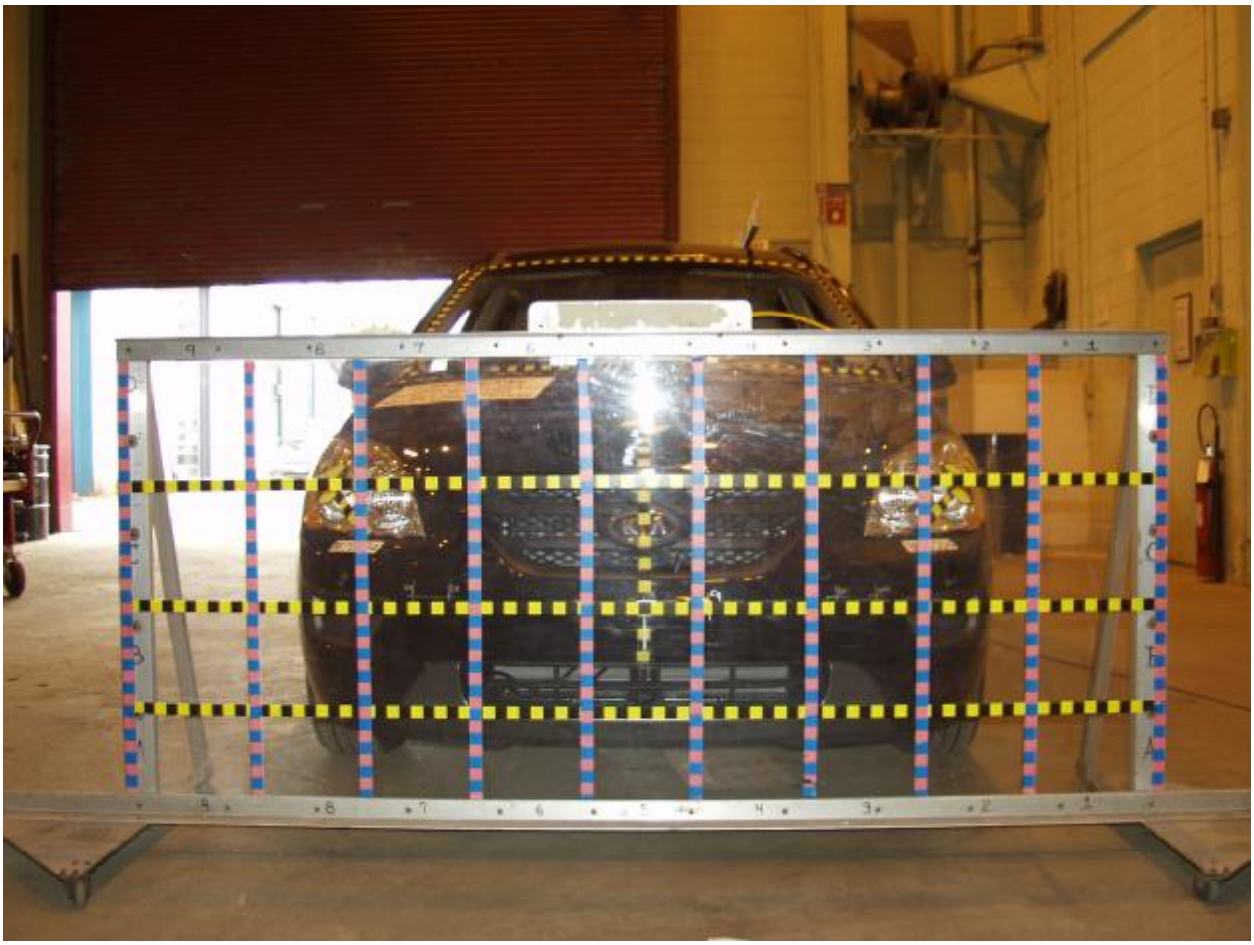


Figure A-1: Load Cell Locations

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

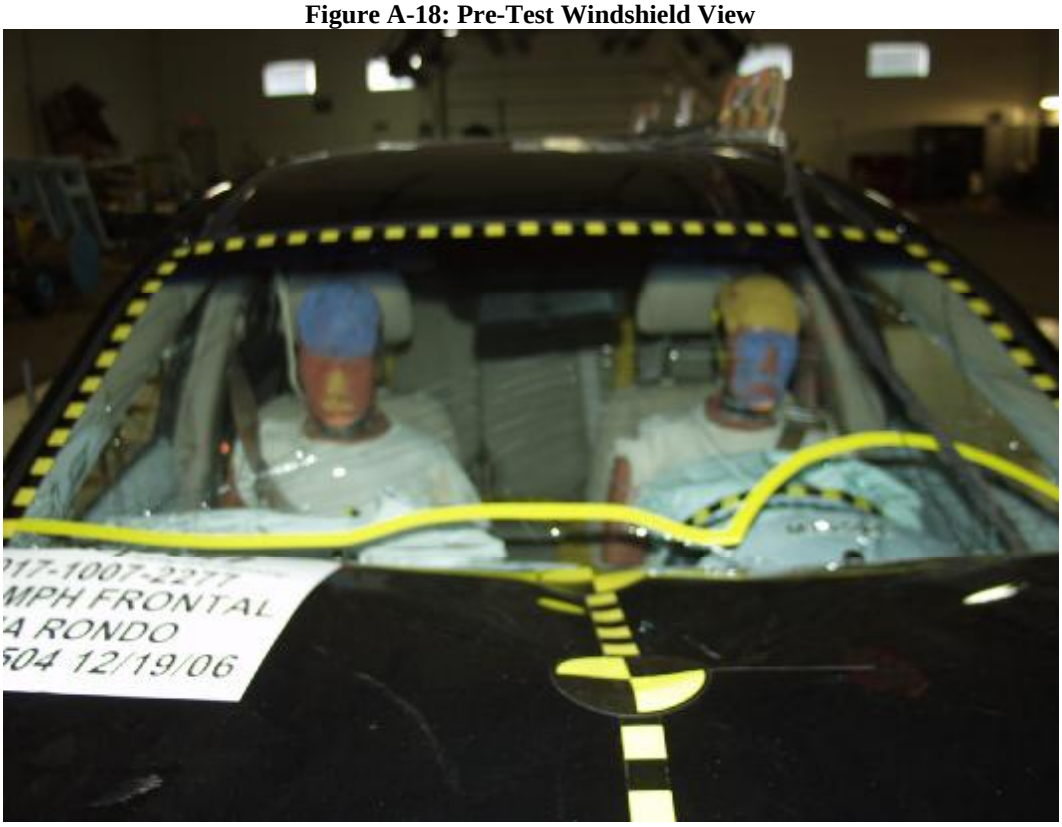


Figure A-19: Post-Test Windshield View

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

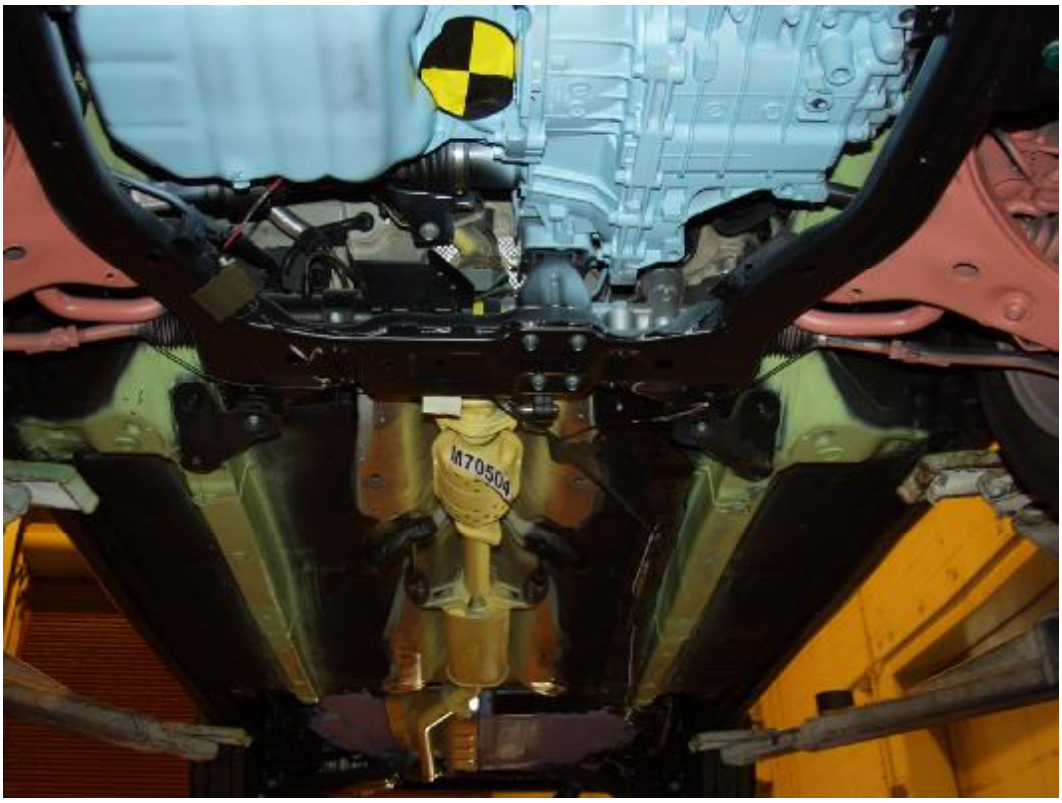


Figure A-26: Pre-Test Mid Underbody View

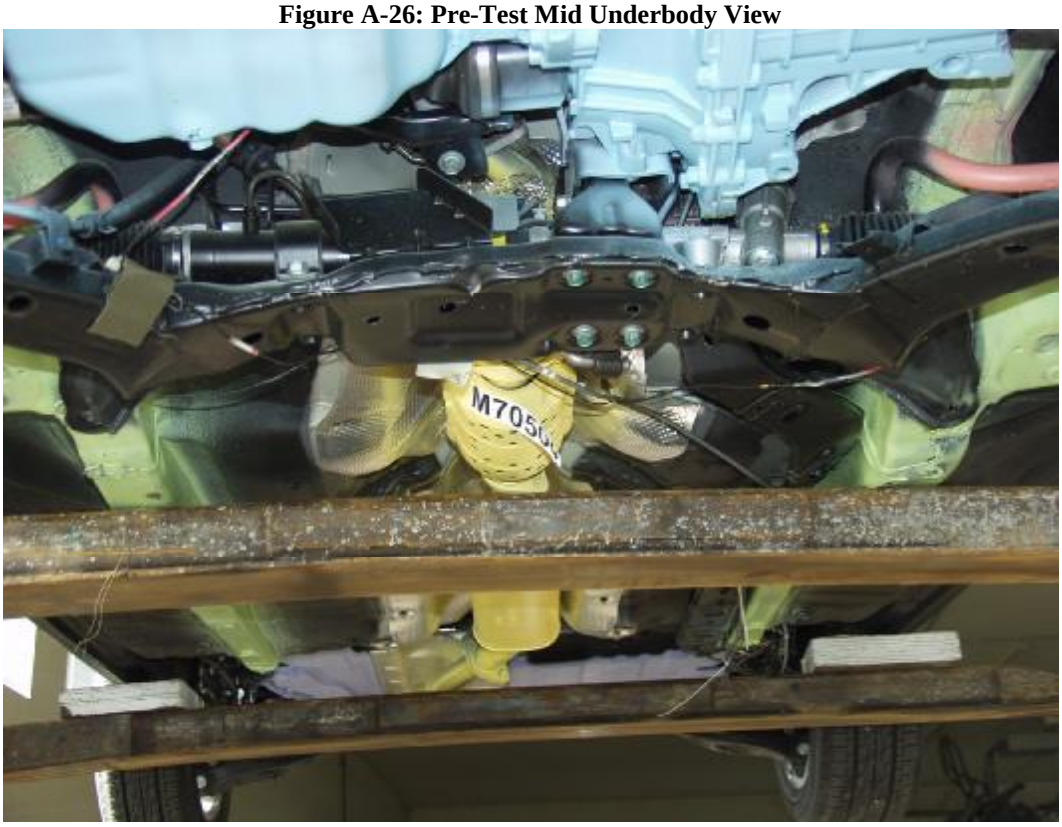


Figure A-27: Post-Test Mid Underbody View

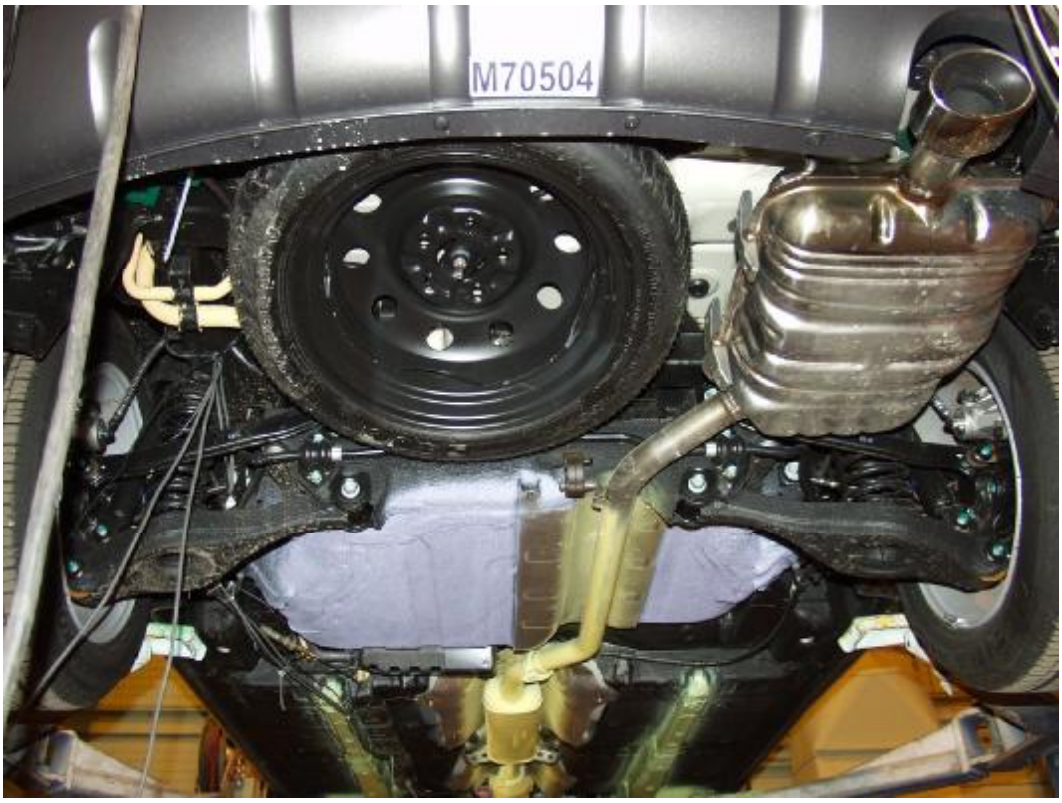


Figure A-28: Pre-Test Rear Underbody View

Figure A-29: Post-Test Rear Underbody View

Figure A-30: Pre-Test Driver Head Location

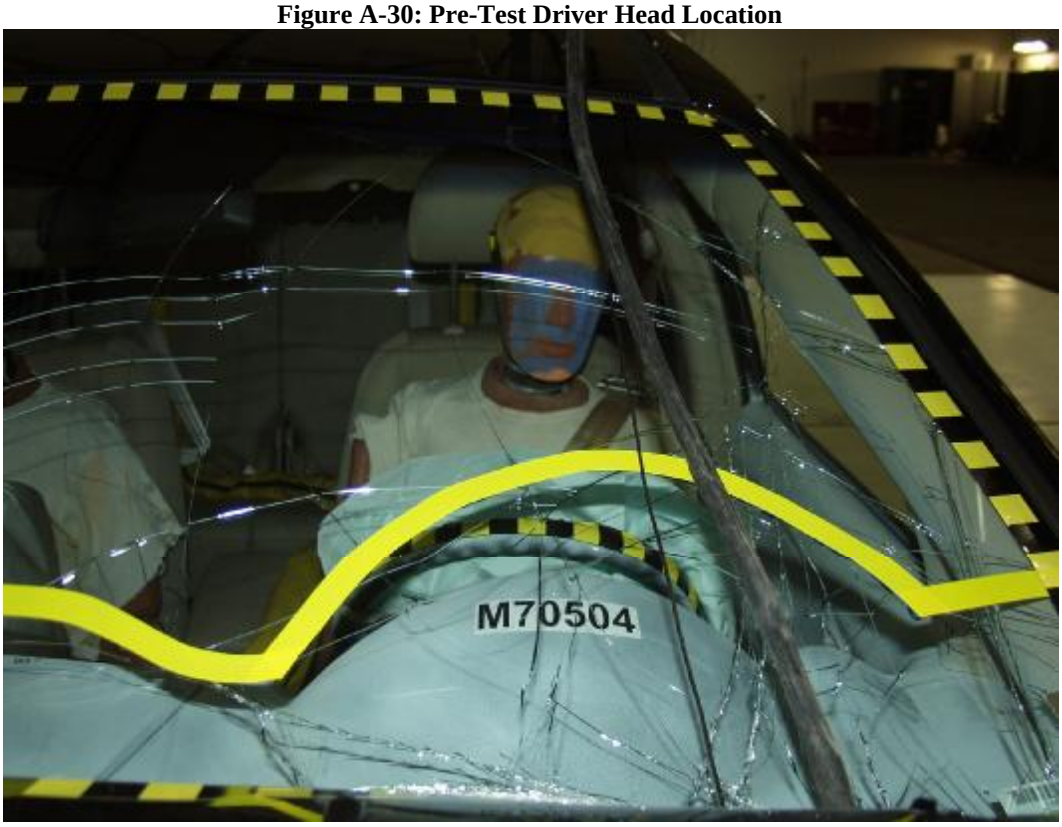


Figure A-31: Post-Test Driver Head Location

Figure A-32: Pre-Test Driver Position View

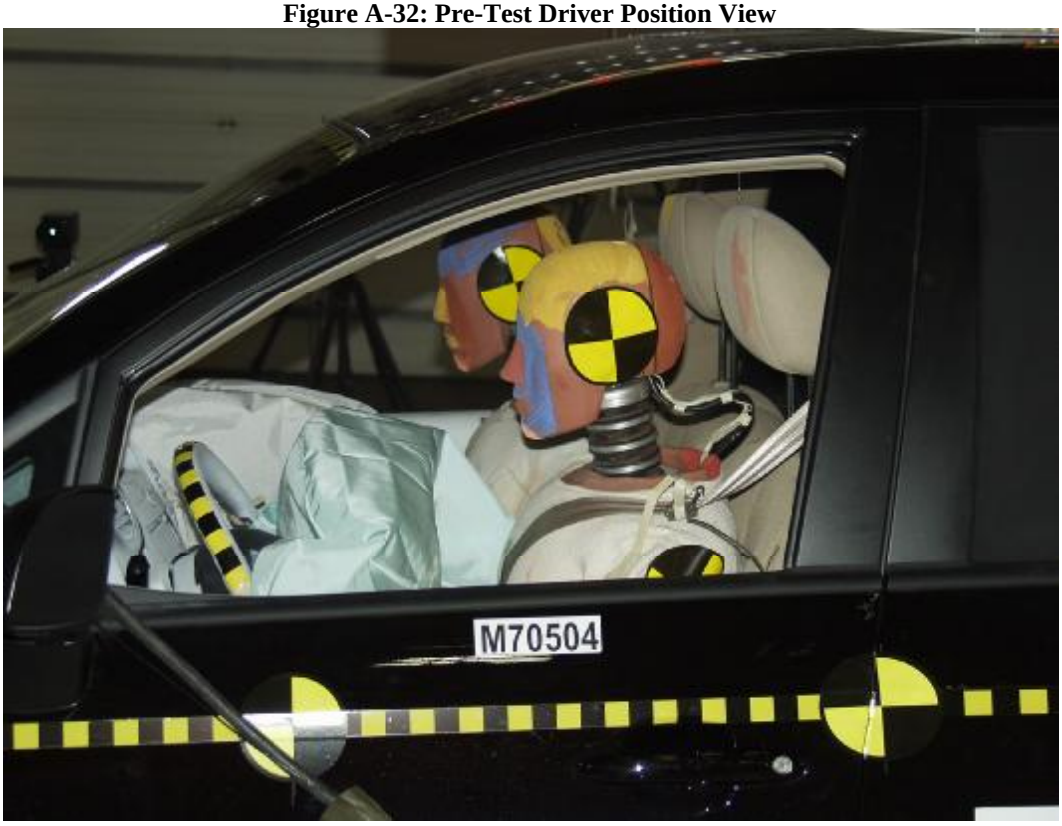


Figure A-33: Post-Test Driver Position View

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

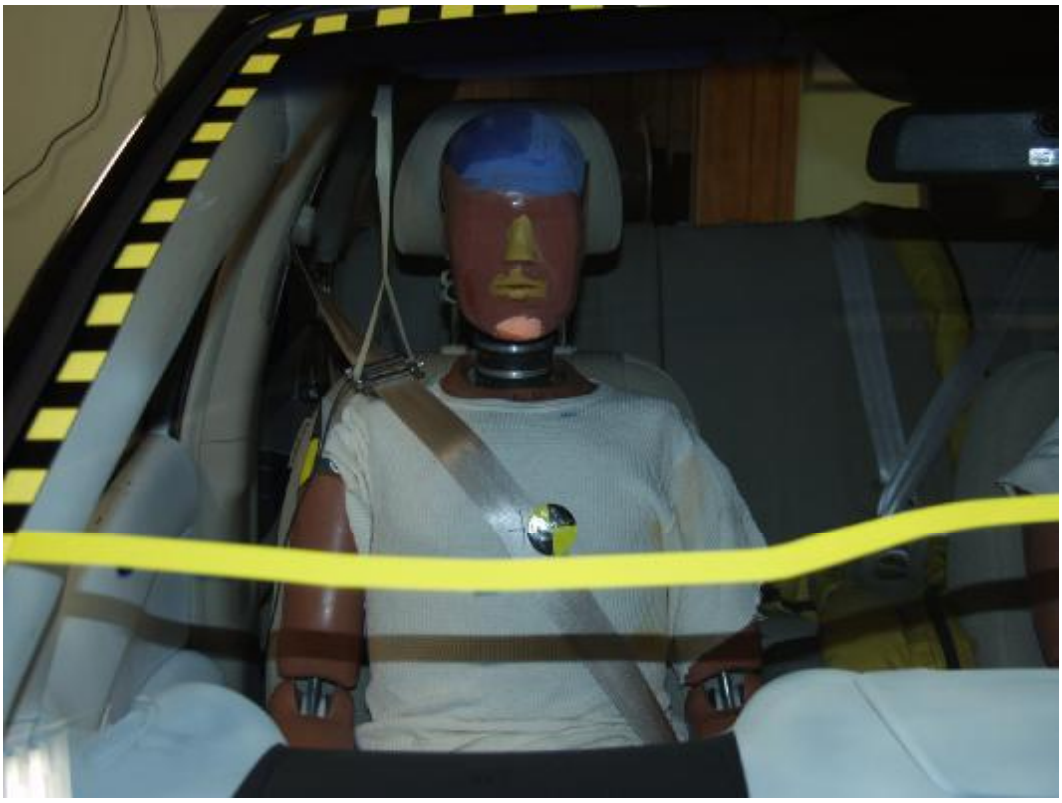


Figure A-44: Pre-Test Passenger Head Location

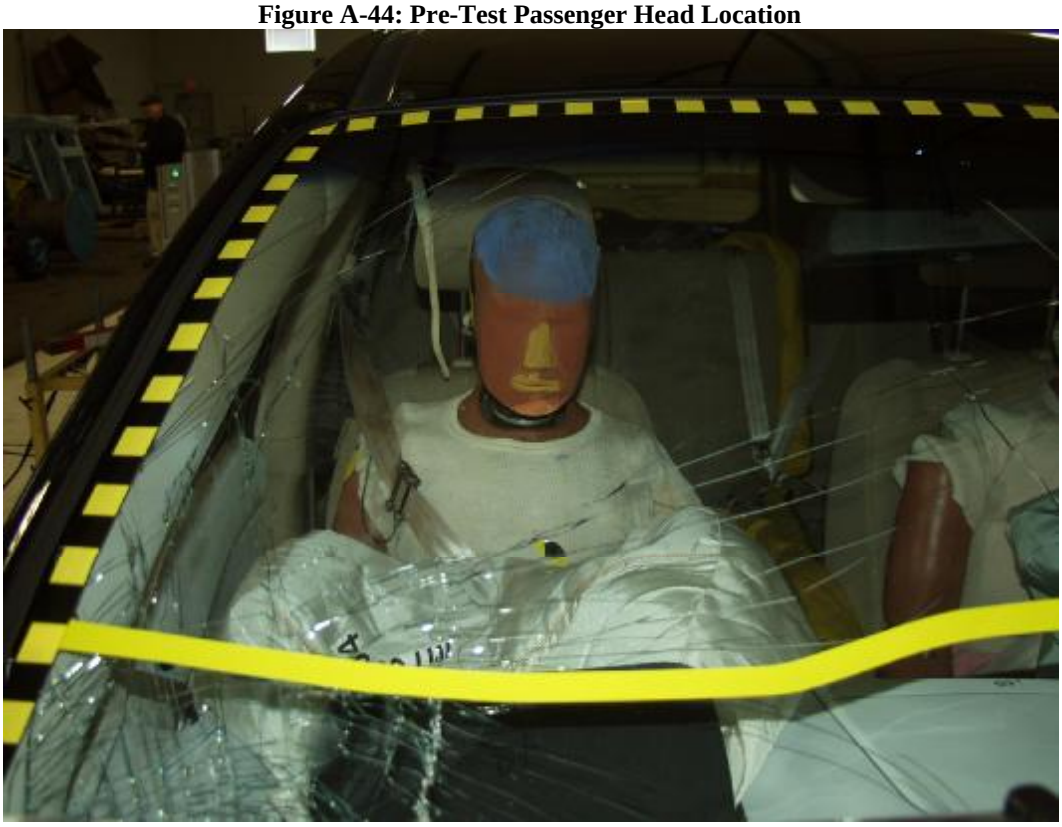


Figure A-45: Post-Test Passenger Head Location

Figure A-46: Pre-Test Passenger Position View

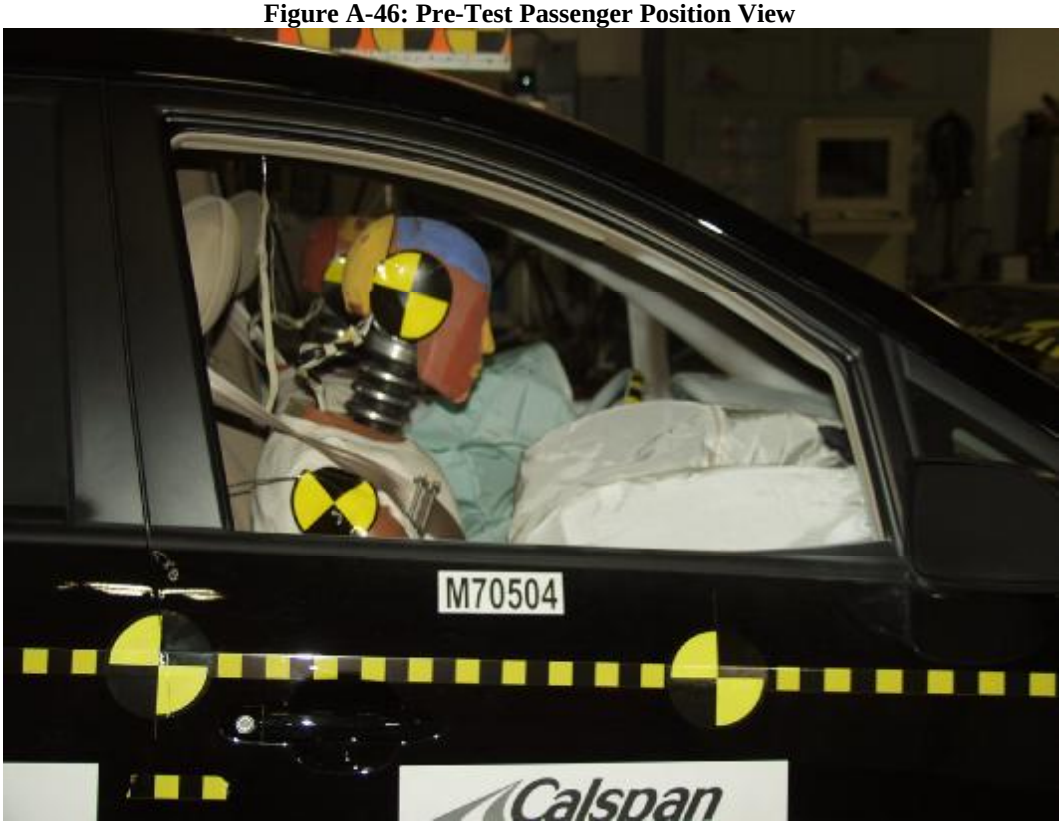


Figure A-47: Post-Test Passenger Position View

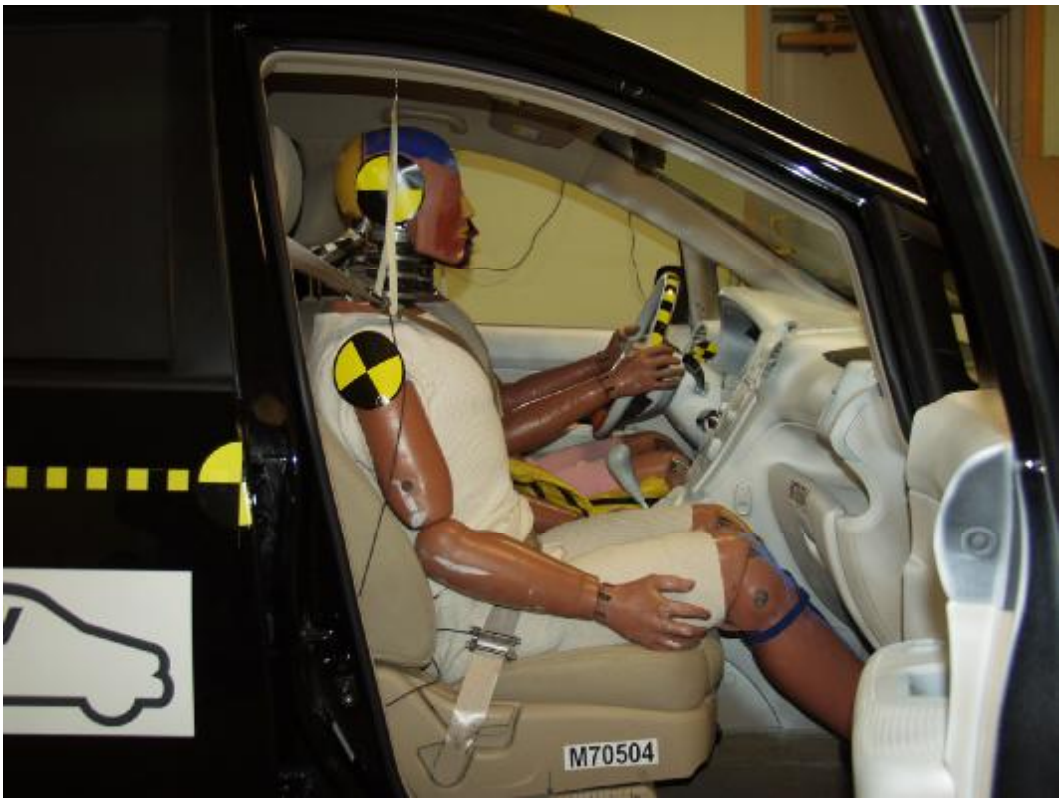


Figure A-48: Pre-Test Passenger and Interior View

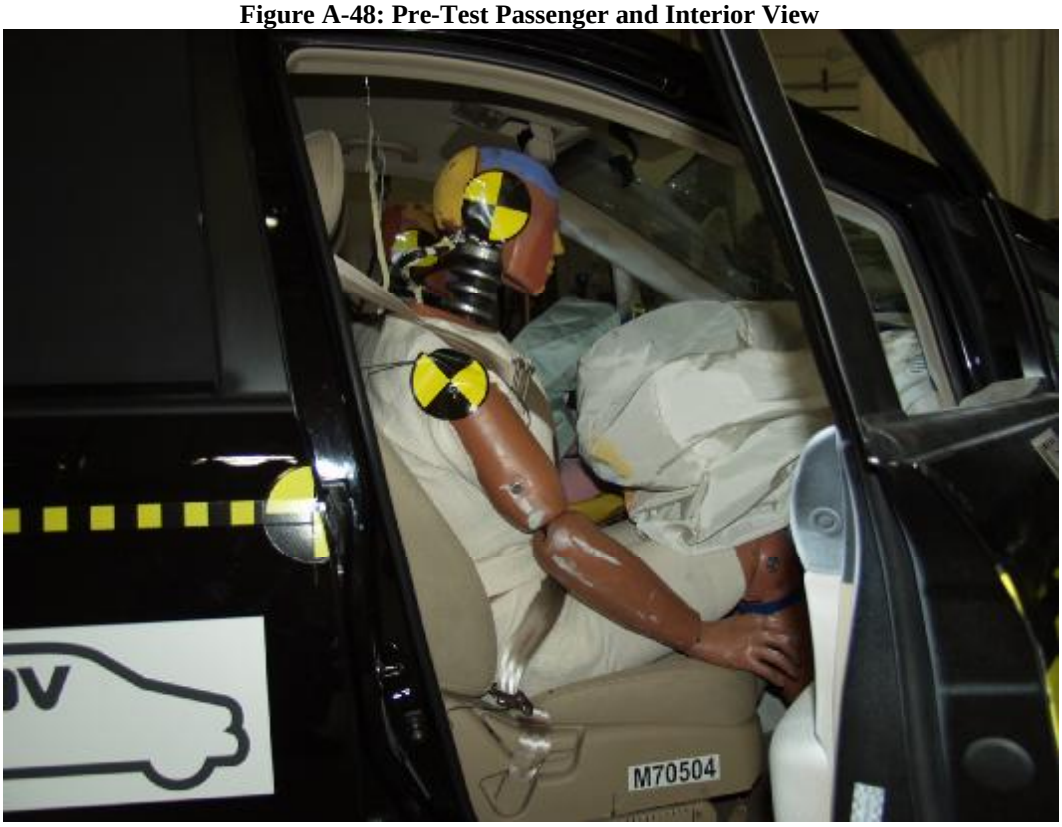


Figure A-49: Post-Test Passenger and Interior View

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°

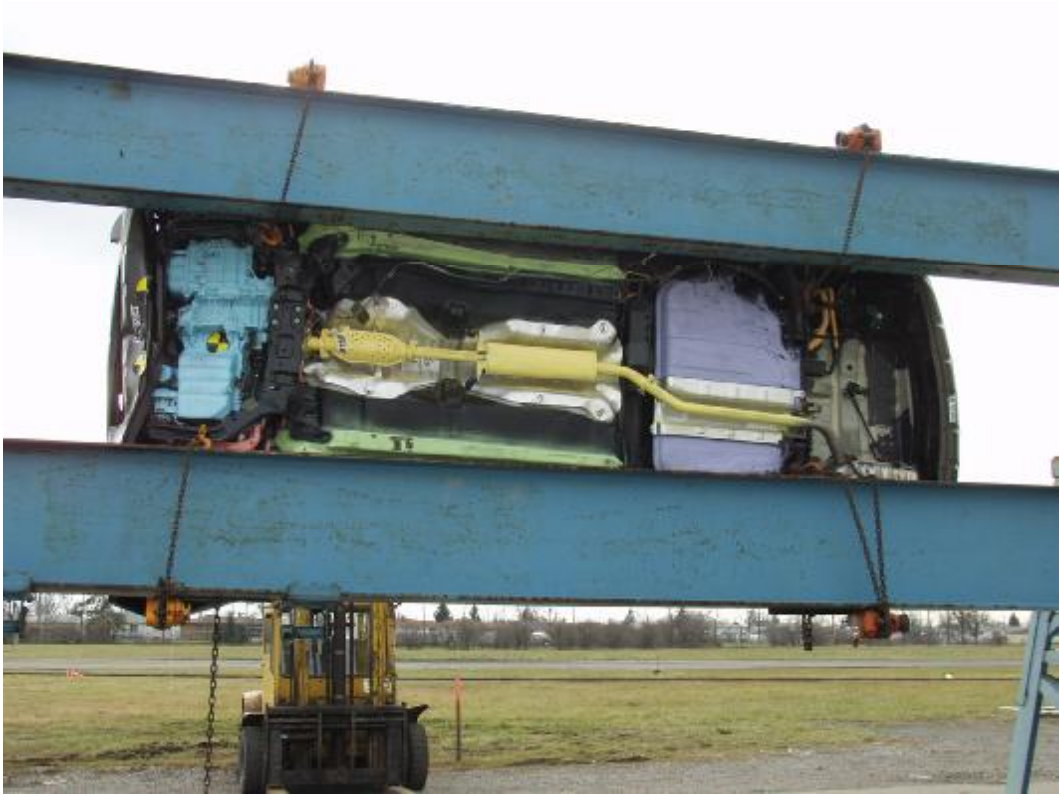


Figure A-60: Rollover View - 270°

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.: M70504

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

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	
V1P2 Upper Neck Fy	
V1P2 Upper Neck Fz	
V1P2 Upper Neck Mx	
V1P2 Upper Neck My	
V1P2 Upper Neck Mz	
V1P2 Chest Ax	
V1P2 Chest Ay	
V1P2 Chest Az	
V1P2 Chest Red Ax	
V1P2 Chest Red Ay	
V1P2 Chest Red Az	
V1P2 Chest Compression	
V1P2 Pelvic Ax	
V1P2 Pelvic Ay	
V1P2 Pelvic Az	
V1P2 Left Femur Fz	
V1P2 Right Femur Fz	
V1P2 Left Upper Tibia Fz	
V1P2 Left Upper Tibia Mx	
V1P2 Left Upper Tibia My	
V1P2 Left Lower Tibia Mx	
V1P2 Left Lower Tibia My	
V1P2 Right Upper Tibia Mx	
V1P2 Right Upper Tibia My	
V1P2 Right Lower Tibia Fz	
V1P2 Right Lower Tibia Mx	
V1P2 Right Lower Tibia My	
V1P2 Left Foot Aft Ax	
V1P2 Left Foot Aft Az	
V1P2 Left Foot Fore Az	
V1P2 Right Foot Aft Ax	
V1P2 Right Foot Aft Az	
V1P2 Right Foot Fore Az	
Barrier Load Cell A1 Fx	
Barrier Load Cell A2 Fx	
Barrier Load Cell A3 Fx	
Barrier Load Cell A4 Fx	
Barrier Load Cell A5 Fx	
Barrier Load Cell A6 Fx	
Barrier Load Cell A7 Fx	
Barrier Load Cell A8 Fx	
Barrier Load Cell A9 Fx	
Barrier Load Cell B1 Fx	
Barrier Load Cell B2 Fx	
Barrier Load Cell B3 Fx	
Barrier Load Cell B4 Fx	
Barrier Load Cell B5 Fx	
Barrier Load Cell B6 Fx	

Barrier Load Cell B7 Fx	
Barrier Load Cell B8 Fx	
Barrier Load Cell B9 Fx	
Barrier Load Cell C1 Fx	
Barrier Load Cell C2 Fx	
Barrier Load Cell C3 Fx	
Barrier Load Cell C4 Fx	
Barrier Load Cell C5 Fx	
Barrier Load Cell C6 Fx	
Barrier Load Cell C7 Fx	
Barrier Load Cell C8 Fx	
Barrier Load Cell C9 Fx	
Barrier Load Cell D1 Fx	
Barrier Load Cell D2 Fx	
Barrier Load Cell D3 Fx	
Barrier Load Cell D4 Fx	
Barrier Load Cell D5 Fx	
Barrier Load Cell D6 Fx	
Barrier Load Cell D7 Fx	
Barrier Load Cell D8 Fx	
Barrier Load Cell D9 Fx	

TEST NOTES	
Data Channel	Anomalies
V1P1 Left Lower Tibia Mx	Questionable Data
V1P1 Left Foot Aft z	Channel Opened at 48 ms
Barrier Load Cell A1 Fx	Did Not Record
Barrier Load Cell A9 Fx	Did Not Record
Barrier Load Cell B1 Fx	Did Not Record
Barrier Load Cell B2 Fx	Did Not Record
Barrier Load Cell B5 Fx	Did Not Record
Barrier Load Cell B9 Fx	Did Not Record
Barrier Load Cell C1 Fx	Did Not Record
Barrier Load Cell C9 Fx	Did Not Record
Barrier Load Cell D1 Fx	Did Not Record
Barrier Load Cell D2 Fx	Did Not Record
Barrier Load Cell D5 Fx	Did Not Record
Barrier Load Cell D6 Fx	Did Not Record
Barrier Load Cell D7 Fx	Did Not Record
Barrier Load Cell D8 Fx	Did Not Record
Barrier Load Cell D9 Fx	Did Not Record

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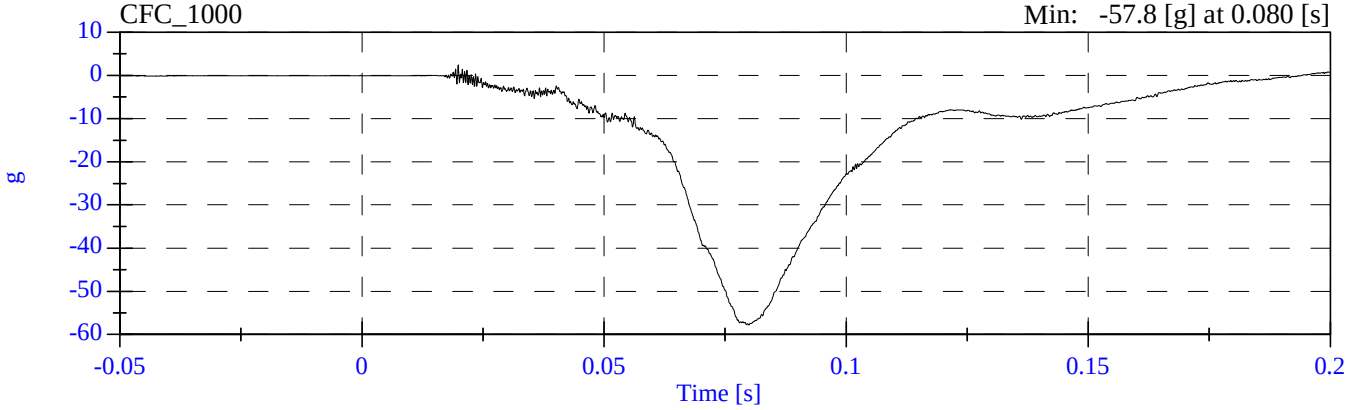
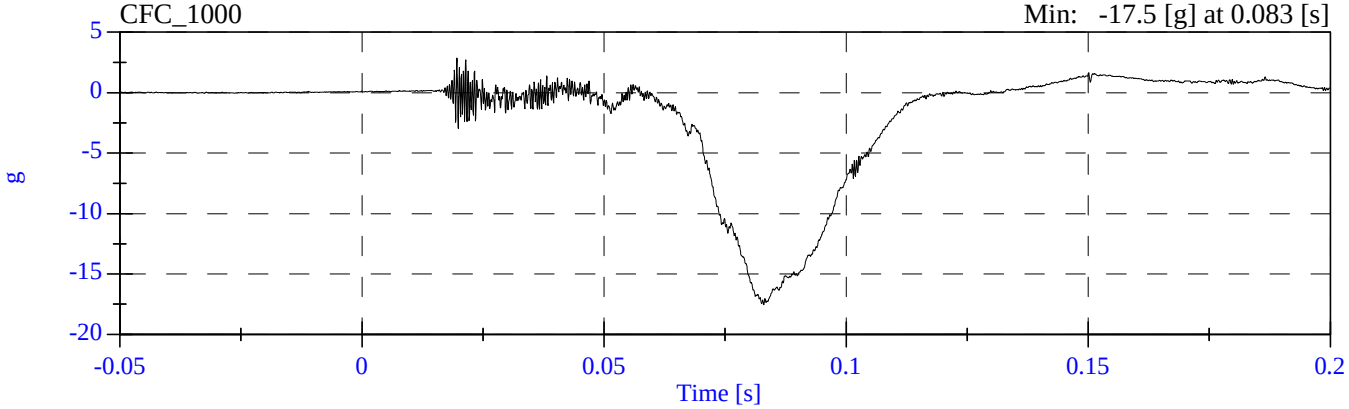
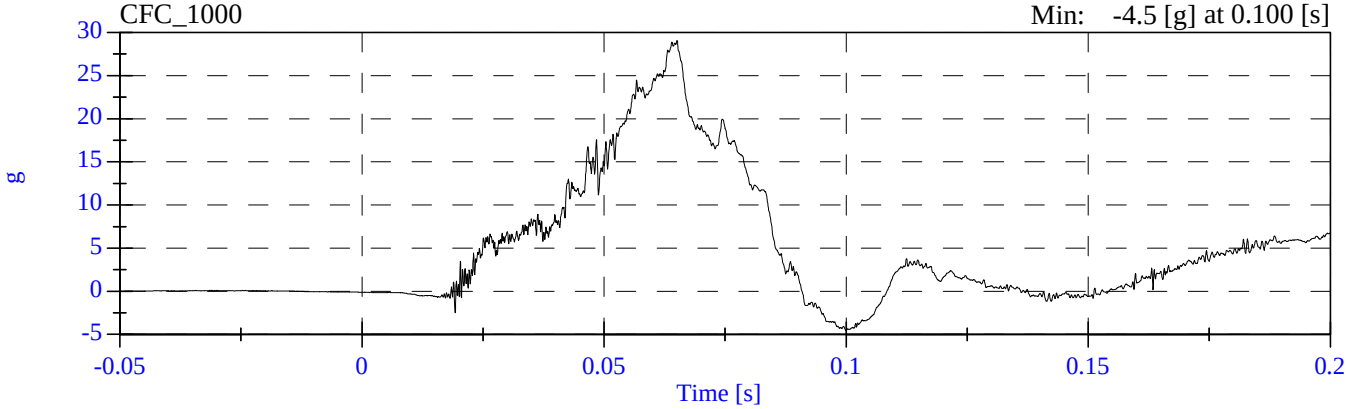
V1P1 Head CG x
CFC_1000
Max: 2.5 [g] at 0.020 [s]
Min: -57.8 [g] at 0.080 [s]



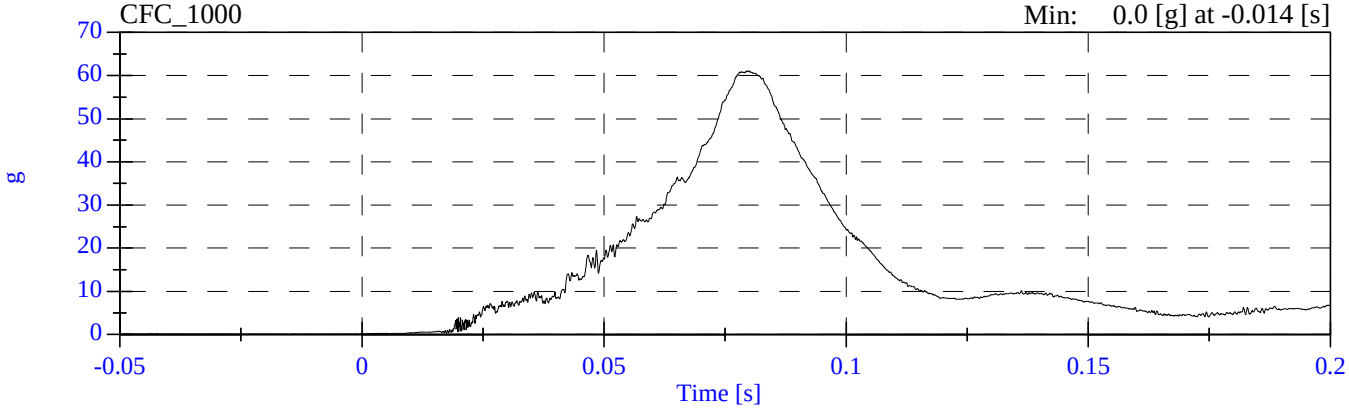
V1P1 Head CG y
CFC_1000
Max: 2.9 [g] at 0.020 [s]
Min: -17.5 [g] at 0.083 [s]



V1P1 Head CG z
CFC_1000
Max: 29.1 [g] at 0.065 [s]
Min: -4.5 [g] at 0.100 [s]



V1P1 Head CG Resultant
CFC_1000
Max: 61.2 [g] at 0.080 [s]
Min: 0.0 [g] at -0.014 [s]



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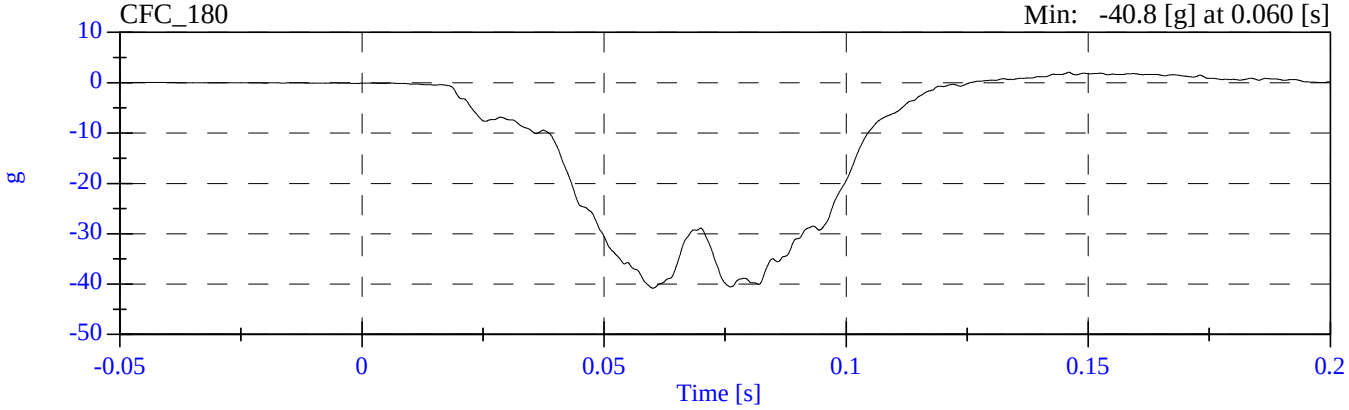
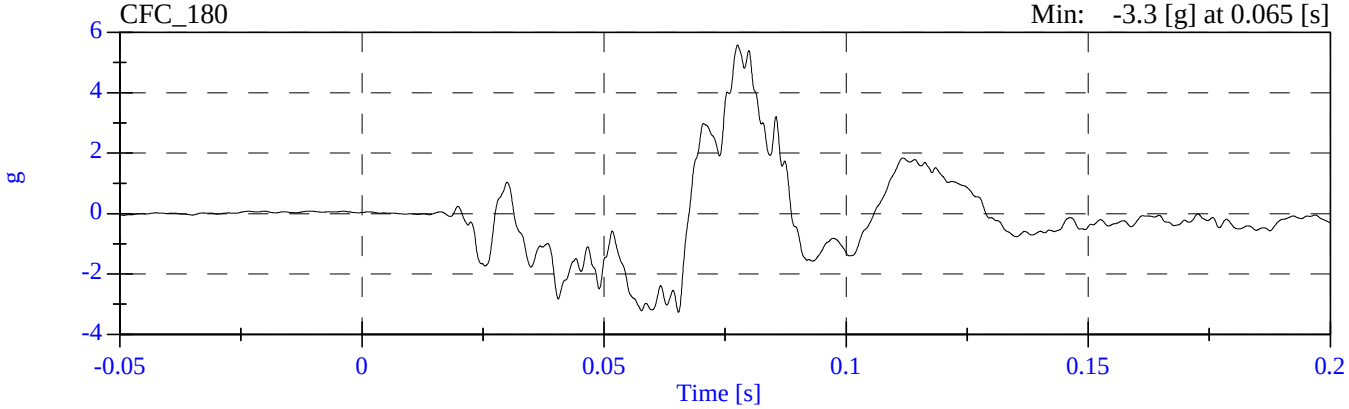
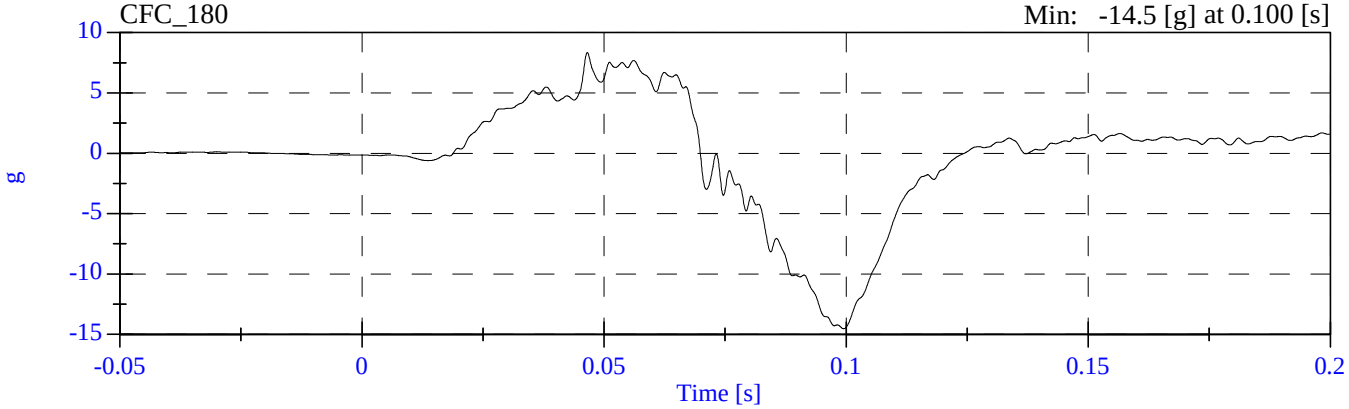
V1P1 Chest x
CFC_180
Max: 2.1 [g] at 0.146 [s]
Min: -40.8 [g] at 0.060 [s]



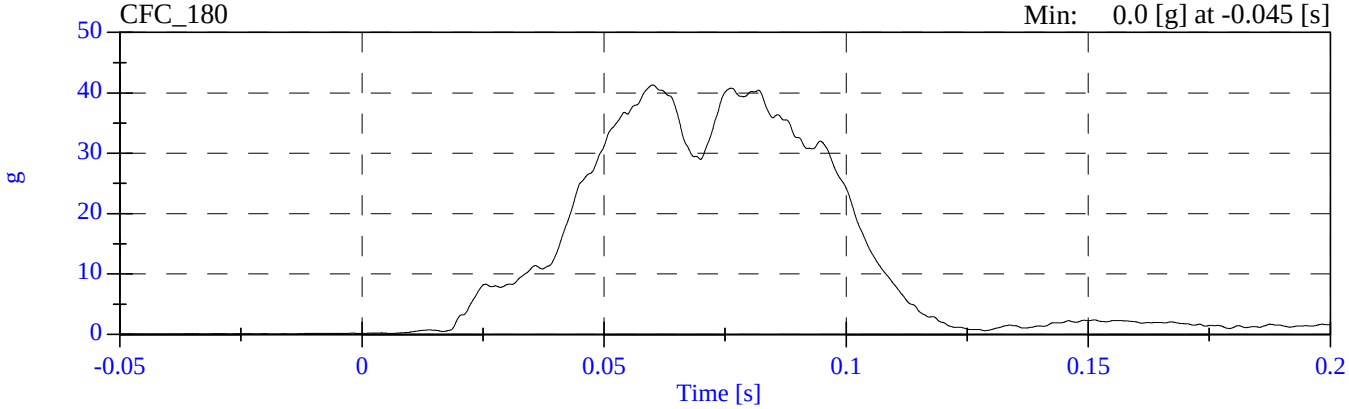
V1P1 Chest y
CFC_180
Max: 5.6 [g] at 0.078 [s]
Min: -3.3 [g] at 0.065 [s]



V1P1 Chest z
CFC_180
Max: 8.3 [g] at 0.047 [s]
Min: -14.5 [g] at 0.100 [s]



V1P1 Chest Resultant
CFC_180
Max: 41.3 [g] at 0.060 [s]
Min: 0.0 [g] at -0.045 [s]



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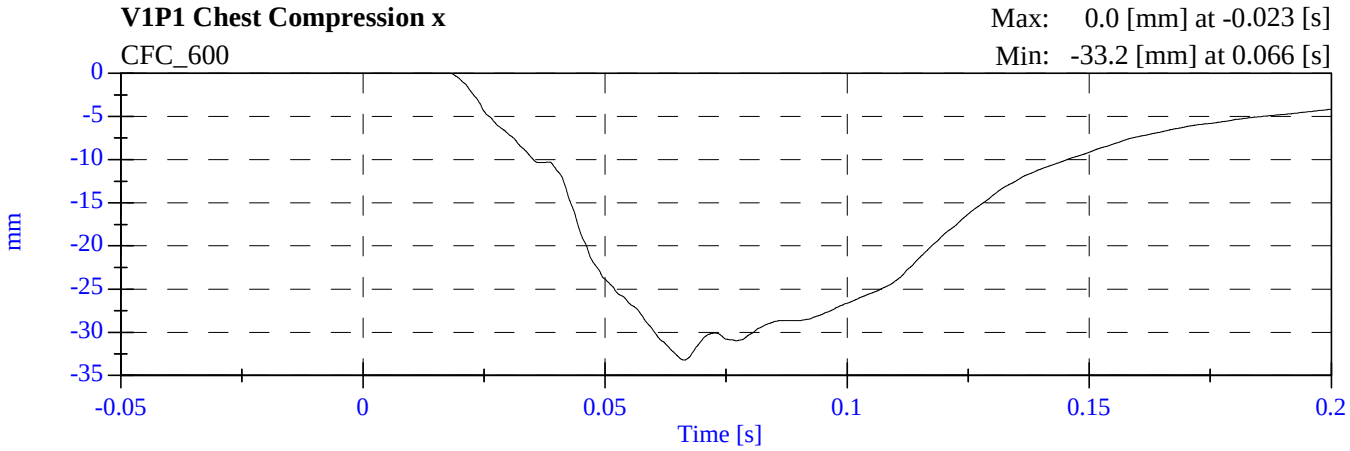

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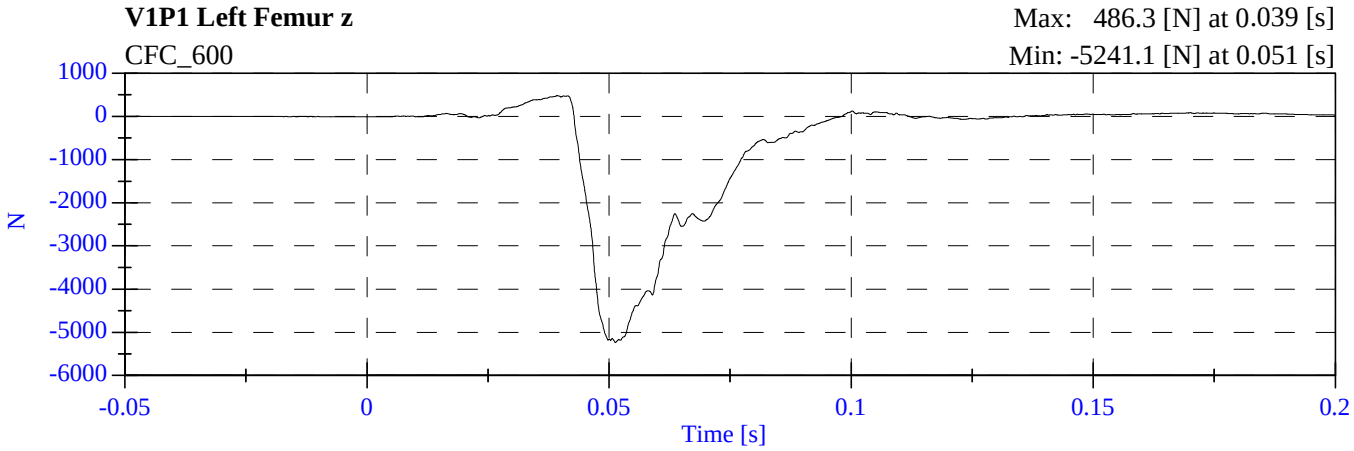

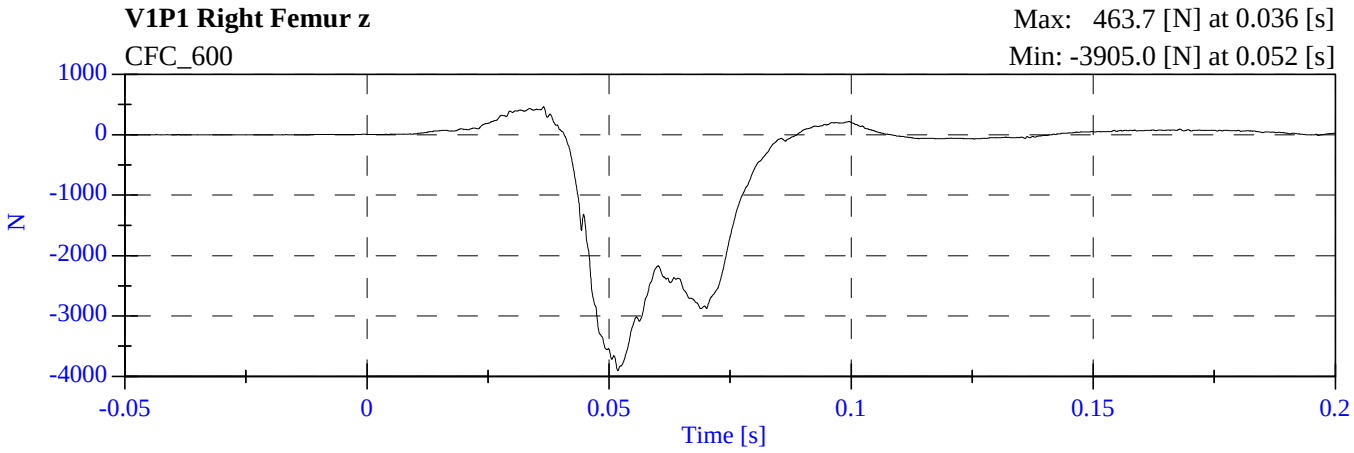

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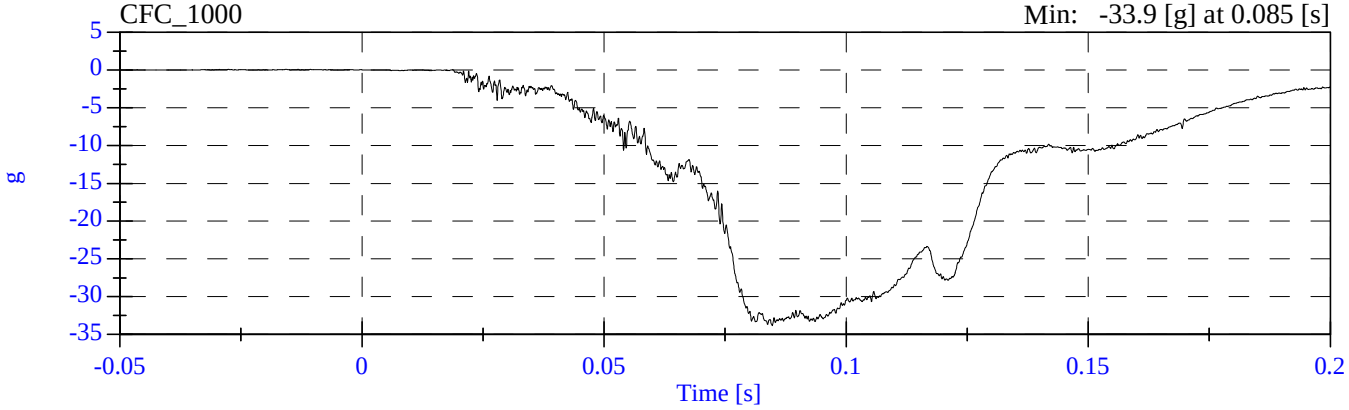
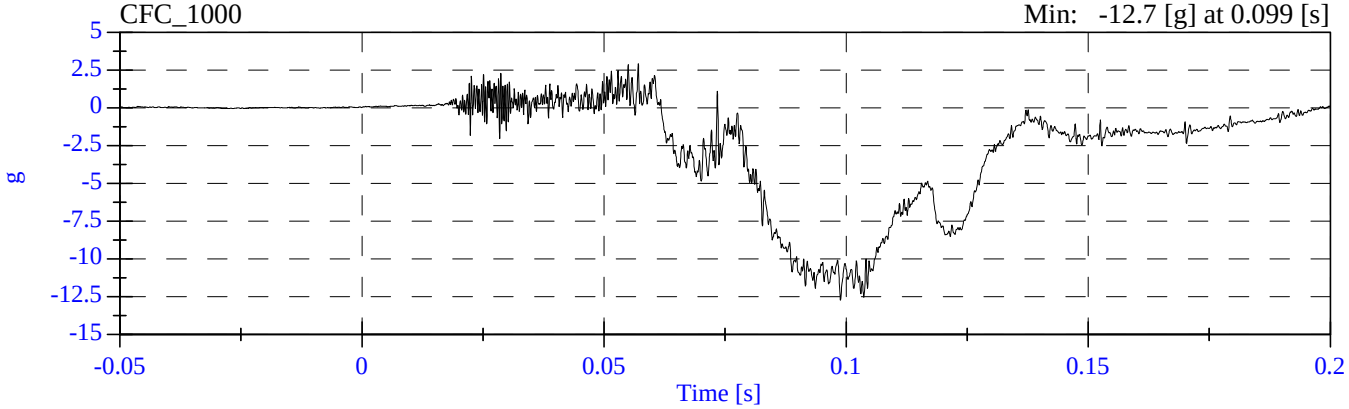
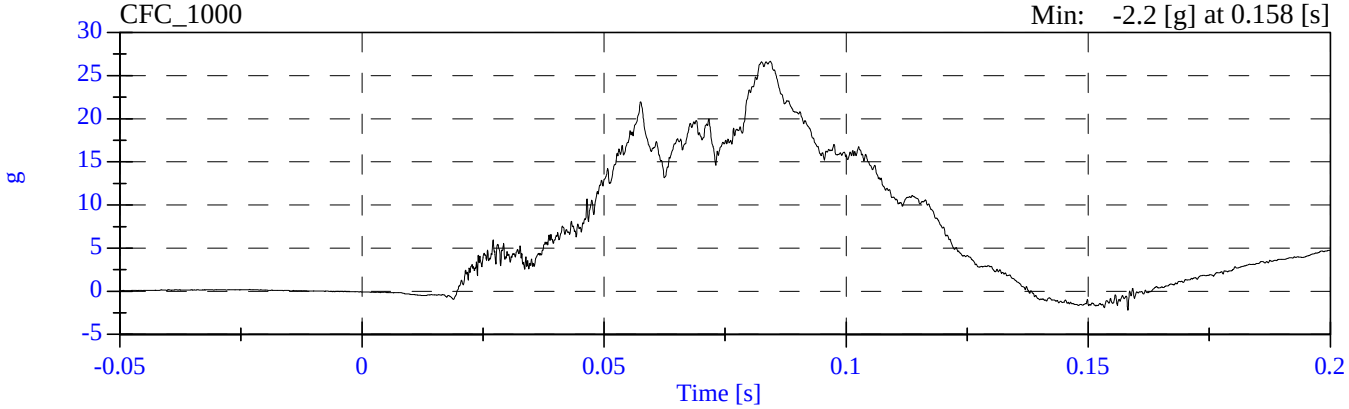
V1P2 Head CG x
CFC_1000
Max: 0.1 [g] at -0.016 [s]
Min: -33.9 [g] at 0.085 [s]



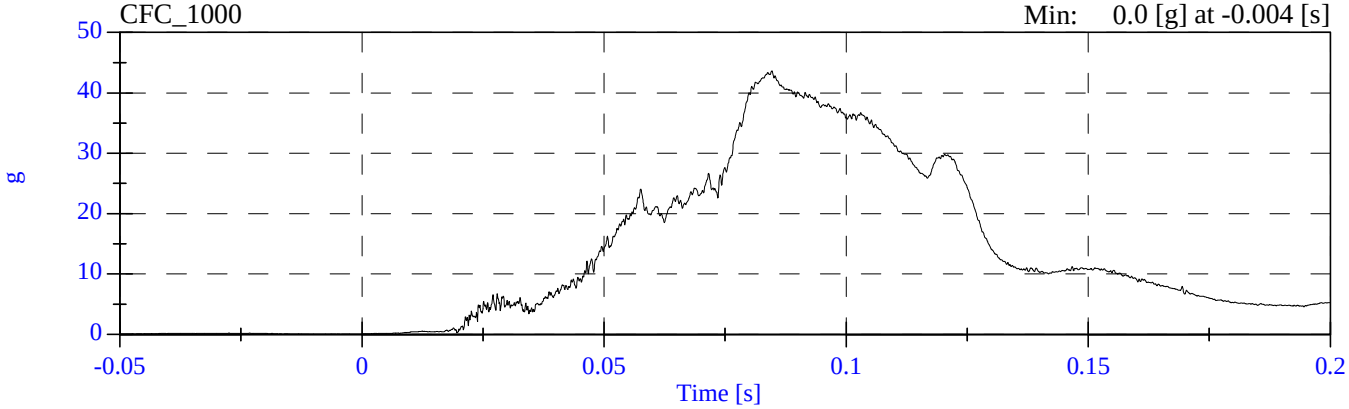
V1P2 Head CG y
CFC_1000
Max: 2.9 [g] at 0.057 [s]
Min: -12.7 [g] at 0.099 [s]



V1P2 Head CG z
CFC_1000
Max: 26.7 [g] at 0.084 [s]
Min: -2.2 [g] at 0.158 [s]



V1P2 Head CG Resultant
CFC_1000
Max: 43.6 [g] at 0.085 [s]
Min: 0.0 [g] at -0.004 [s]



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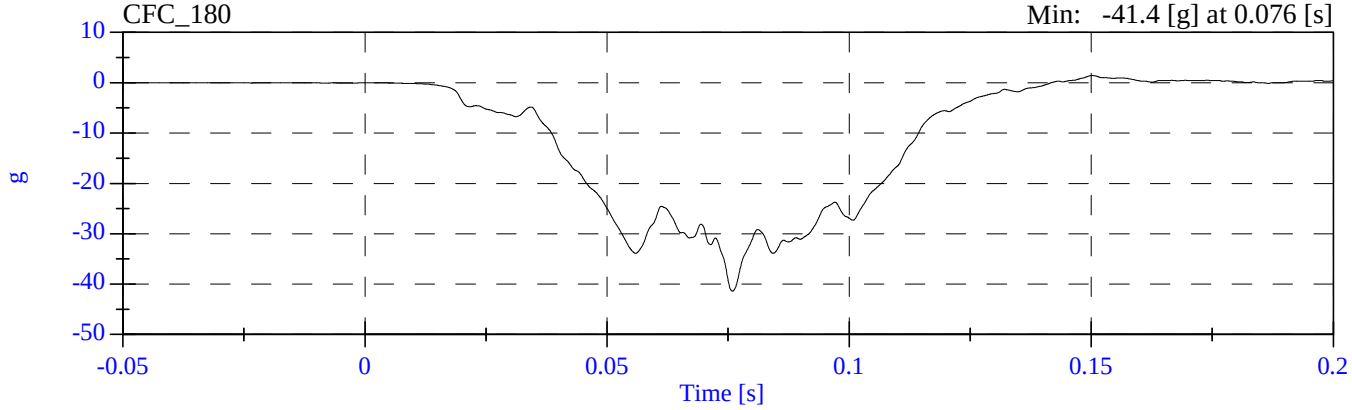
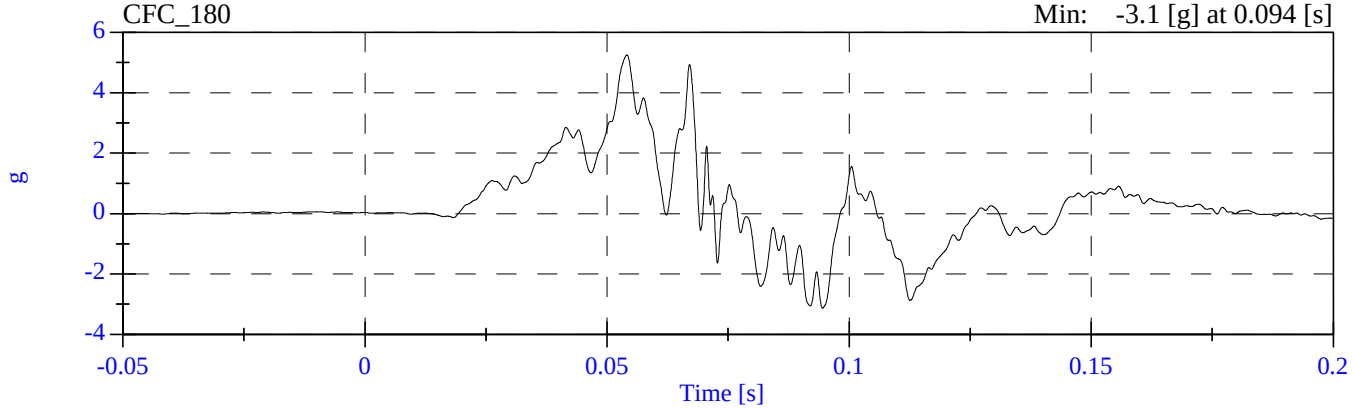
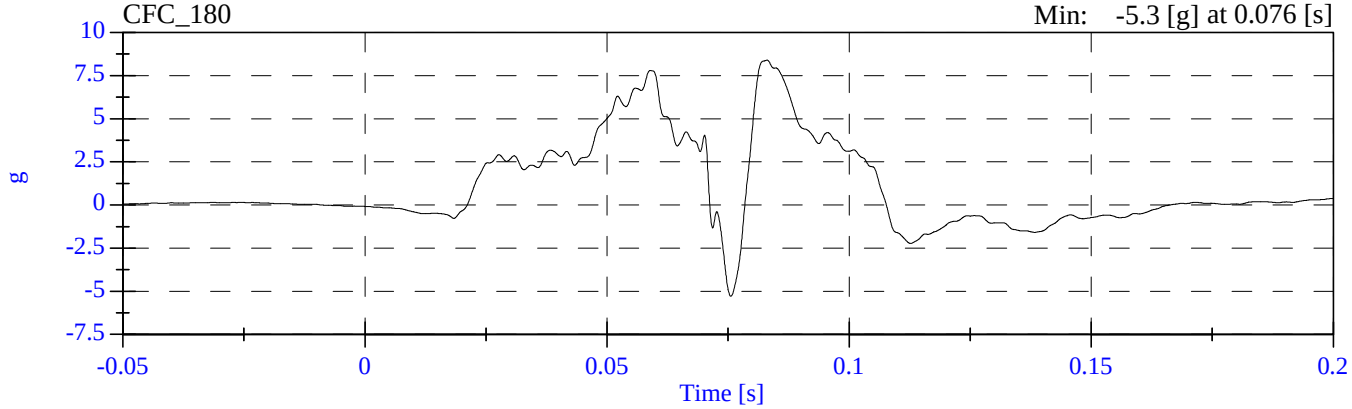
V1P2 Chest x
CFC_180
Max: 1.4 [g] at 0.150 [s]
Min: -41.4 [g] at 0.076 [s]



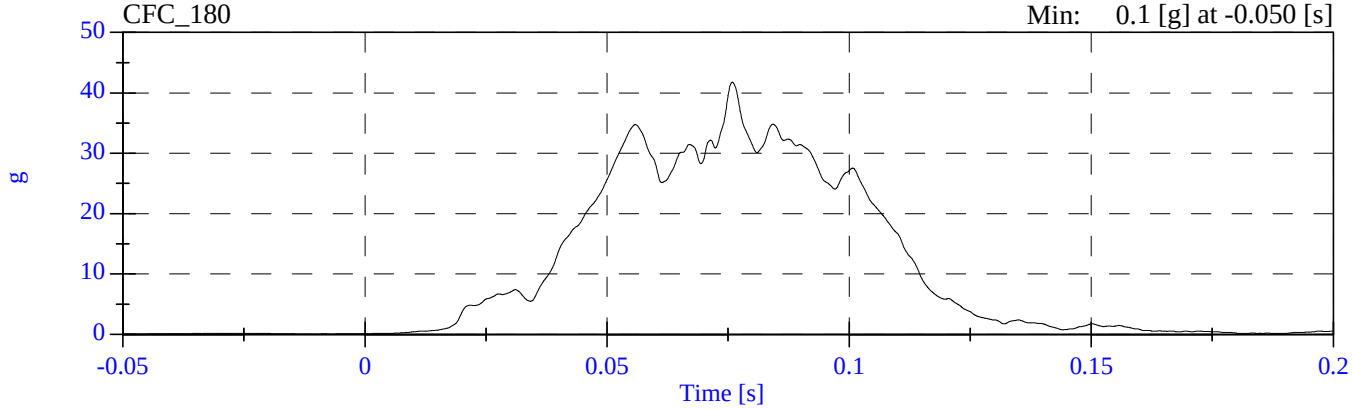
V1P2 Chest y
CFC_180
Max: 5.3 [g] at 0.054 [s]
Min: -3.1 [g] at 0.094 [s]



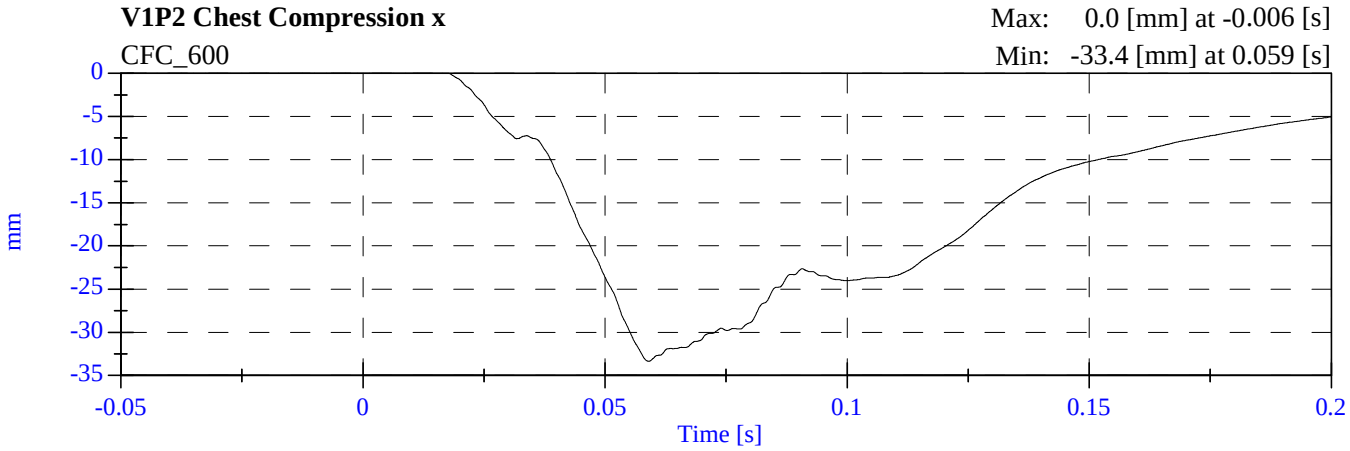
V1P2 Chest z
CFC_180
Max: 8.4 [g] at 0.083 [s]
Min: -5.3 [g] at 0.076 [s]



V1P2 Chest Resultant
CFC_180
Max: 41.7 [g] at 0.076 [s]
Min: 0.1 [g] at -0.050 [s]



2007 NCAP Test 7 2007 Kia Rondo
M70504 - December 19, 2006



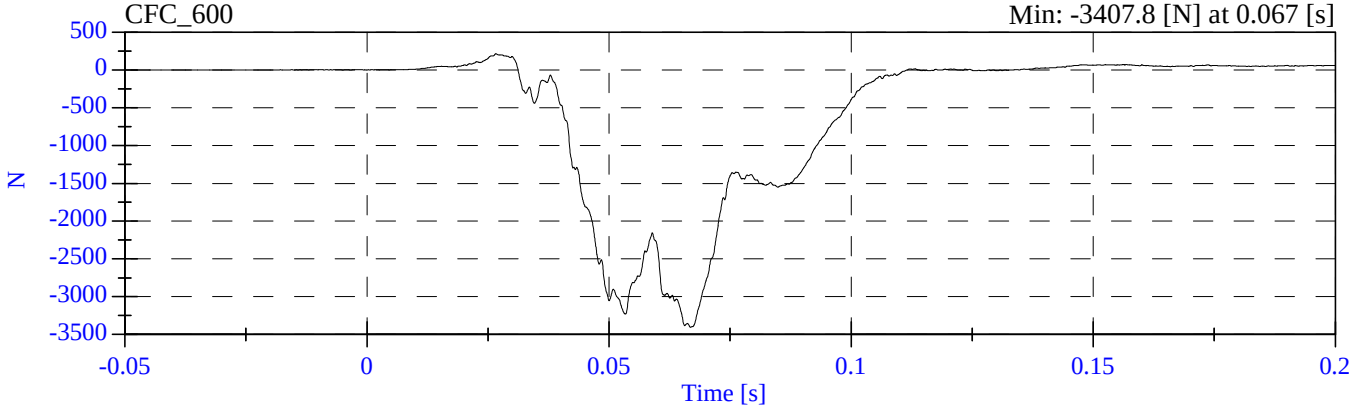
2007 NCAP Test 7 2007 Kia Rondo
M70504 - December 19, 2006

V1P2 Left Femur z

Max: 216.0 [N] at 0.027 [s]

CFC_600

Min: -3407.8 [N] at 0.067 [s]

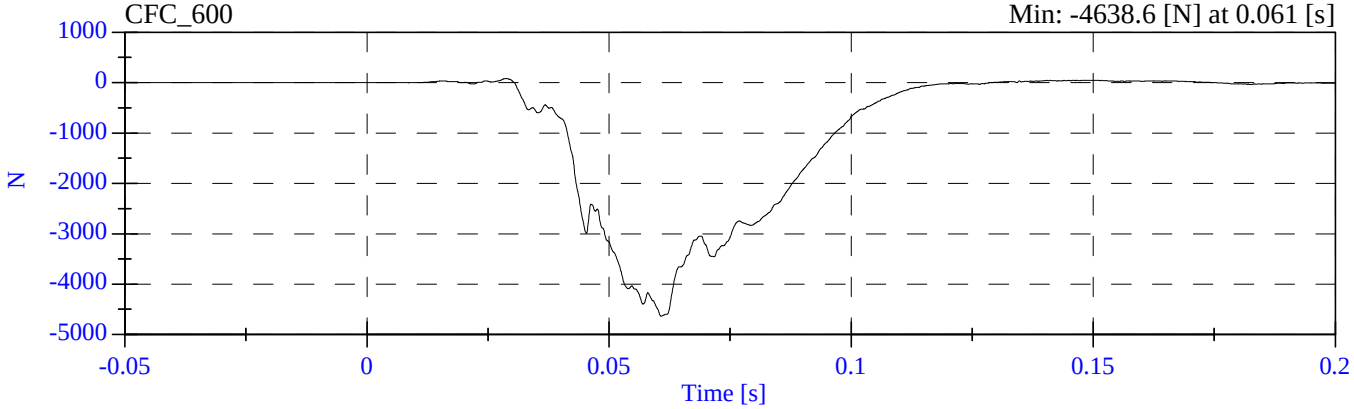


V1P2 Right Femur z

Max: 82.1 [N] at 0.029 [s]

CFC_600

Min: -4638.6 [N] at 0.061 [s]



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.

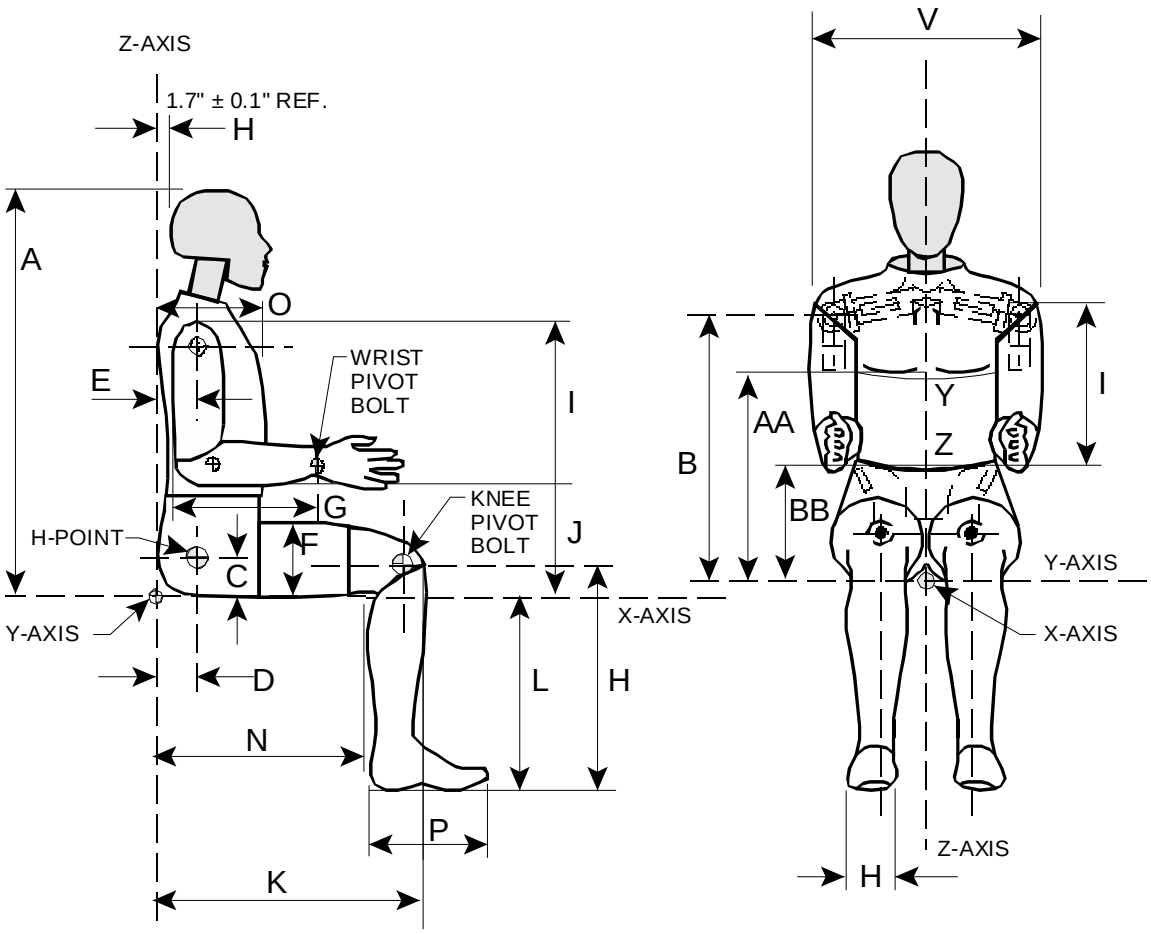
Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	61	August 30, 2006
#2/Right Front Passenger	64	August 30, 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 Indicant 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	61
Sequential Test Number	1
Date	August 24, 2007
Workfile	4001

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	273.59
Peak Lateral Acceleration	15 G's Max	7.61
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	61	
Sequential Test Number	1	
Date	August 25, 2006	6 Axis Neck Transducer
Workfile	4001	

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	7.01
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.89
	20 ms	17.60 - 22.60 G's	21.91
	30 ms	12.50 - 18.50 G's	18.38
Max Pendulum G's Above 30 ms		29 G's Max	19.77
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	40.70
D Plane Rotation	Max	64 - 78 Deg	68.92
	Time	57 - 64 ms	61.10
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	97.22
	Time	47 - 58 ms	51.40
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.20
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	97.80

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	61	
Sequential Test Number	1	
Date	August 28, 2006	6 Axis Neck Transducer
Workfile	4001	

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	17.20
	20 ms	14.00 - 19.00 G's	16.89
	30 ms	11.00 - 16.00 G's	15.70
Max Pendulum G's Above 30 ms		22 G's Max	17.99
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	41.50
D Plane Rotation	Max	81 - 106 Deg	96.48
	Time	72 - 82 ms	78.80
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-78.98
	Time	65 - 79 ms	75.50
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	156.10
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	143.30

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	61
Sequential Test Number	1
Date	August 30, 2006
Workfile	4001

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	6.74
Maximum Deflection	63.50 – 72.64 mm	64.26
Maximum Resistive Force	5159.9 – 5893.9 N	5736.68
Internal Hysteresis	69 - 85 %	74.71

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	61
Sequential Test Number	1
Date	August 30, 2006
Workfile	4001

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	4844.17
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	5222.28

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 61
Sequential Test Number 1
Date August 30, 2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			50
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.7
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
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	3.4
Thigh Clearance	F	5.5 - 6.1 in	5.9
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.8
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.3
Elbow Rest Height	J	7.5 - 8.3 in	7.7
Buttock Knee Length	K	22.8 - 23.8 in	22.9
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.6
Chest Depth	O	8.4 - 9.0 in	8.6
Foot Length	P	9.9 - 10.5 in	10.0
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	39.0
Waist Circumference	Z	32.9 - 34.1 in	33.6

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number	64
Sequential Test Number	1
Date	August 24, 2006
Workfile	4001

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	260.36
Peak Lateral Acceleration	15 G's Max	10.42
Is Acceleration Curve Unimodal?	YES	8.21

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	64	
Sequential Test Number	1	
Date	August 28, 2006	6 Axis Neck Transducer
Workfile	4001	

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	6.92
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	22.55
	20 ms	17.60 - 22.60 G's	21.04
	30 ms	12.50 - 18.50 G's	18.21
Max Pendulum G's Above 30 ms		29 G's Max	18.21
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	40.00
D Plane Rotation	Max	64 - 78 Deg	73.54
	Time	57 - 64 ms	62.40
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	90.53
	Time	47 - 58 ms	54.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	120.90
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	100.60

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	64	
Sequential Test Number	1	
Date	August 28, 2006	6 Axis Neck Transducer
Workfile	4001	

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	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	17.70
	20 ms	14.00 - 19.00 G's	18.48
	30 ms	11.00 - 16.00 G's	15.03
Max Pendulum G's Above 30 ms		22 G's Max	15.03
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	38.20
D Plane Rotation	Max	81 - 106 Deg	104.11
	Time	72 - 82 ms	76.00
Moment About Occipital	Max	-79.99 - -52.88 N-m	-67.18
Condyle	Time	65 - 79 ms	70.90
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	156.30
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	146.70

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	64
Sequential Test Number	1
Date	August 30, 2006
Workfile	4001

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	6.83
Maximum Deflection	63.50 – 72.64 mm	66.33
Maximum Resistive Force	5159.9 – 5893.9 N	5629.52
Internal Hysteresis	69 - 85 %	74.07

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	64
Sequential Test Number	1
Date	August 30, 2006
Workfile	4001

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	5171.43
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	4971.19

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 64
Sequential Test Number 1
Date August 30, 2006

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			50.0
Location for Chest Circumference	AA	16.9 -17.1 in	16.9
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.7
Shoulder Pivot Height	B	19.9 - 20.5 in	19.9
H-Point Height	C	3.3 - 3.5 in	3.5
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	5.6
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.7
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Elbow Rest Height	J	7.5 - 8.3 in	7.8
Buttock Knee Length	K	22.8 - 23.8 in	22.9
Popliteal Height	L	16.9 - 17.9 in	17.6
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Chest Depth	O	8.4 - 9.0 in	8.6
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	3.8
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.1
Waist Circumference	Z	32.9 - 34.1 in	33.6

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 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-J20018	16-Nov-06	16-May-07
	Y	ENDEVCO	AC-P16755	16-Nov-06	16-May-07
	Z	ENDEVCO	AC-J14667	16-Nov-06	16-May-07
Head	X (R)	ENDEVCO	AC-J38127	16-Nov-06	16-May-07
	Y (R)	ENDEVCO	AC-J20569	16-Nov-06	16-May-07
	Z (R)	ENDEVCO	AC-J21963	16-Nov-06	16-May-07
Neck Load Cell	X	DENTON	LC-1916Fx	12-May-06	12-Nov-06
	Y	DENTON	LC-1916Fy	12-May-06	12-Nov-06
	Z	DENTON	LC-1916Fz	12-May-06	12-Nov-06
Neck Moment	X	DENTON	LC-1916Mx	12-May-06	12-Nov-06
	Y	DENTON	LC-1916My	12-May-06	12-Nov-06
	Z	DENTON	LC-1916Mz	12-May-06	12-Nov-06
Chest	X	ENDEVCO	AC-AAKC6	16-Nov-06	16-May-07
	Y	ENDEVCO	AC-AAKD0	16-Nov-06	16-May-07
	Z	ENDEVCO	AC-J27470	16-Nov-06	16-May-07
Chest	X (R)	ENDEVCO	AC-J21988	16-Nov-06	16-May-07
	Y (R)	ENDEVCO	AC-J20027	16-Nov-06	16-May-07
	Z (R)	ENDEVCO	AC-J36741	16-Nov-06	16-May-07
Chest Deflection	X	SERVO	DS-061	07-Apr-06	07-Oct-06
Pelvic	X	ENTRAN	AC-99H30-Z13	16-Nov-06	16-May-07
	Y	ENTRAN	AC-01G18-F14	16-Nov-06	16-May-07
	Z	ENTRAN	AC-02I02I05-F06	16-Nov-06	16-May-07

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-1532	21-Apr-06	21-Oct-06
Right Femur Load Cell	Fz	DENTON	LC-1533	21-Apr-06	21-Oct-06
Left Upper Tibia	Mx	DENTON	LC-268Mx	21-Apr-06	21-Oct-06
	My	DENTON	LC-268My	21-Apr-06	21-Oct-06
Left Lower Tibia	Fz	DENTON	LC-196Fz	21-Apr-06	21-Oct-06
	Mx	DENTON	LC-196Mx	21-Apr-06	21-Oct-06
	My	DENTON	LC-196My	21-Apr-06	21-Oct-06
Right Upper Tibia	Mx	DENTON	LC-266Mx	17-Apr-06	17-Oct-06
	My	DENTON	LC-266My	17-Apr-06	17-Oct-06
Right Lower Tibia	Fz	DENTON	LC-179Fz	17-Apr-06	17-Oct-06
	Mx	DENTON	LC-179Mx	17-Apr-06	17-Oct-06
	My	DENTON	LC-179My	17-Apr-06	17-Oct-06
Left Foot Rear	X	ENDEVCO	AC-J18662	17-Nov-06	17-May-07
	Z	ENDEVCO	AC-J19927	17-Nov-06	17-May-07
Left Foot Front	Z	ENDEVCO	AC-J20030	16-Nov-06	16-May-07
Right Foot Rear	X	ENDEVCO	AC-DE54J	16-Nov-06	16-May-07
	Z	ENDEVCO	AC-J19440	16-Nov-06	16-May-07
Right Foot Front	Z	ENDEVCO	AC-J20382	16-Nov-06	16-May-07
Lap Belt Load Cell		First Technology	LC-156	11-Jul-06	11-Jan-07
Shoulder Belt Load Cell		First Technology	LC-159	11-Jul-06	11-Jan-07

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-J27517	04-Dec-06	04-Jun-07
	Y	ENDEVCO	AC-AAKB1	01-Dec-06	01-Jun-07
	Z	ENDEVCO	AC-AAK48	01-Dec-06	01-Jun-07
Head	X (R)	ENDEVCO	AC-P16194	04-Dec-06	04-Jun-07
	Y (R)	ENDEVCO	AC-J14688	04-Dec-06	04-Jun-07
	Z (R)	ENDEVCO	AC-P21399	01-Dec-06	01-Jun-07
Neck Load Cell	X	DENTON	LC-1912Fx	10-May-06	10-Nov-06
	Y	DENTON	LC-1912Fy	10-May-06	10-Nov-06
	Z	DENTON	LC-1912Fz	10-May-06	10-Nov-06
Neck Moment	X	DENTON	LC-1912Mx	10-May-06	10-Nov-06
	Y	DENTON	LC-1912My	10-May-06	10-Nov-06
	Z	DENTON	LC-1912Mz	10-May-06	10-Nov-06
Chest	X	ENDEVCO	AC-J23946	01-Dec-06	01-Jun-07
	Y	ENDEVCO	AC-AGAC4	01-Dec-06	01-Jun-07
	Z	ENDEVCO	AC-P16225	01-Dec-06	01-Jun-07
Chest	X (R)	ENTRAN	AC-03E03E21-M20	01-Dec-06	01-Jun-07
	Y (R)	ENDEVCO	AC-P15638	01-Dec-06	01-Jun-07
	Z (R)	ENDEVCO	AC-P16517	01-Dec-06	01-Jun-07
Chest Deflection	X	SERVO	DS-064	12-Jun-06	12-Dec-06
Pelvic	X	ENDEVCO	AC-AJ5R0	04-Dec-06	04-Jun-07
	Y	ENDEVCO	AC-J22036	04-Dec-06	04-Jun-07
	Z	ENDEVCO	AC-P32204	04-Dec-06	04-Jun-07

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

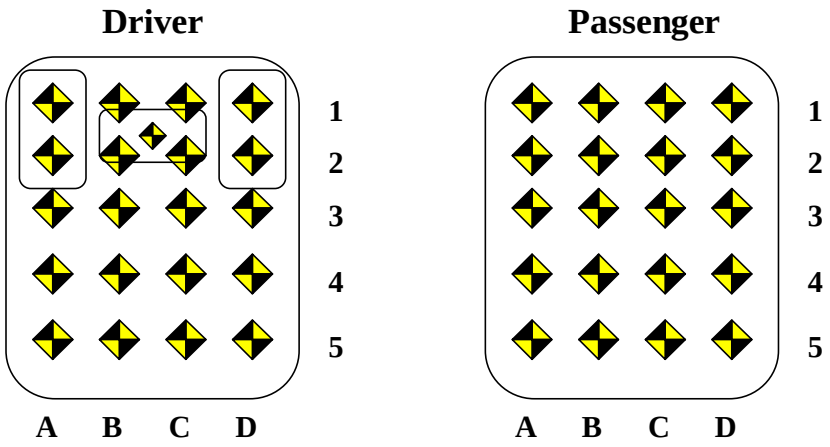
PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-1525	21-Apr-06	21-Oct-06
Right Femur Load Cell	Fz	DENTON	LC-1526	21-Apr-06	21-Oct-06
Left Upper Tibia	Mx	DENTON	LC-404Mx	09-May-06	09-Nov-06
	My	DENTON	LC-404My	09-May-06	09-Nov-06
Left Lower Tibia	Fz	DENTON	LC-396Fz	09-May-06	09-Nov-06
	Mx	DENTON	LC-396Mx	09-May-06	09-Nov-06
	My	DENTON	LC-396My	09-May-06	09-Nov-06
Right Upper Tibia	Mx	DENTON	LC-374Mx	02-Dec-06	02-Jun-07
	My	DENTON	LC-374My	02-Dec-06	02-Jun-07
Right Lower Tibia	Fz	DENTON	LC-372Fz	14-Nov-06	14-May-07
	Mx	DENTON	LC-372Mx	14-Nov-06	14-May-07
	My	DENTON	LC-372My	14-Nov-06	14-May-07
Left Foot Rear	X	ENDEVCO	AC-J33376	04-Dec-06	04-Jun-07
	Z	ENDEVCO	AC-P16899	04-Dec-06	04-Jun-07
Left Foot Front	Z	ENDEVCO	AC-P17912	04-Dec-06	04-Jun-07
Right Foot Rear	X	ENDEVCO	AC-J20209	04-Dec-06	04-Jun-07
	Z	ENDEVCO	AC-J14234	04-Dec-06	04-Jun-07
Right Foot Front	Z	ENDEVCO	AC-J14669	04-Dec-06	04-Jun-07
Lap Belt Load Cell		First Technology	LC-173	11-Jul-06	11-Jan-07
Shoulder Belt Load Cell		First Technology	LC-178	11-Jul-06	11-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	11-Jan-07
Right Rear Seat Crossmember X	GS SENSORS	AC-9440-046	11-Jul-06	11-Jan-07
Top of Engine	ICS	AC-8083-037	12-Jul-06	12-Jan-07
Bottom of Engine	ICS	AC-FGP50	26-Jul-06	26-Jan-07
Right Disc Brake Caliper	ICS	AC-FGP03	26-Jul-06	26-Jan-07
Left Disc Brake Caliper	ICS	AC-FGP49	26-Jul-06	26-Jan-07
Left Seat Rear Crossmember Z	ICS	AC-FGP29	11-Jul-06	11-Jan-07
Right Seat Rear Crossmember Z	GS SENSORS	AC-9440-023	11-Jul-06	11-Jan-07

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

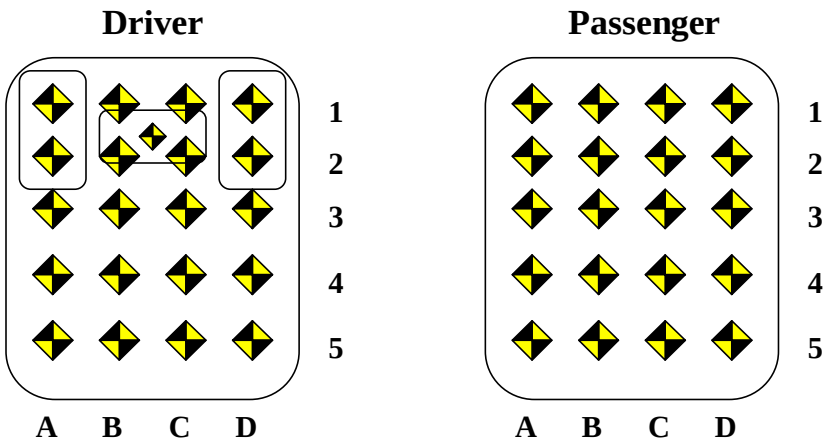


Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3156	-555	354	3118	-563	357	38	8	-3
B1	3298	-445	347	3247	-440	385	51	-5	-38
C1	3304	-320	349	3231	-316	383	73	-4	-34
D1	3301	-203	356	3219	-200	384	82	-3	-28
A2	3110	-557	308	3081	-559	302	29	2	6
B2	3248	-440	312	3202	-445	340	46	5	-28
C2	3246	-320	313	3180	-329	354	66	9	-41
D2	3244	-196	317	3163	-207	366	81	11	-49
A3	3061	-558	258	3046	-558	243	15	0	15
B3	3158	-440	263	3145	-444	265	13	4	-2
C3	3161	-317	267	3126	-330	280	35	13	-13
D3	3136	-197	271	3100	-221	277	36	24	-6
A4	3063	-559	258	3045	-558	242	18	-1	16
B4	3062	-439	261	3058	-444	251	4	5	10
C4	3063	-317	263	3057	-332	248	6	15	15
D4	3062	-198	264	3059	-217	284	3	19	-20
A5	2967	-556	252	2964	-561	244	3	5	8
B5	2966	-436	253	2965	-444	234	1	8	19
C5	2968	-318	256	2967	-328	238	1	10	18
D5	2963	-202	265	2963	-214	273	0	12	-8
BP	3144	-358	419	3135	-365	400	9	7	19
G	2968	-522	700	2972	-522	702	-4	0	-2
H	2980	-212	713	2982	-216	717	-2	4	-4
L	2715	-364	988	2731	-362	993	-16	-2	-5
AB	2603	-609	318	2606	-608	314	-3	-1	4

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	3307	222	378	3250	229	414	57	-7	-36
B1	3304	345	378	3263	340	416	41	5	-38
C1	3294	474	383	3261	459	410	33	15	-27
D1	3212	580	381	3190	577	389	22	3	-8
A2	3220	222	326	3180	213	356	40	9	-30
B2	3226	347	326	3190	334	363	36	13	-37
C2	3221	465	327	3197	453	352	24	12	-25
D2	3203	584	325	3190	576	332	13	8	-7
A3	3123	219	270	3106	214	275	17	5	-5
B3	3122	342	269	3110	333	279	12	9	-10
C3	3121	463	268	3125	458	277	-4	5	-9
D3	3118	588	267	3124	580	276	-6	8	-9
A4	3045	216	274	3041	213	307	4	3	-33
B4	3046	340	267	3032	335	300	14	5	-33
C4	3046	462	265	3040	457	294	6	5	-29
D4	3041	586	260	3037	577	276	4	9	-16
A5	2967	212	265	2977	203	278	-10	9	-13
B5	2969	337	262	2959	331	304	10	6	-42
C5	2962	457	260	2959	452	282	3	5	-22
D5	2963	585	255	2964	571	267	-1	14	-12
R	2929	223	716	2903	218	661	26	5	55
S	2936	524	707	2892	513	661	44	11	46
AB	2610	610	318	2606	603	312	4	7	6

R=Left side of bolster, S=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt