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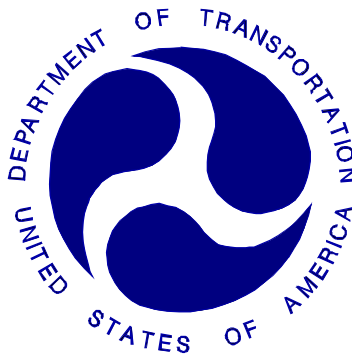
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

MAZDA MOTOR CORPORATION
2010 MAZDA 3
4-DOOR SEDAN

NHTSA NUMBER: MA5400

CALSPAN TEST NUMBER: 8865-NCAP-06

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



April 28, 2009

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
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Washington, DC 20590

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Prepared by:

James Czarnecki, Project Engineer

Approved by:

David J. Travale, Program Manager
Transportation Science Center

Approval Date:

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16. Abstract A frontal load cell barrier test of a 2010 Mazda 3 4-door Sedan was performed at Calspan Corporation's crash test facility in Buffalo, New York, on April 28, 2009. The impact velocity was 56.5 kph and the temperature at the barrier face was 21.0°C. The maximum post-test vehicle crush was 421 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 (061)	Passenger (064)
Head Injury Criteria (HIC - 36 ms)		-	1000	422.7	307.3
Maximum Thorax Acceleration (3 ms Clip)		g's	60 g's	39.6	39.8
Chest Displacement		mm	-76 mm	19.8	22.4
Left Femur Force		Newtons	-10000 N	-246.4	-4860.3
Right Femur Force		Newtons	-10000 N	-2475.1	-2693.3
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

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

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

1.2 TEST PROCEDURE

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

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.064) 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 - channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2010 Mazda 3 4-door Sedan at a velocity of 56.5 kph. The test was performed at Calspan on April 28, 2009. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

ATD	HIC	T ₁	T ₂	Clip (g)	T ₁	T ₂	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	422.7	68.2	104.1	39.6	68.5	71.5	19.8	-246.4	-2475.1
Passenger	307.3	61.0	97.0	39.8	73.5	76.5	22.4	-4860.3	-2693.3

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

TEST NOTES	
Data Channel	Anomalies
V1P1 RIGHT LOWER TIBIA MX	WIRE CUT AT 17 MSEC
V1 LEFT CALIPER AX	WIRE CUT AT 47 MSEC

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: MA5400 Test Mode: 56.3 kph Frontal Barrier
 Test Date: April 28, 2009 Time: 15:00 Temperature: 21.0 °C
 Vehicle Make/Model/Body Style: 2010 Mazda 3 4-door Sedan
 Vehicle Test Weight: 1497.0 kg Impact Velocity: 56.5 kph (55.5 – 57.1 kph)
 Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 421 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 to airbag , Back of head to head restraint	Face to airbag , Back of head to head restraint
Abdomen Contact:	None	None
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee Bolster	Knee Bolster
Right Knee Contact:	Knee Bolster	Knee Bolster

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed and operable without tools	Closed and operable without tools
Rear Door Opening	Closed and operable without tools	Closed and operable without tools
Hatch/Other Door Opening	Closed and operable without tools	
Front Seat Track Shift (mm)	0	10 forward
Front Seat Back Failure	None	None
Glazing Damage	No damage	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	757	518	595	623

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	895	915
Lap belt length as measured on ATD	mm	790	600
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	145	145

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2010 Mazda 3 4-door Sedan

NHTSA No. : MA5400 ; VIN: JM1BL1SF8A1124021 ; Color: Silver

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

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

Transmission Data: 5 speeds; X Manual; - 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? X Yes; - No; - N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 4/15/09 ; Odometer Reading 6 km

Selling Dealer: Ricart Mazda

Dealer Address: 4255 S. Hamilton Rd. Groveport, OH. 43125

TEST VEHICLE OPTIONS:

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

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

SAFETY BELT FEATURES:

Driver: X Pretensioner (Torso); X Load Limiter; X Adjustable Anchorage

Passenger: X Pretensioner (Torso); 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: Mazda Motor Corporation

Date of Manufacture 02/09

GVWR: 1768 kg; GAWR: 933 kg FRONT; 835 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) = 385.0 kg

No. of Occupants x 68.04 kg = 340.0 kg

Rated Cargo/Luggage Weight (RCLW) = 45.0 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 =	378.5	404.5	59.9	783.0
Rear =	274.0	249.5	40.1	523.5
Total Delivered Weight (UDW) =				1306.5

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW)	=	1306.5	kg
Rated Cargo/Luggage Weight (RCLW)	=	45.0	kg
Weight of 2 p.572 Dummies @ 76 each	=	152	kg
TARGET TEST WEIGHT	=	1503.5	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 38.5 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	415.0	440.0	57.1	855.0
Rear =	331.0	311.0	42.9	642.0
Total Vehicle Test Weight (ATW) =				1497.0

Weight of Ballast Secured in Vehicle Trunk Area¹ = 0 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG ²
AS DELIVERED:	704	704	719	715	1057.8
FULLY LOADED:	691	691	694	688	-
AS TESTED:	698	695	696	688	1132.2

Vehicle's Wheel Base: 2640 mm

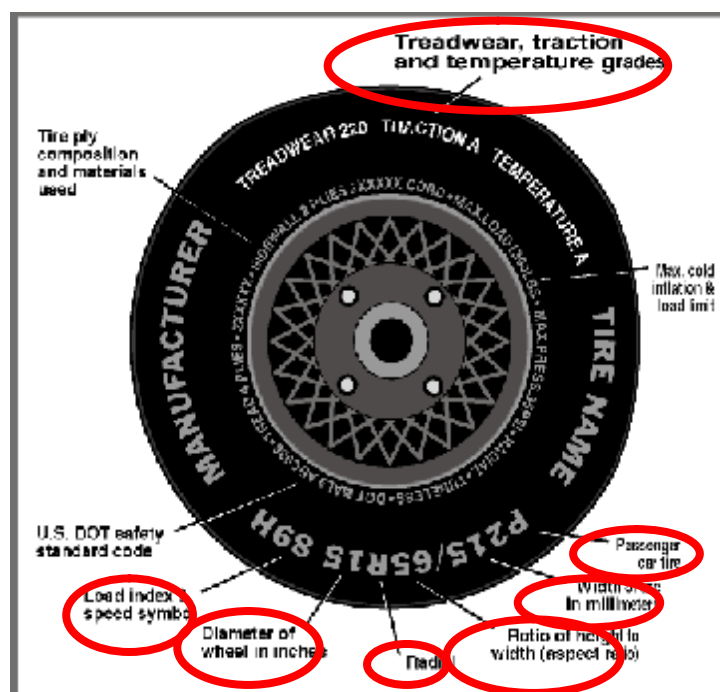
¹Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

²Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2010 Mazda 3 4-door Sedan

NHTSA Test No.: MA5400 Test Date: April 28, 2009



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	300	300
Cold Pressure (from tire placard - kPa)*	240	240
Recommended Tire Size (from tire placard)	P205/55R16	P205/55R16
Tire size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	BRIDGESTONE	BRIDGESTONE
Tire Name	TURANZA	TURANZA
Tire Type	PASSENGER	PASSENGER
Tire Width (mm)	205	205
Ratio of Height to Width (aspect ratio)	55	55
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	89H	89H
Treadwear	300	300
Traction Grade	A	A
Temperature Grade	A	A

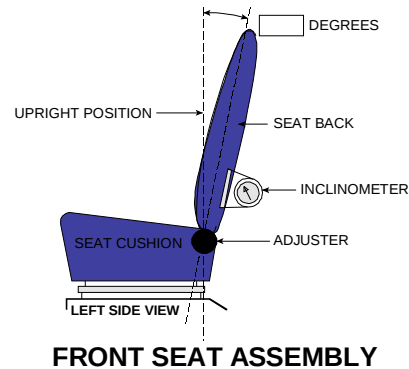
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2010 Vehicle Model: Mazda 3 Body Style : 4-door Sedan

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: N/A

Measurement instructions: Full forward is 5.2 degrees – moved 12 degrees rearward to 17.2 degrees

Seat back angle for passenger's seat: N/A

Measurement instructions: Full forward is 3.6 degrees – moved 12 degrees rearward to 15.6 degrees

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Full up forward to full down rearward is 328 mm – 154mm mid point

Scribed detents 0-26 on vehicle side sill – placed in detent 11 which is equal to 154 mm mid point

Positioning of the passenger's seat: Scribed detents 0-26 on vehicle side sill – placed in middle detent 13

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 55.0 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 = 50.6 to 51.7 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 50.7 liters

3.3 One-Third of Useable Capacity = 18.3 liters

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

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

With ignition turned "ON"

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

4. STEERING COLUMN ADJUSTMENTS:

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

Operational Instructions: Telescoping 0-50 mm travel, place at 25 mm mid point

Upper angle is 25.7, lower angle is 19.6 – mechanical middle is 22.65 degrees

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: Total Detents 0-3 – placed in 0 position for test

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

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

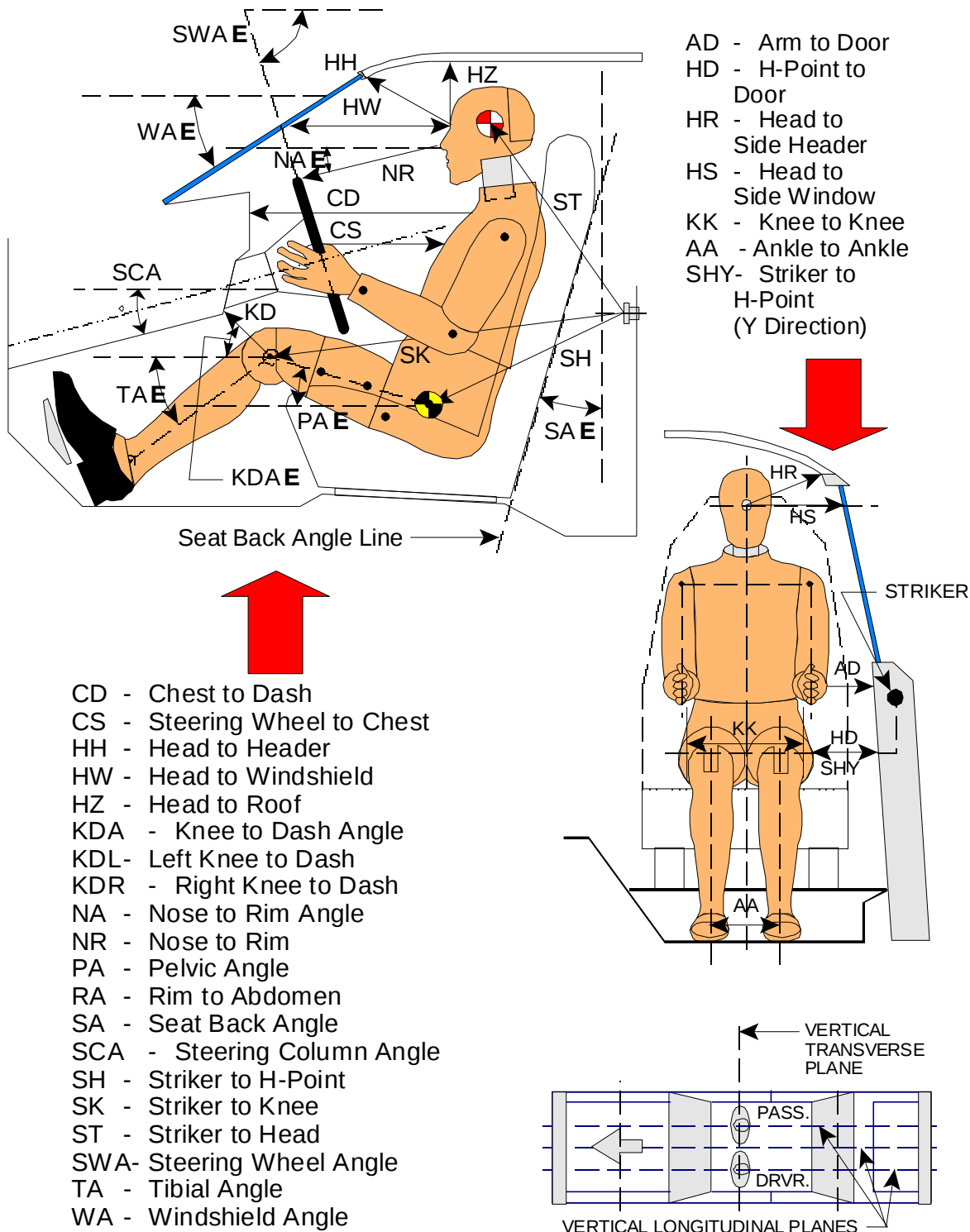
Comments: _____

None

DATA SHEET NO. 5

FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



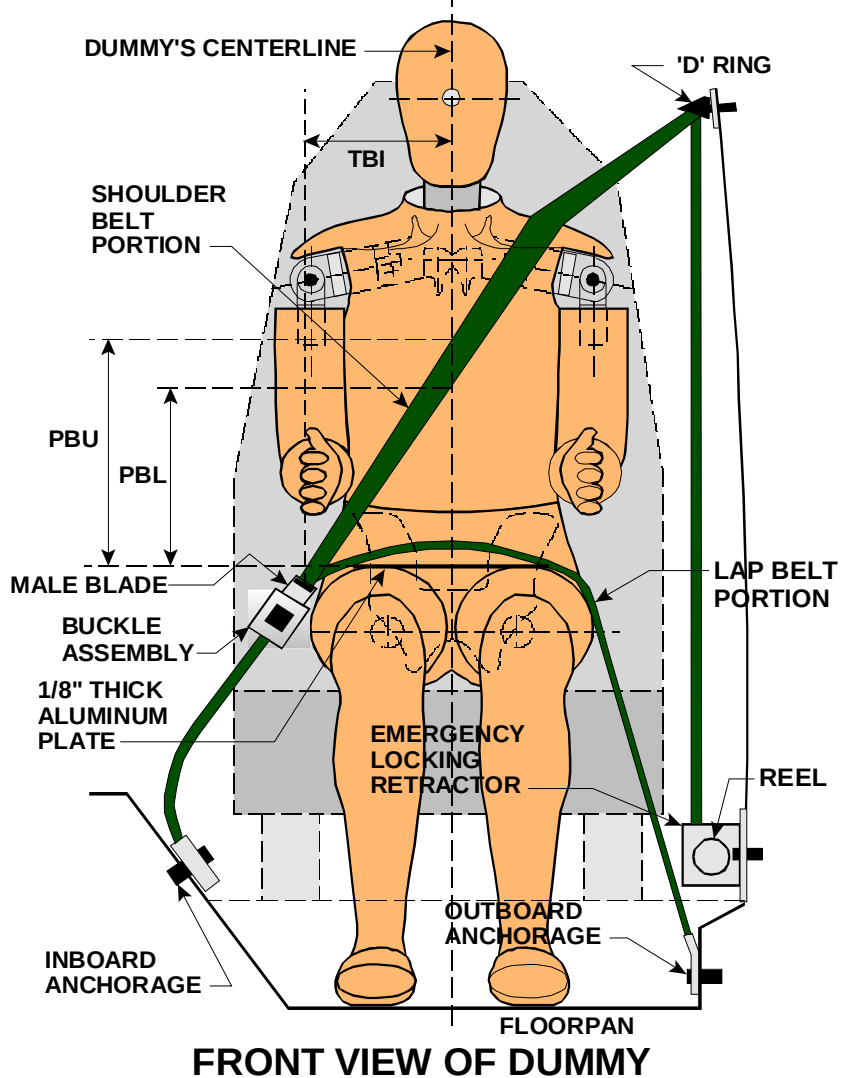
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA ^o	24 deg.			N/A		
SWA ^o	66.4 deg.			N/A		
SCA ^o	23.6 deg.			N/A		
SA ^o	(See Form 1) deg.			(See Form 1) deg.		
HZ	208			170		
HH	358			342		
HW	665			630		
HR	219			209		
NR	411	Angle	7.3 deg.	N/A		
CD	572			518		
CS	335			N/A		
RA	224			N/A		
KDL	163	Angle (KDA)	34 deg.	115		
KDR	115			157	Angle (KDA)	33 deg.
PA ^o	23.9 deg.			24.5 deg.		
TA ^o	50.0 deg.			42.7 deg.		
KK	315			250		
AA	351			180		
ST	474	Angle	16 deg.	495	Angle	14 deg.
SK	627	Angle	97 deg.	623	Angle	97 deg.
SH	290	Angle	134 deg.	282	Angle	130 deg.
SHY	273			265		
HS	343			328		
HD	144			146		
AD	114			103		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

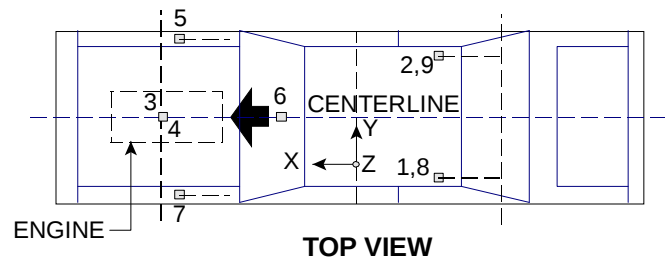
SEAT BELT POSITIONING DATA



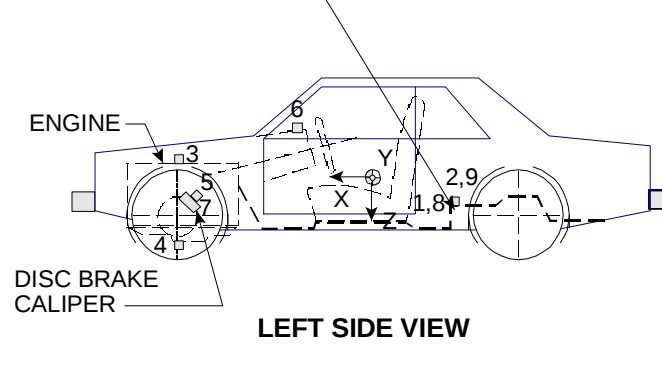
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	335	365
PBL-- Top surface of alum. plate to belt lower edge	260	275
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

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	1869	-455	267
2	Right Rear Seat Cross Member X	1866	467	253
3	Top of Engine Block	3741	248	782
4	Bottom of Engine	4293	196	184
5	Disc Brake Caliper @ Right Side	3584	618	616
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3582	-619	622
8	Left Rear Seat Cross Member Z	1869	-455	267
9	Right Rear Seat Cross Member Z	1866	467	253

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 15 mm molding.

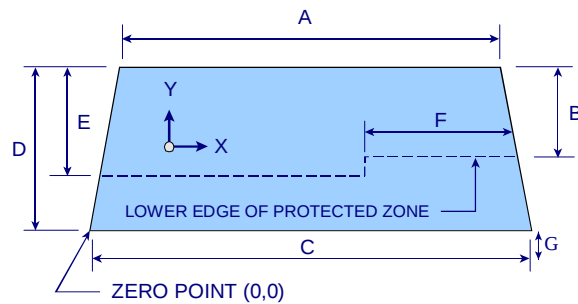
FMVSS 212 REQUIREMENTS:

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: 21.0°C.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2094.5	2094.5	100.0%
LEFT SIDE	2094.5	2094.5	100.0%
TOTAL	4189	4189	100.0%



DIMENSIONS (mm)	
A	1184
B	520
C	1465
D	770
E	559
F	395
G	15

FRONT VIEW OF WINDSHIELD

FAILURE DETAILS:

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

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

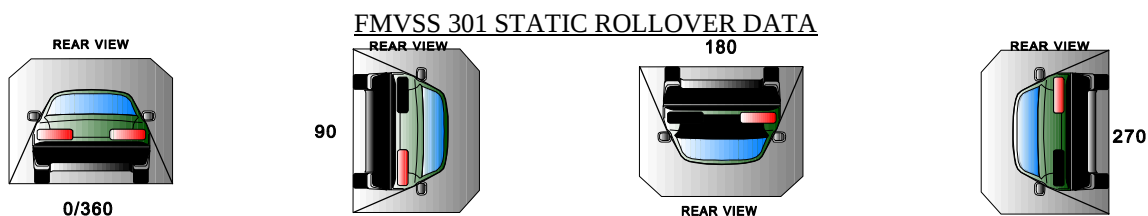
DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: _____ MA5400 TEST DATE: _____ April 28, 2009
VEHICLE MAKE/MODEL: _____ 2010 Mazda 3 4-door Sedan
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	13	seconds	5	minutes	6	minutes	13	seconds	7	minutes
90° - 180°	1	minutes	07	seconds	5	minutes	6	minutes	7	seconds	7	minutes
180°-270°	1	minutes	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes
270°-360°	1	minutes	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes

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

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

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

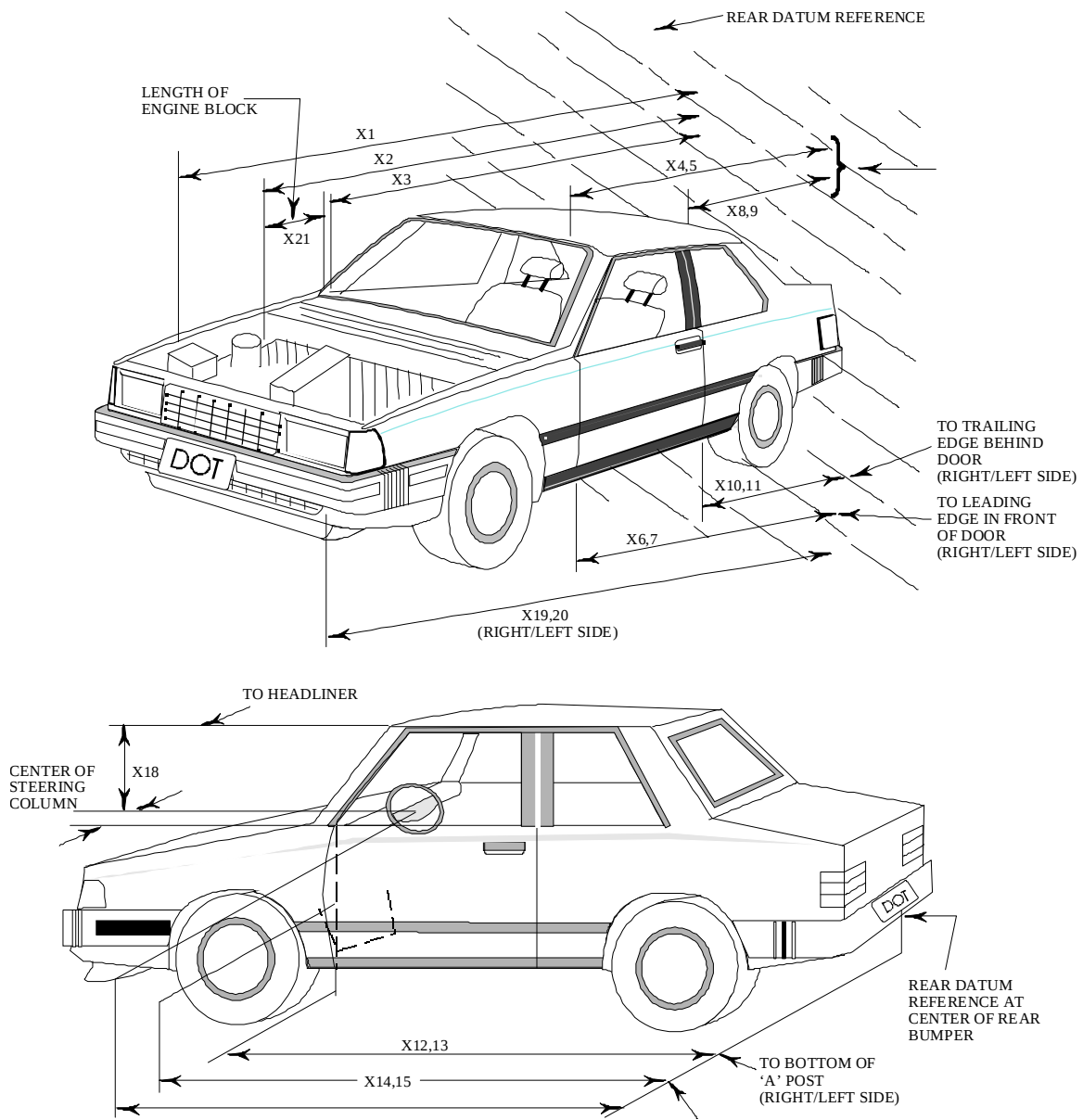
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS



DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: MA5400 TEST DATE: April 28, 2009
VEHICLE MAKE/MODEL: 2010 Mazda 3 4-door Sedan

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4580	4159	421
X2	Rear Surface of Vehicle to Front of Engine	4142	3834	308
X3	Rear Surface of Vehicle to Firewall	3567	3553	14
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3147	3147	0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3146	3145	1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3143	3140	3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3142	3140	2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2015	2016	-1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2015	2015	0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2080	2077	3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2079	2078	1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3179	3177	2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3178	3175	3
X14	Rear Surface of Vehicle to Firewall, Right Side	3549	3522	27
X15	Rear Surface of Vehicle to Firewall, Left Side	3547	3519	28
X16	Rear Surface of Vehicle to Steering Column	2671	2740	-69
X17	Center of Steering Column to "A" Post	290	293	-3
X18	Center of Steering Column to Headliner	400	408	-8
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4458	4065	393
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4455	4039	416
X21	Length of Engine Block	397	397	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2883	2882	1
CD	Rear Surface of Vehicle to Center of Dash Panel	2878	2878	0
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2883	2883	0

All Dimensions in mm

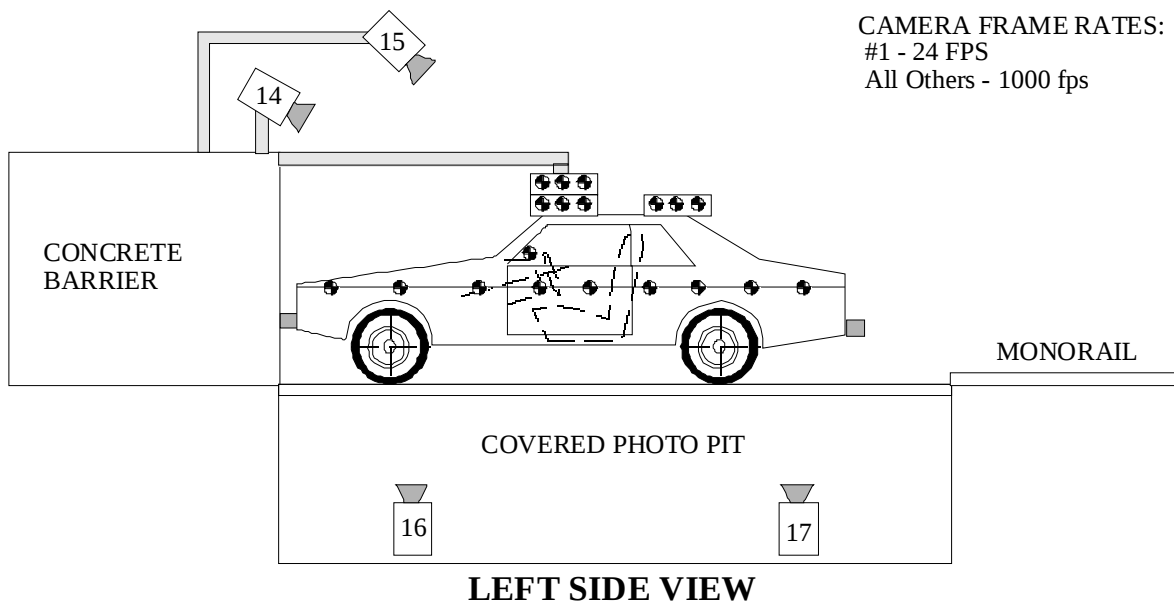
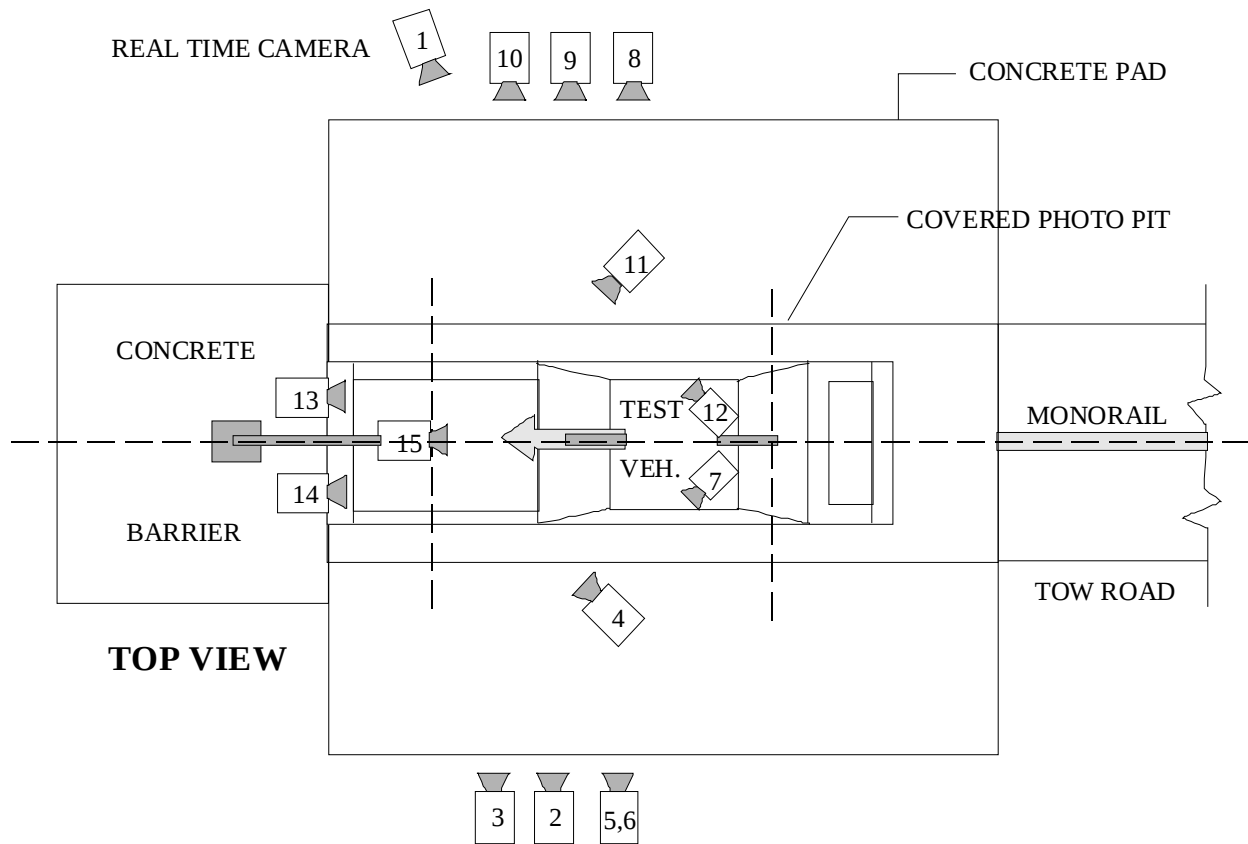
DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: MA5400 TEST DATE: April 28, 2009
VEHICLE MAKE/MODEL: 2010 Mazda 3 4-door Sedan

TARGET VEHICLE STRUCTURAL MEASUREMENTS

	Elements	Pre-Test (mm)
1	Total length	4580
2	Total Width	1810
3	Bumper Top Height	531
4	Bumper Bottom Height	410
5	Longitudinal Member Top Height	572
6	Distance Between Longitudinal Members	986
7	Longitudinal Member Width	85
8	Engine top height	837
9	Engine bottom height	184
10	Engine and gearbox width	580
11	Front bumper-engine distance	438
12	Front shock absorber fixing height	853
13	Bonnet leading edge height	778
14	Front shock absorber fixing width	1142
15	Front bumper – front axle distance	952
16	Front axle – A pillar distance	3626
17	A-pillar – B pillar distance	1171
18	B-pillar – rear axle distance	1619
19	B-pillar – C Pillar distance	874
20	Roof sill bottom height	1335
21	Roof sill top height	1437
22	Floor sill bottom height	262
23	Floor sill top height	358

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



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

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

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

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	6767	2155	964	-3	6344	28	1000
3	Left Side View	9119	1455	904	-4	8696	50	1000
4	Driver and Interior View	6893	3210	2051	-9	-	35	1000
5	Steering Column (Bottom)	7585	2465	1202	-5	7162	25	1000
6	Steering Column (Top)	7585	2465	1807	-9	7162	28-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	7176	2270	960	-1	6753	28	1000
9	Right Side View	9310	1755	930	-2	8887	50	1000
10	Right Passenger View	8360	2130	1135	-2	7937	35	1000
11	Passenger and Interior View	7266	3220	2045	-8	-	35	1000
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-35	-	13	500
14	Driver Front View	620	-92	1987	-36	-	13	500
15	Windshield View	0	-530	3374	-50	-	20	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0	2536	-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

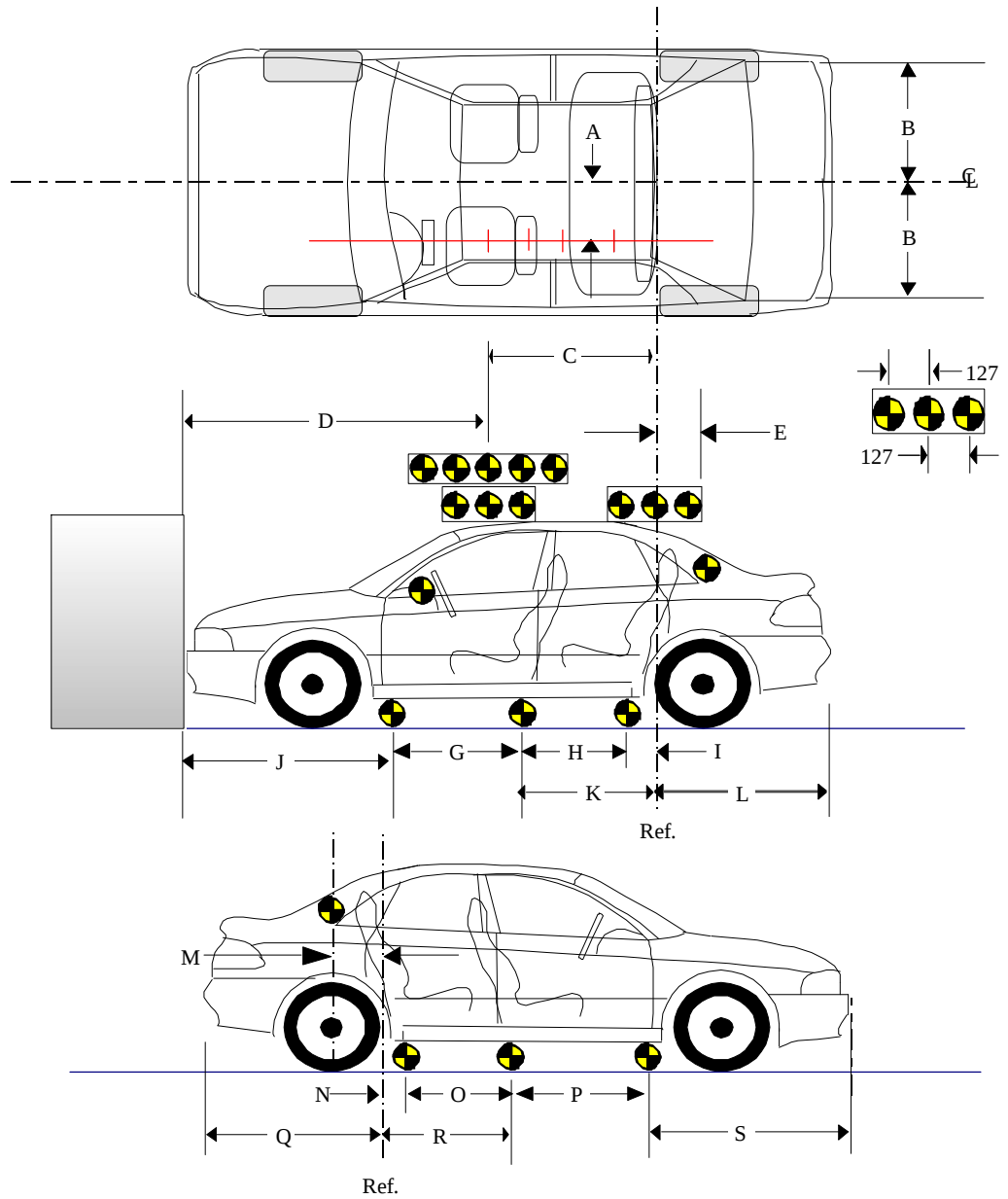
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

(Dimensions in millimeters)

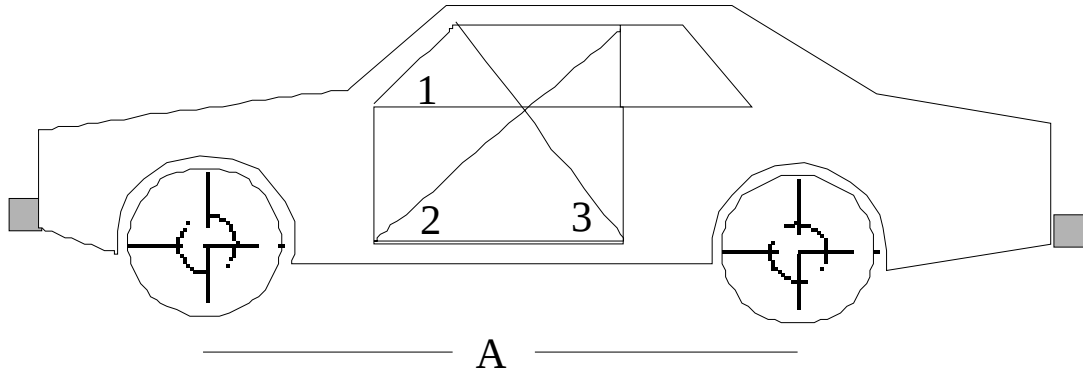
A	347
B	601
C	1217
D	2016
E	366
F	1470
G	877
H	877
I	123
J	1396
K	1000
L	1306
M	362
N	120
O	878
P	877
Q	1310
R	998
S	1395



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



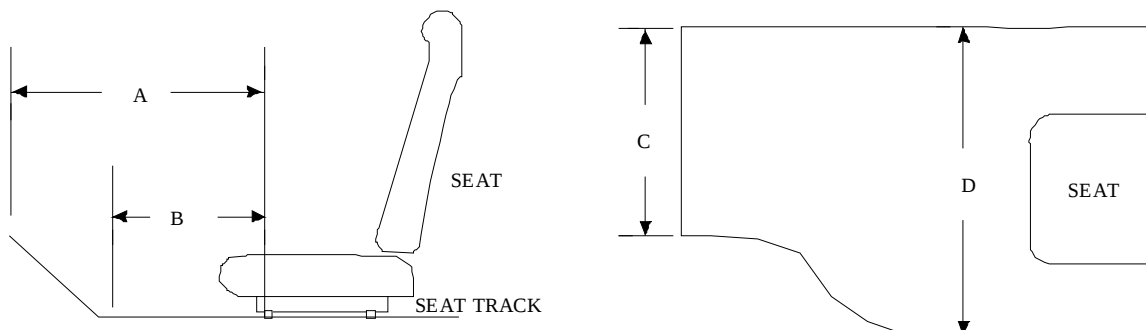
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	976	1455	970	976	1453	969
AFTER TEST	974	1457	970	975	1455	970
DIFFERENCE	2	-2	0	1	-2	-1

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2638	2637
AFTER TEST	2611	2536
DIFFERENCE	27	101

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	658	650	8
B	454	455	-1
C	471	468	3
D	389	383	6

PASSENGER

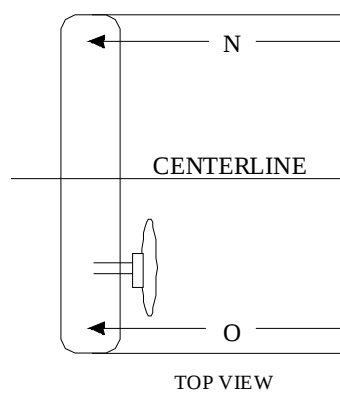
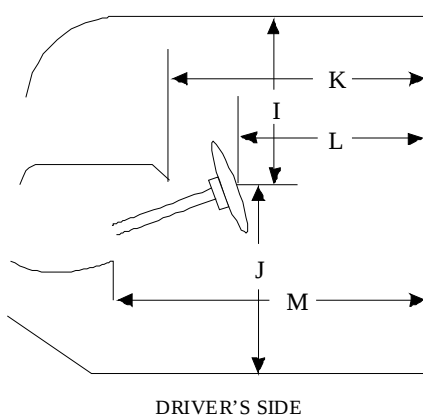
Measurement	Pre-Test	Post-Test	Difference
A	650	647	3
B	456	461	-5
C	458	452	6
D	472	472	0

Units = mm

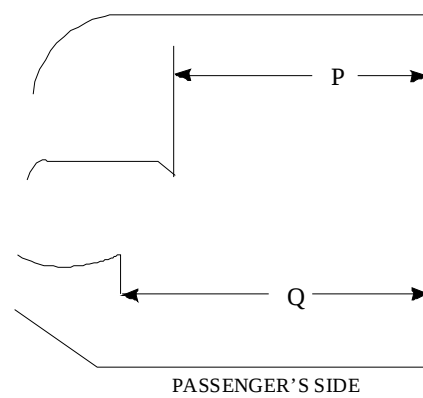
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



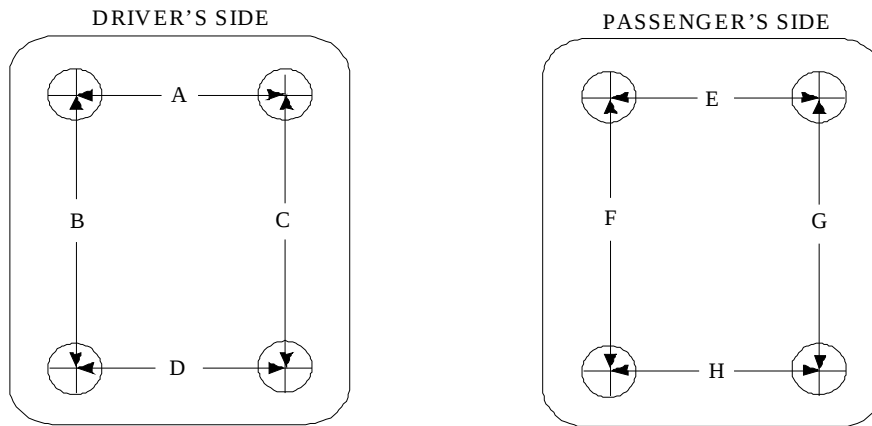
Measurement	Pre-Test	Post-Test	Difference
I	400	408	-8
J	657	661	-4
K	786	787	-1
L	562	631	-69
M	876	879	-3
N	773	773	0
O	775	775	0
P = K (PASS.)	817	817	0
Q = M (PASS.)	815	825	-10

Units = mm

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

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan

FLOORBOARD DEFORMATION



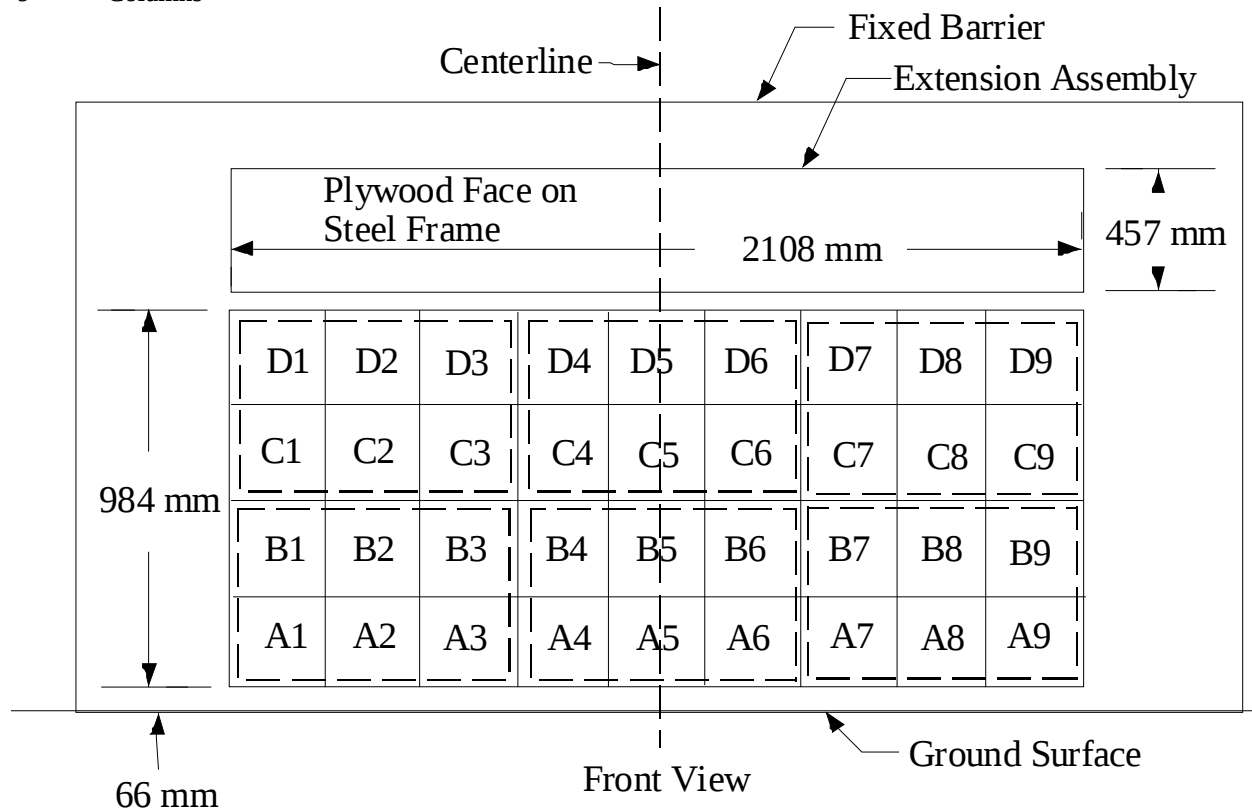
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	471	468	3
B	307	309	-2
C	297	297	0
D	389	383	6
E	458	452	6
F	296	293	3
G	273	273	0
H	472	472	0

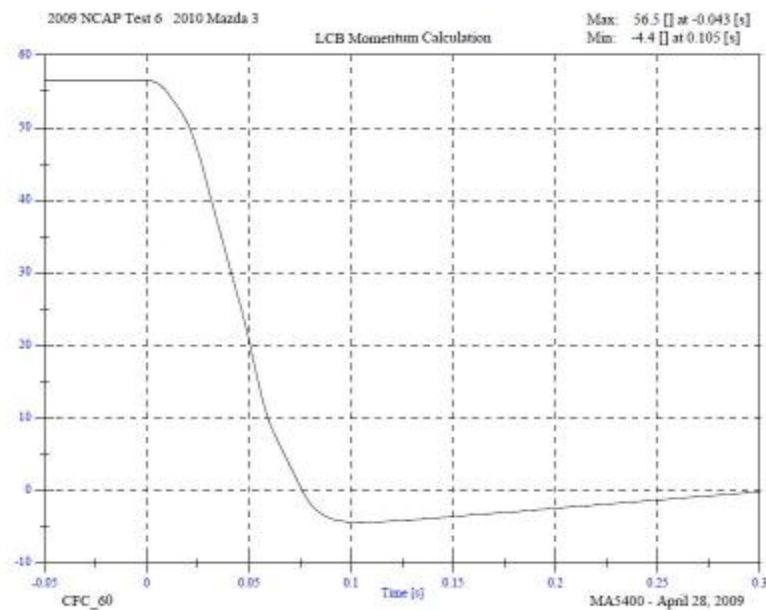
Units = mm

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: Mazda 3 4-door Sedan

NHTSA Test No.: MA5400 VIN: JM1BL1SF8A1124021

Model Year: 2010 Build Date: 02/09 Test Date: April 28, 2009

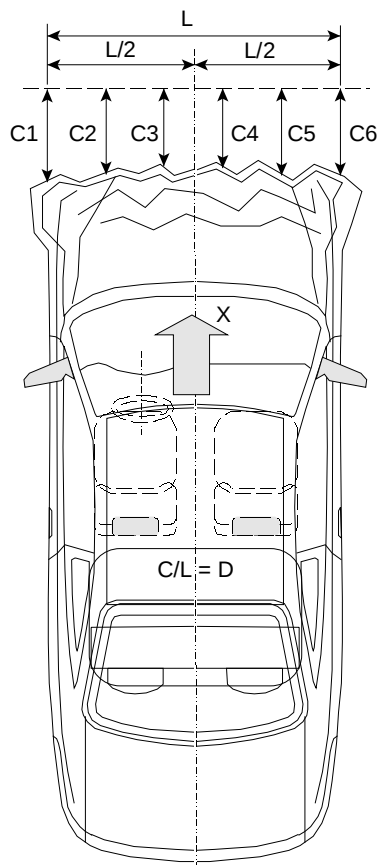
Vehicle Size Category: Sedan Test Weight: 1497.0 kg

Vehicle Wheelbase: 2640 mm; Front Overhang: 953 mm; Overall Width: 1810 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4298	3934	364
C2 =	4460	4110	350
C3 =	4541	4165	376
C4 =	4540	4178	362
C5 =	4460	4137	323
C6 =	4299	4023	276



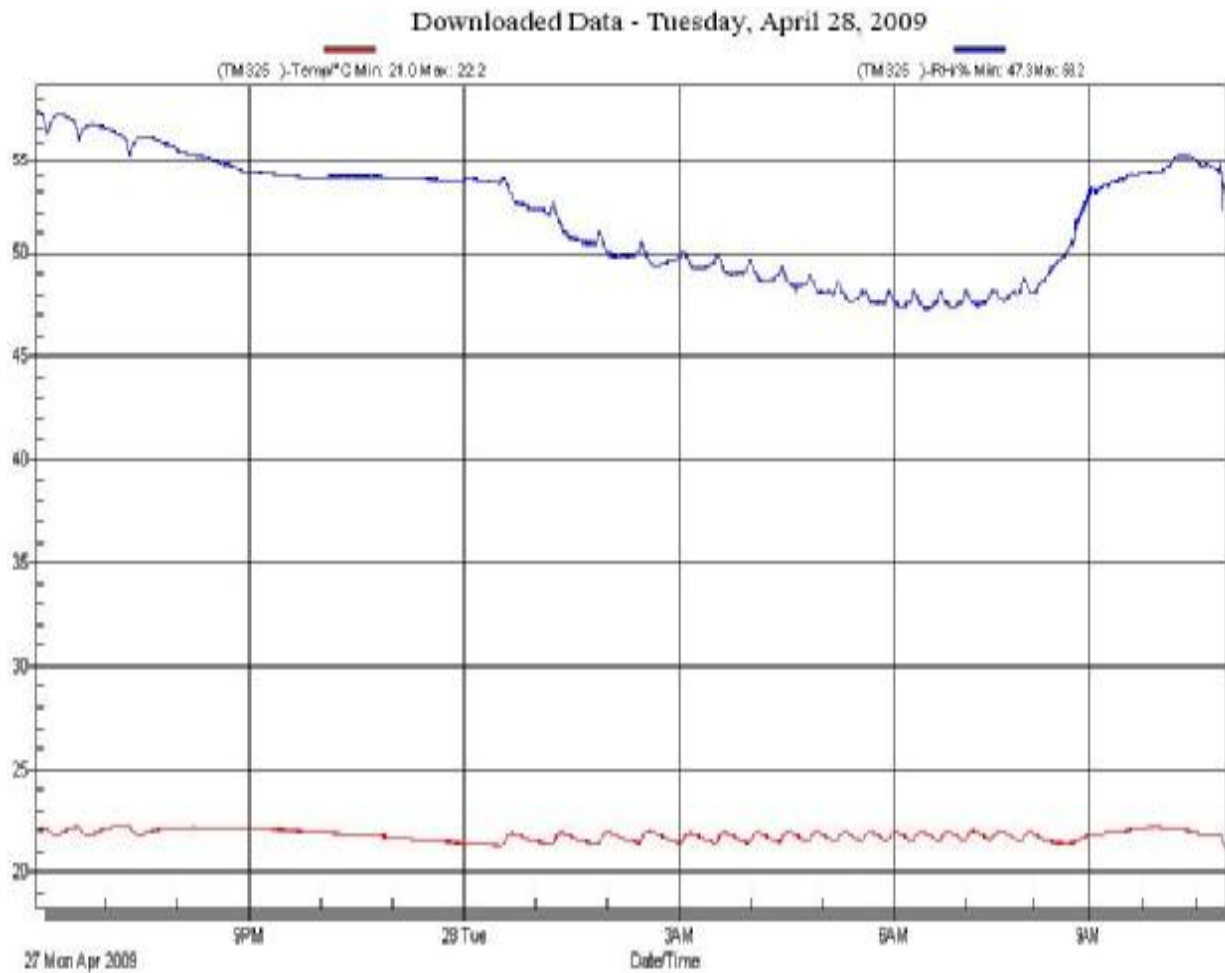
Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region:

L1=	<u>1163</u>	mm
L2=	<u>581.5</u>	mm
L5=	<u>232.6</u>	mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: MA5400 Vehicle: 2010 Mazda 3 4-door Sedan



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

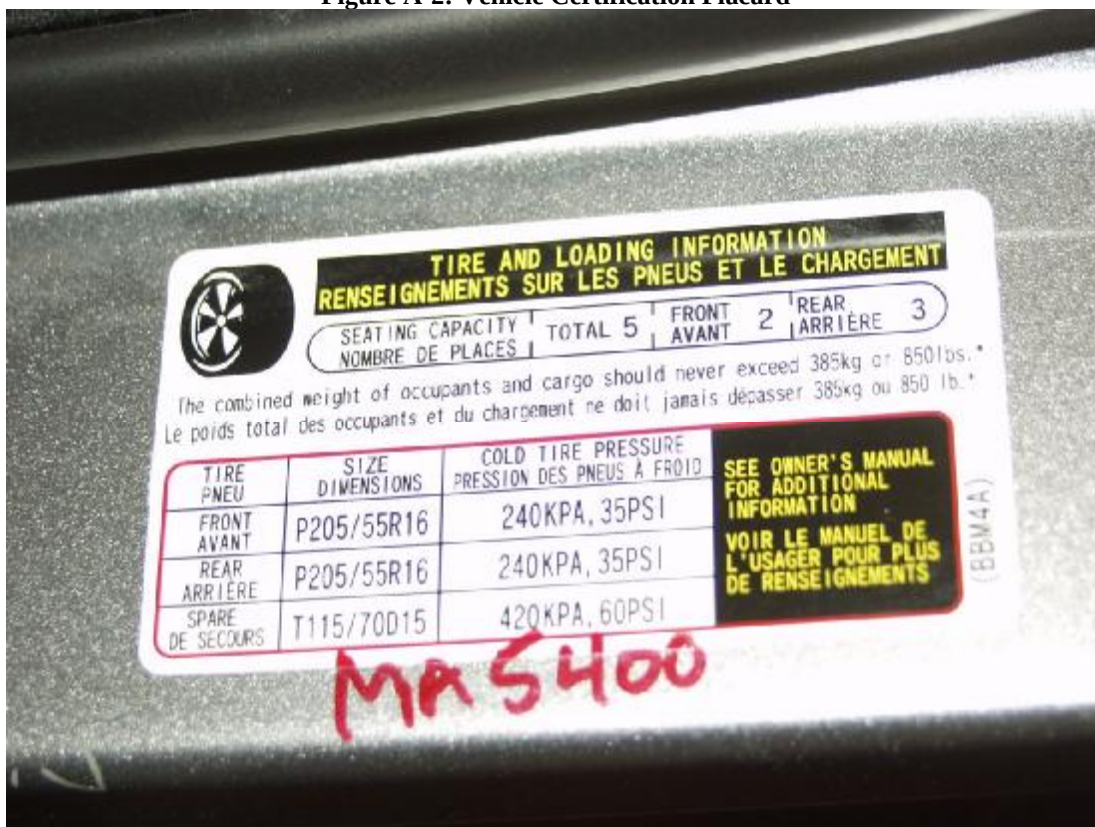


Figure A-3: Vehicle Tire Placard



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

Photo Not Available

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

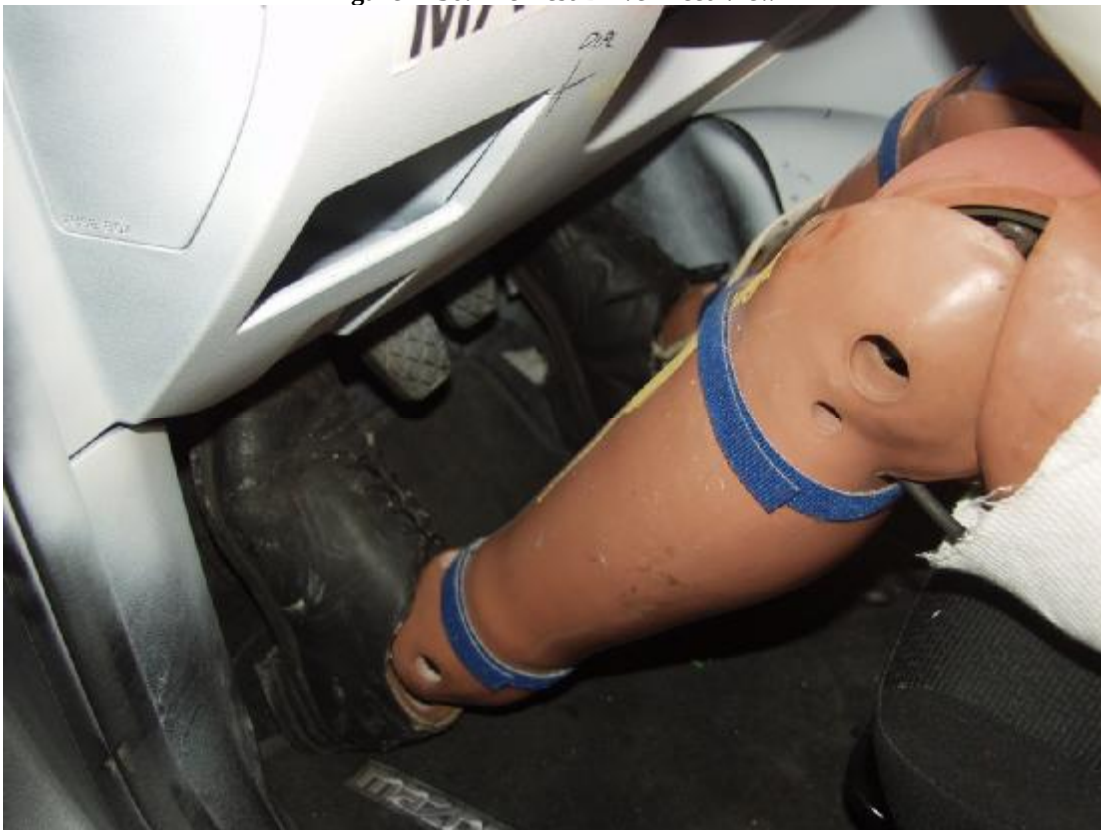


Figure A-37: Post-Test Driver Feet View



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°

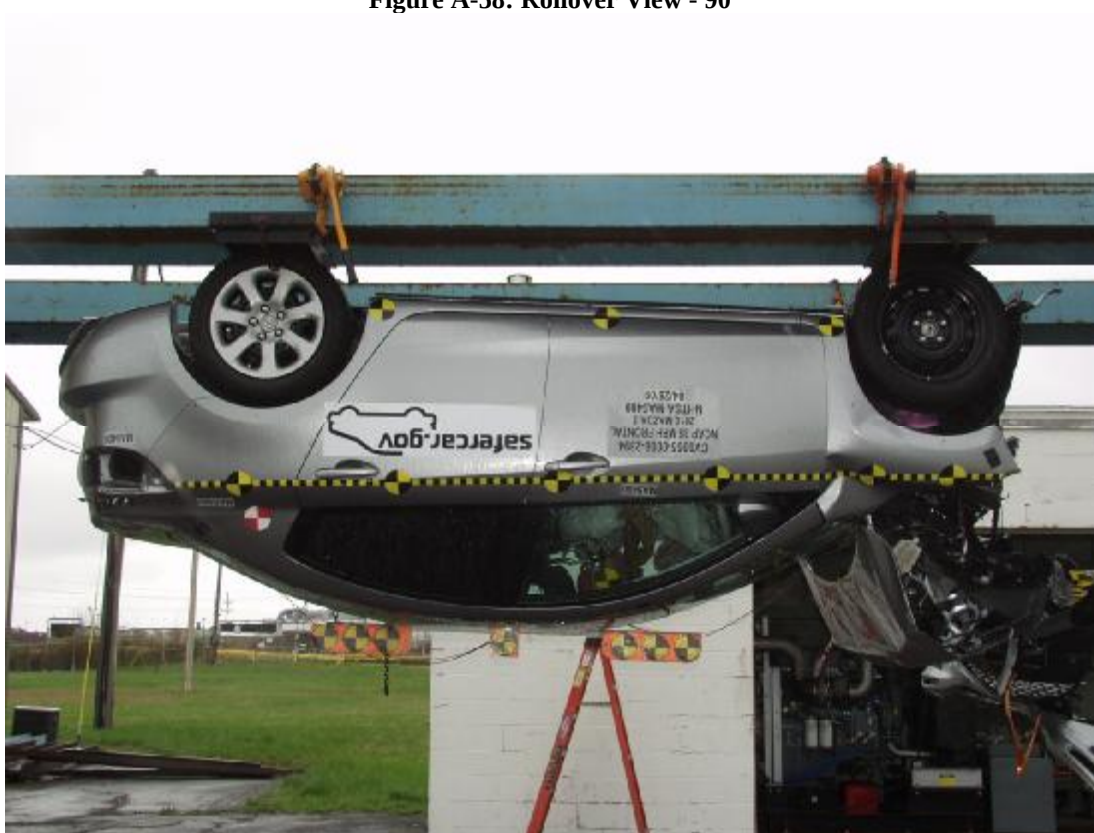


Figure A-59: Rollover View - 180°



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.: MA5400

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

Table of Data Plots

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

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

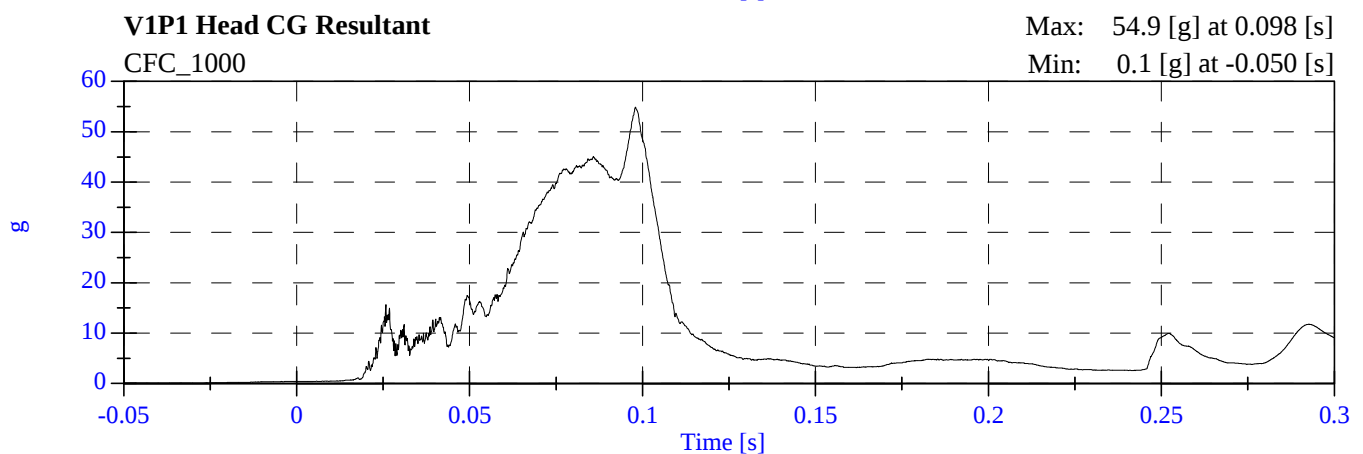
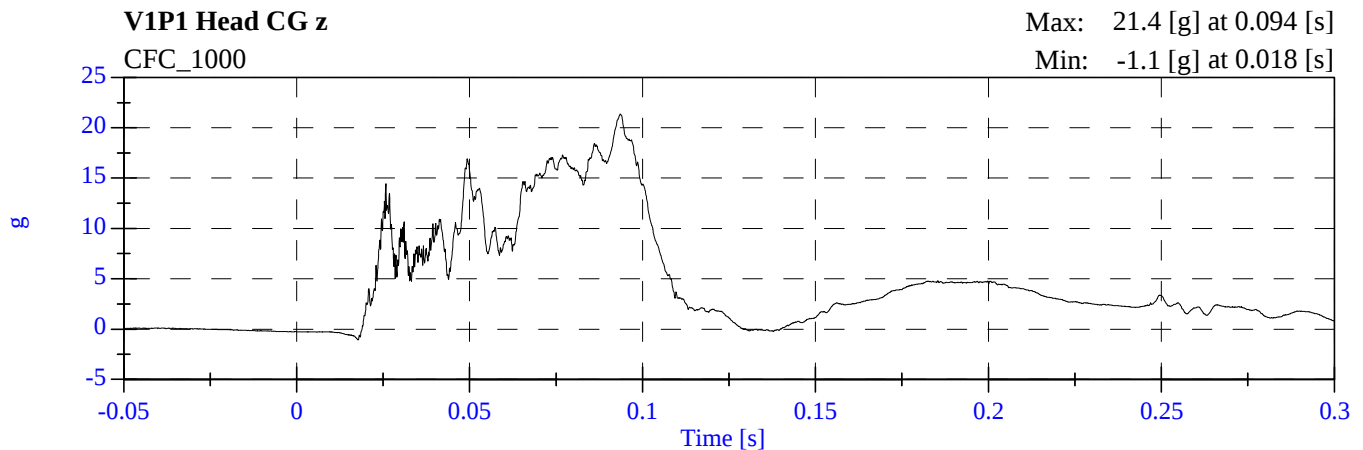
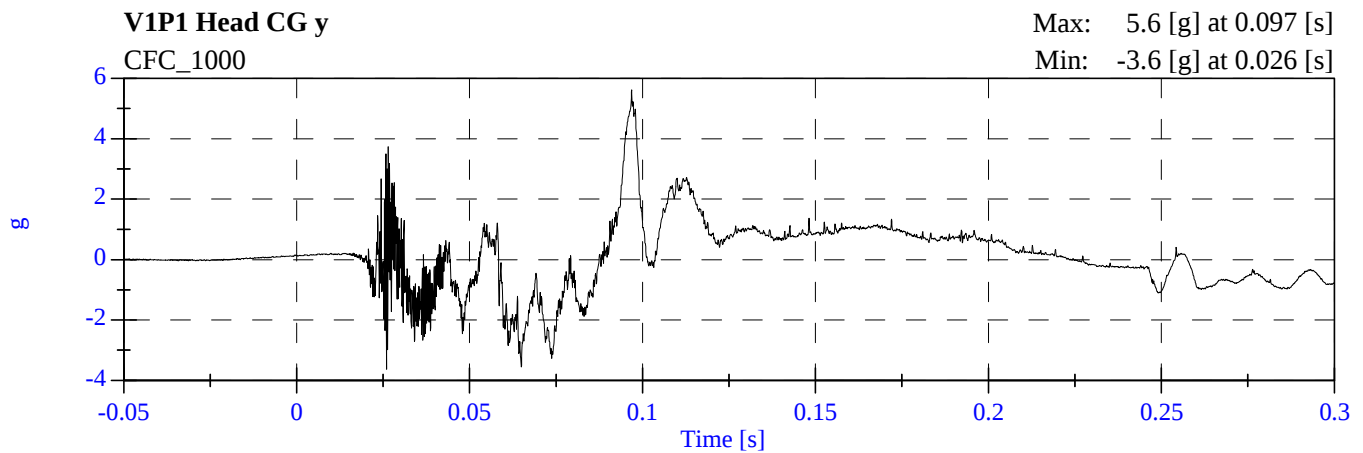
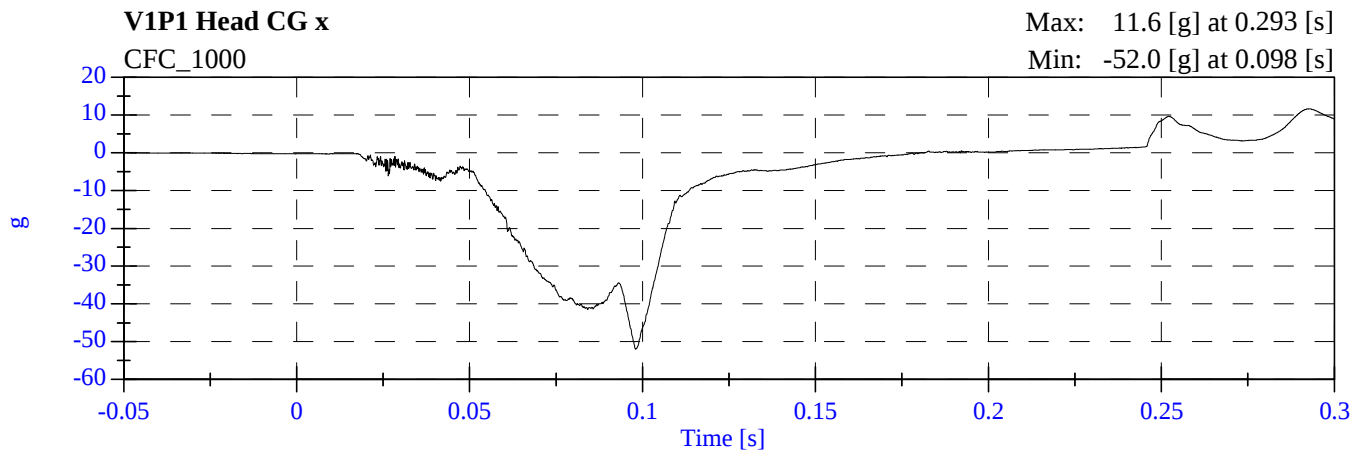
V1P1 Head CG Ax	V1P1 Lap Belt Load
V1P1 Head CG Ay	V1P1 Shoulder Belt Load
V1P1 Head CG Az	V1P2 Lap Belt Load
V1P1 Head CG Red Ax	V1P2 Shoulder Belt Load
V1P1 Head CG Red Ay	V1 Left Rear #1x
V1P1 Head CG Red Az	V1 Right Rear #2x
V1P1 Upper Neck Fx	V1 Engine Top #3x
V1P1 Upper Neck Fy	V1 Engine Bottom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

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	

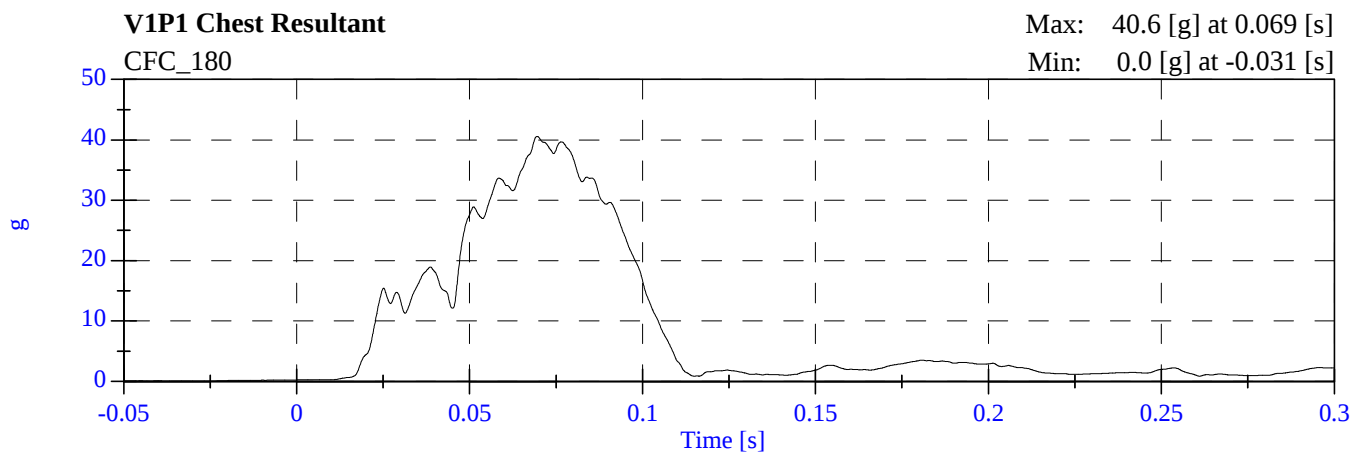
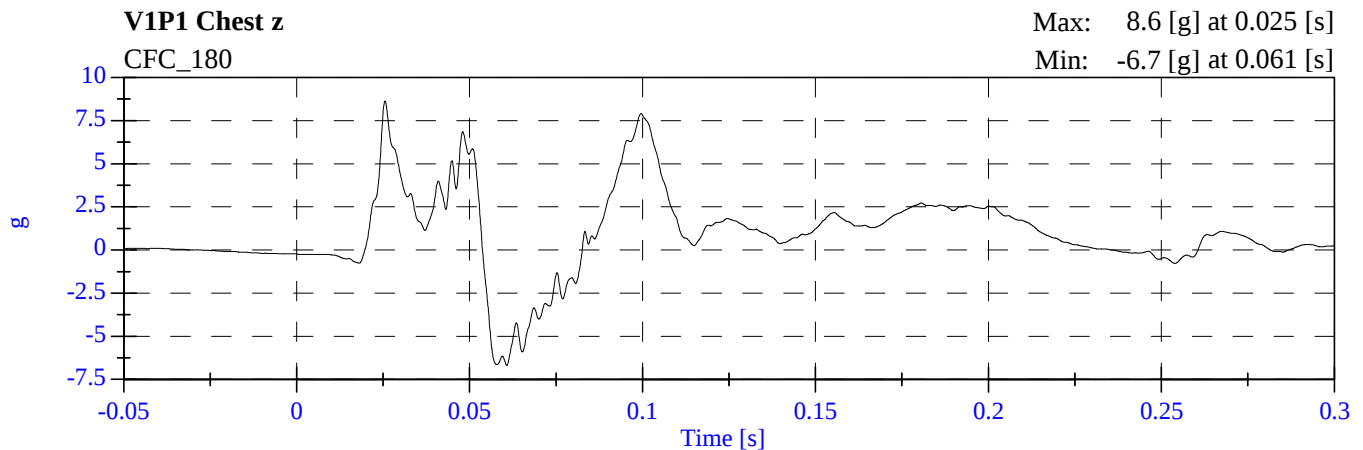
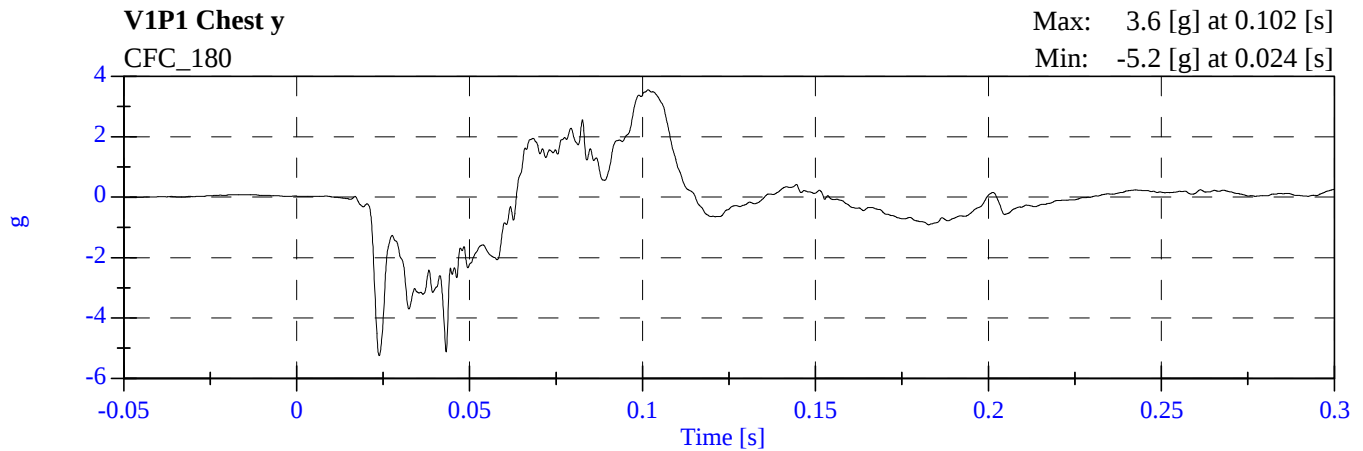
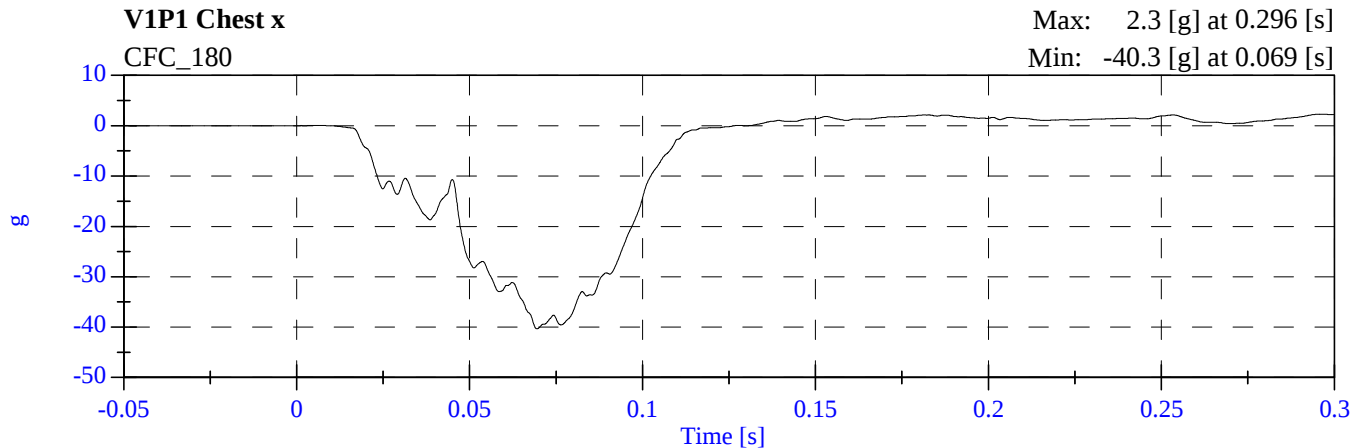
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Barrier Load Cell C4 Fx	
Barrier Load Cell C5 Fx	
Barrier Load Cell C6 Fx	
Barrier Load Cell C7 Fx	
Barrier Load Cell C8 Fx	
Barrier Load Cell C9 Fx	
Barrier Load Cell D1 Fx	
Barrier Load Cell D2 Fx	
Barrier Load Cell D3 Fx	
Barrier Load Cell D4 Fx	
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 RIGHT LOWER TIBIA MX	WIRE CUT AT 17 MSEC
V1 LEFT CALIPER AX	WIRE CUT AT 47 MSEC

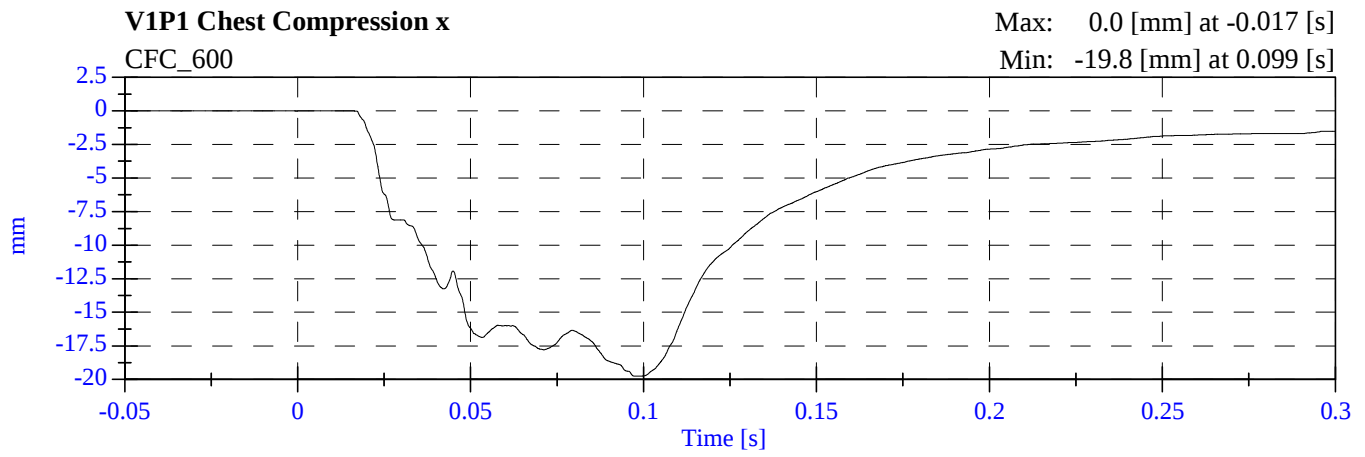
**2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009**



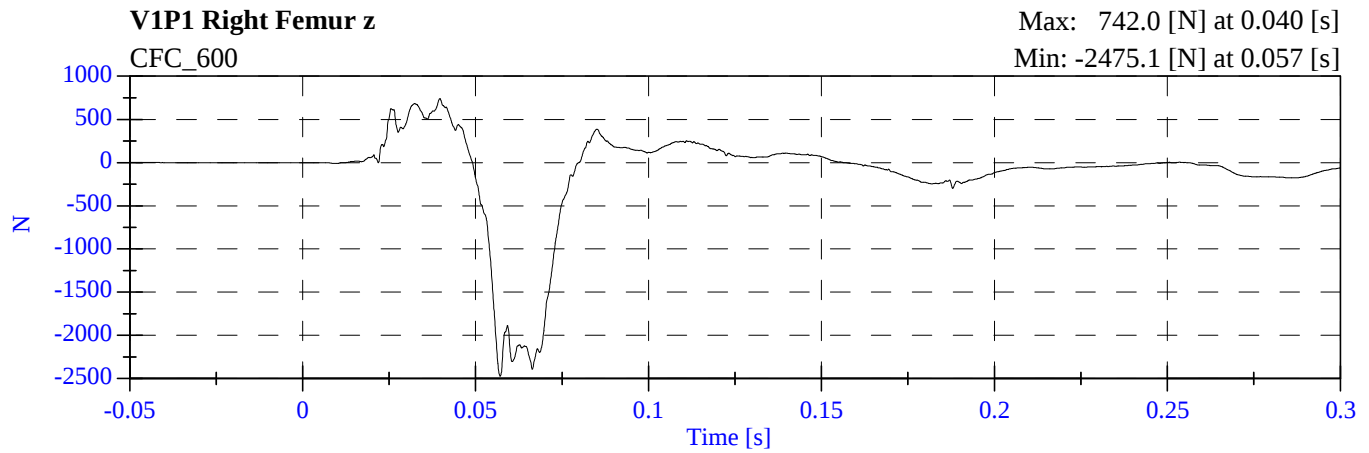
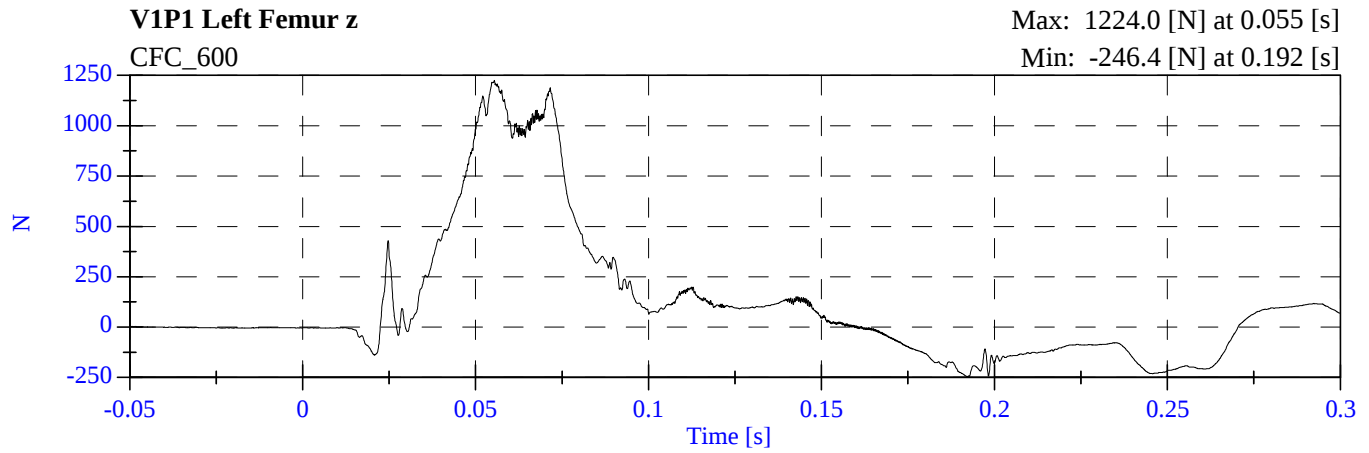
2009 NCAP Test 6 2010 Mazda 3 MA5400 - April 28, 2009



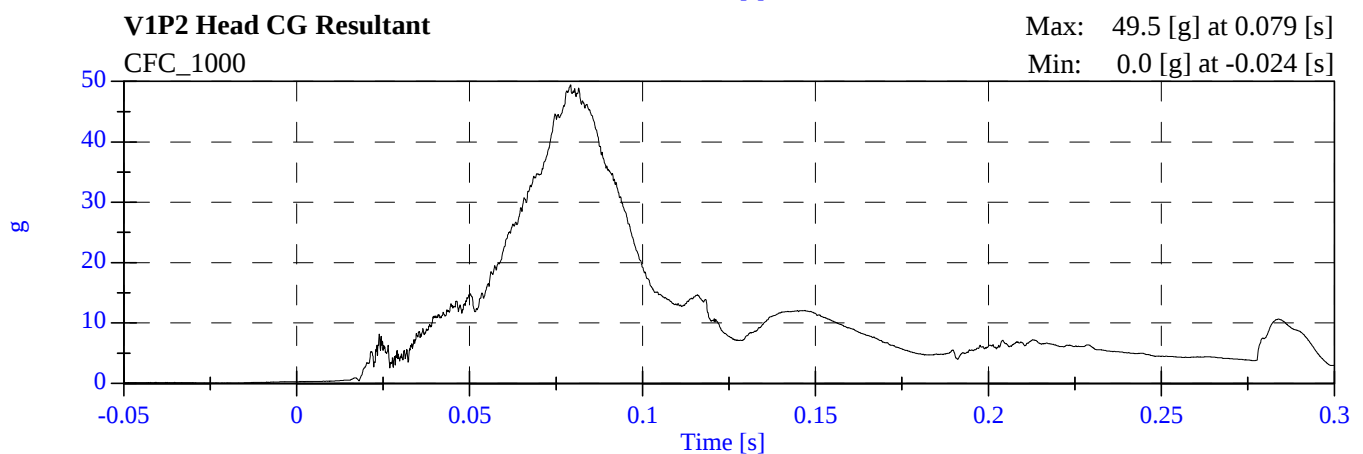
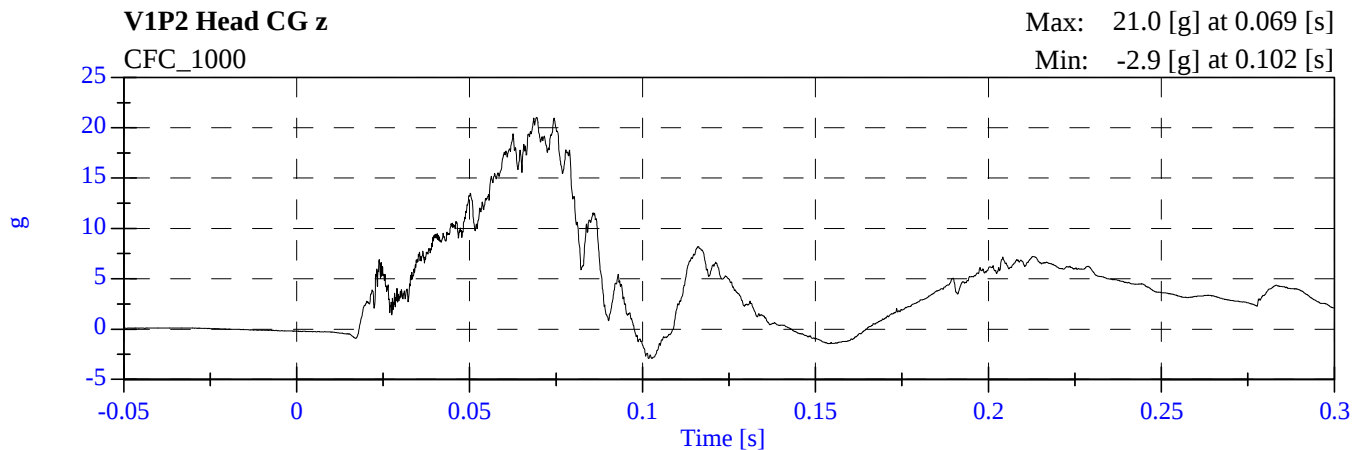
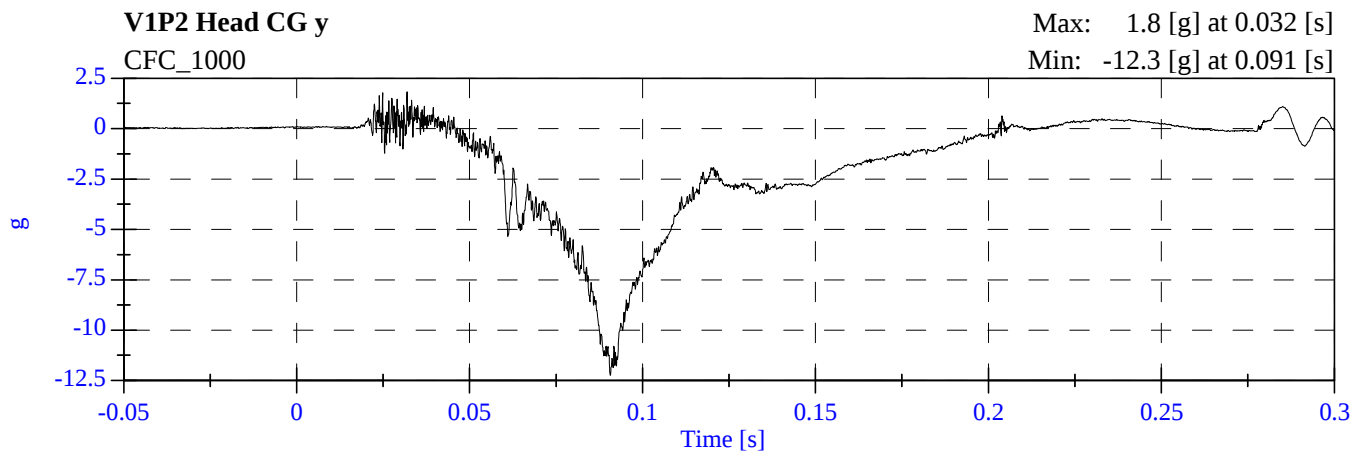
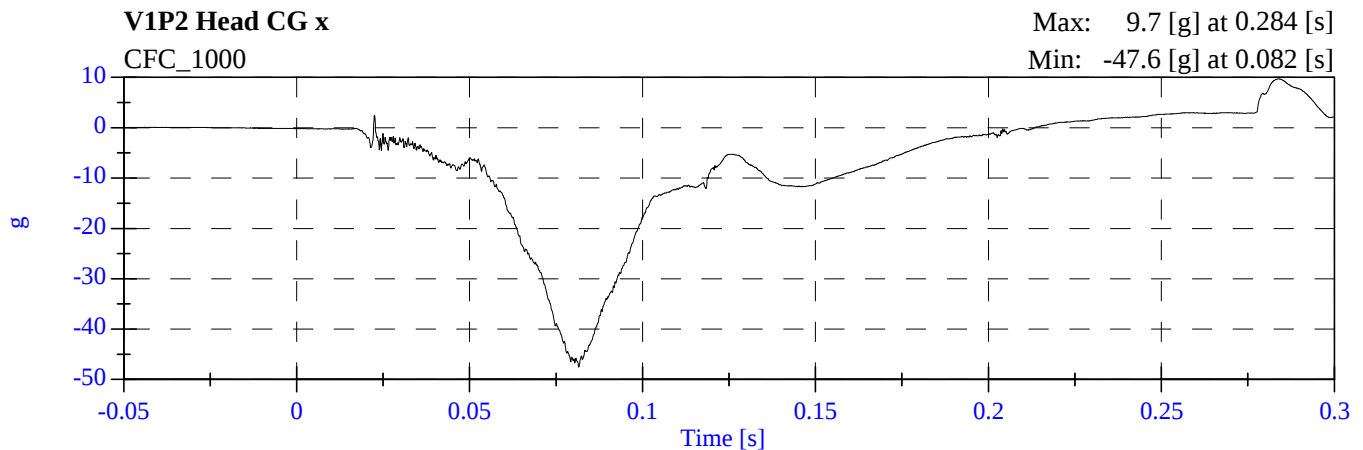
2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009



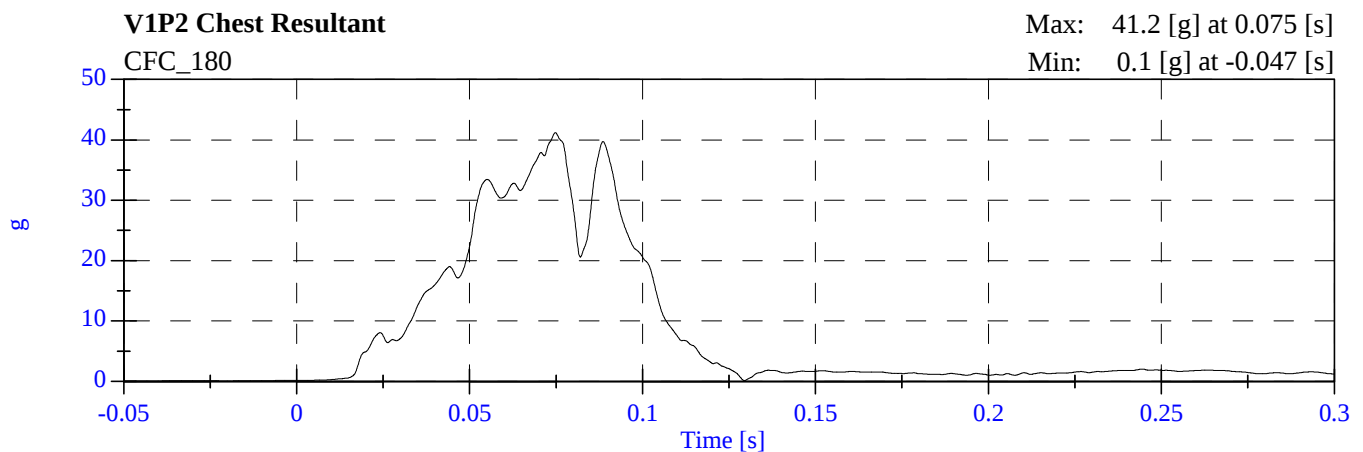
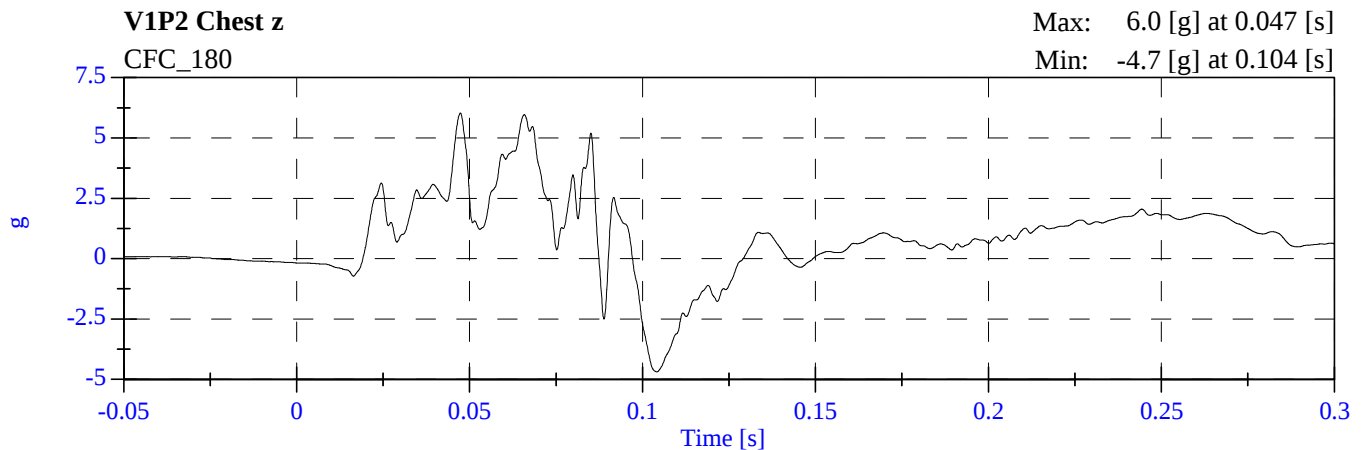
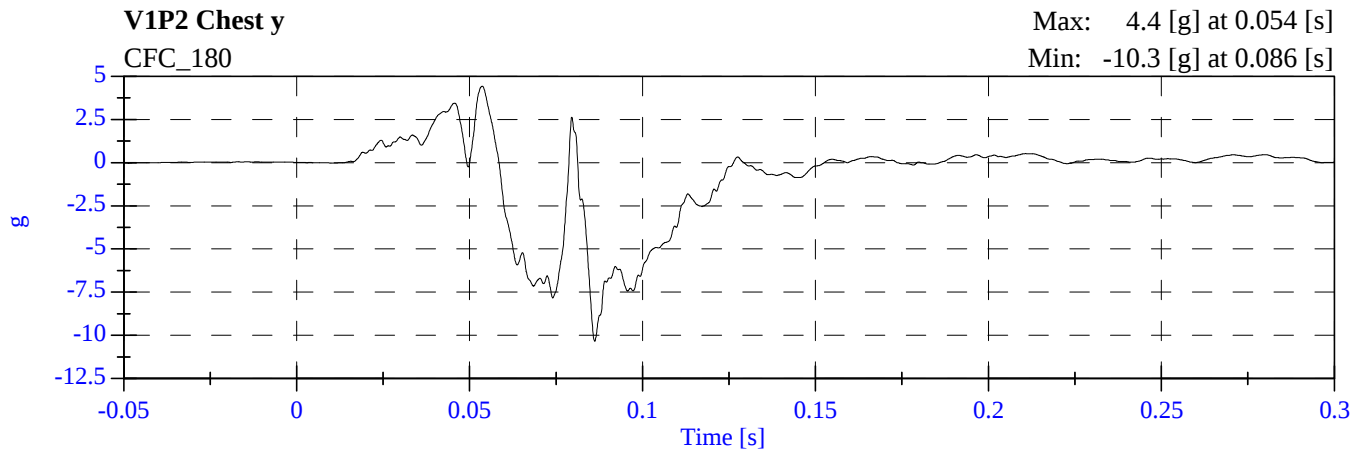
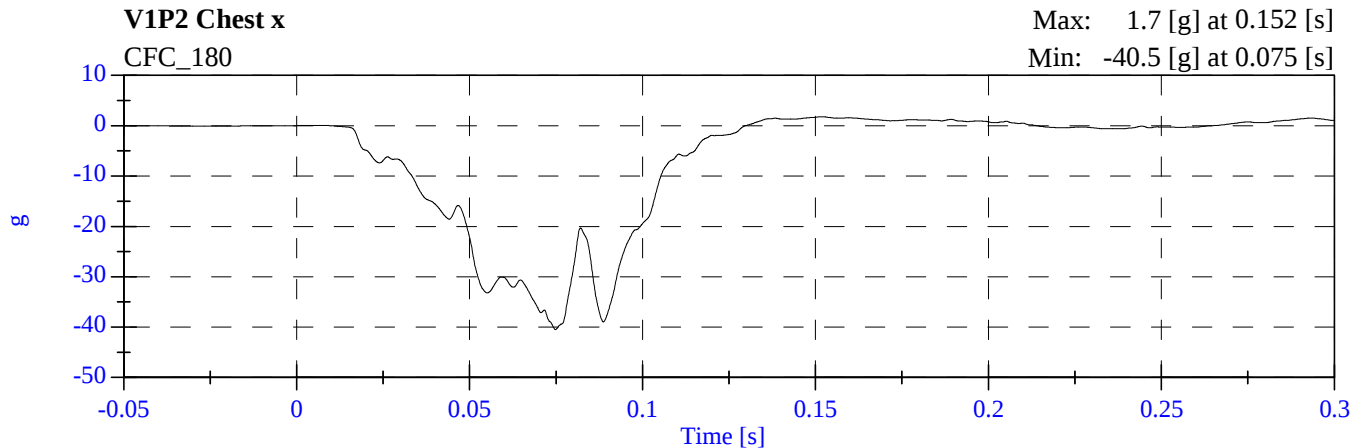
2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009



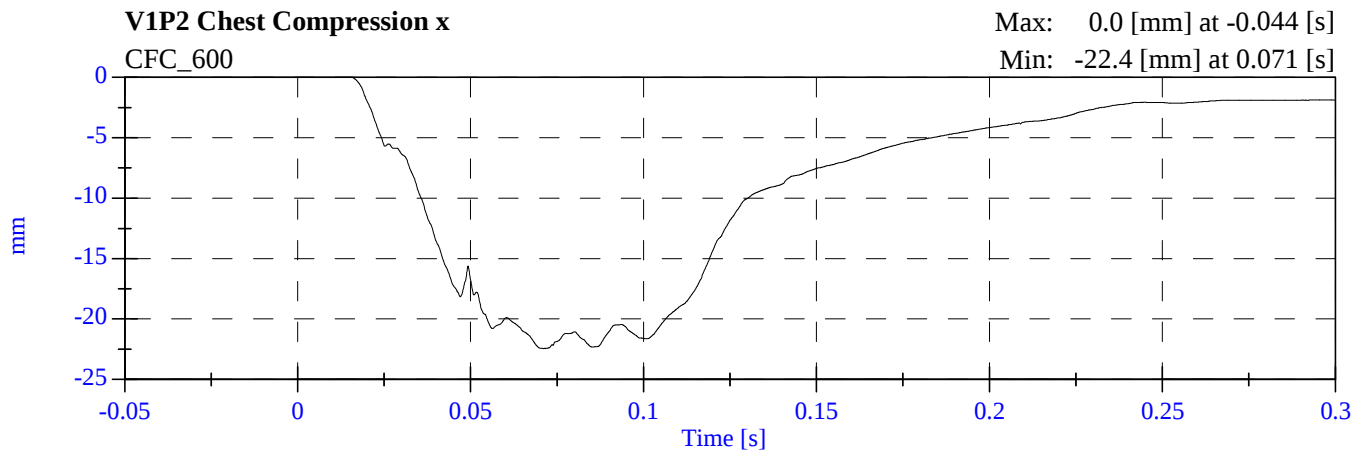
2009 NCAP Test 6 2010 Mazda 3 MA5400 - April 28, 2009



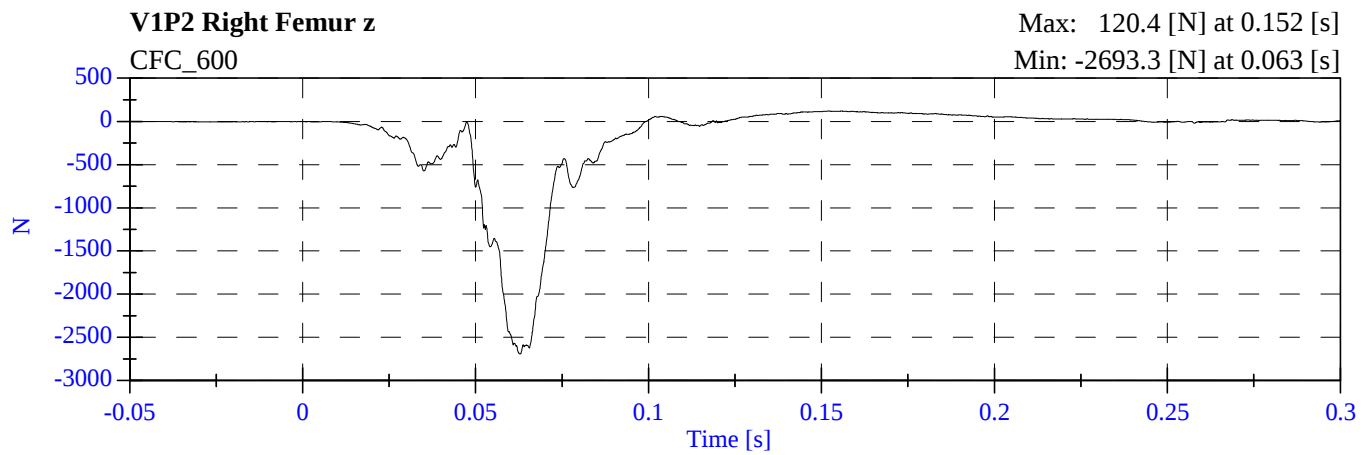
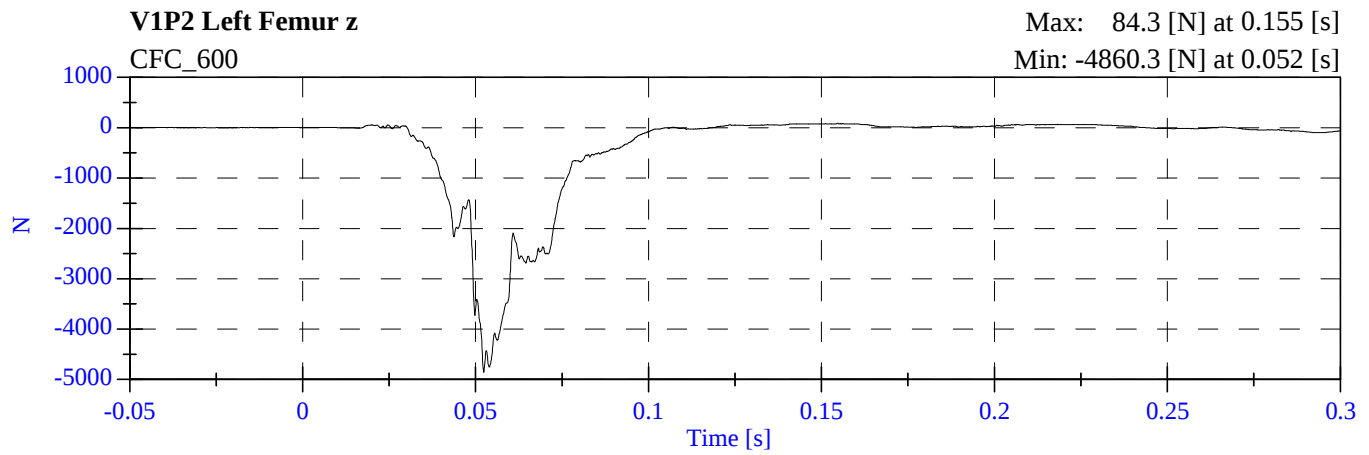
2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009



2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009



2009 NCAP Test 6 2010 Mazda 3
MA5400 - April 28, 2009



APPENDIX C

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

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

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

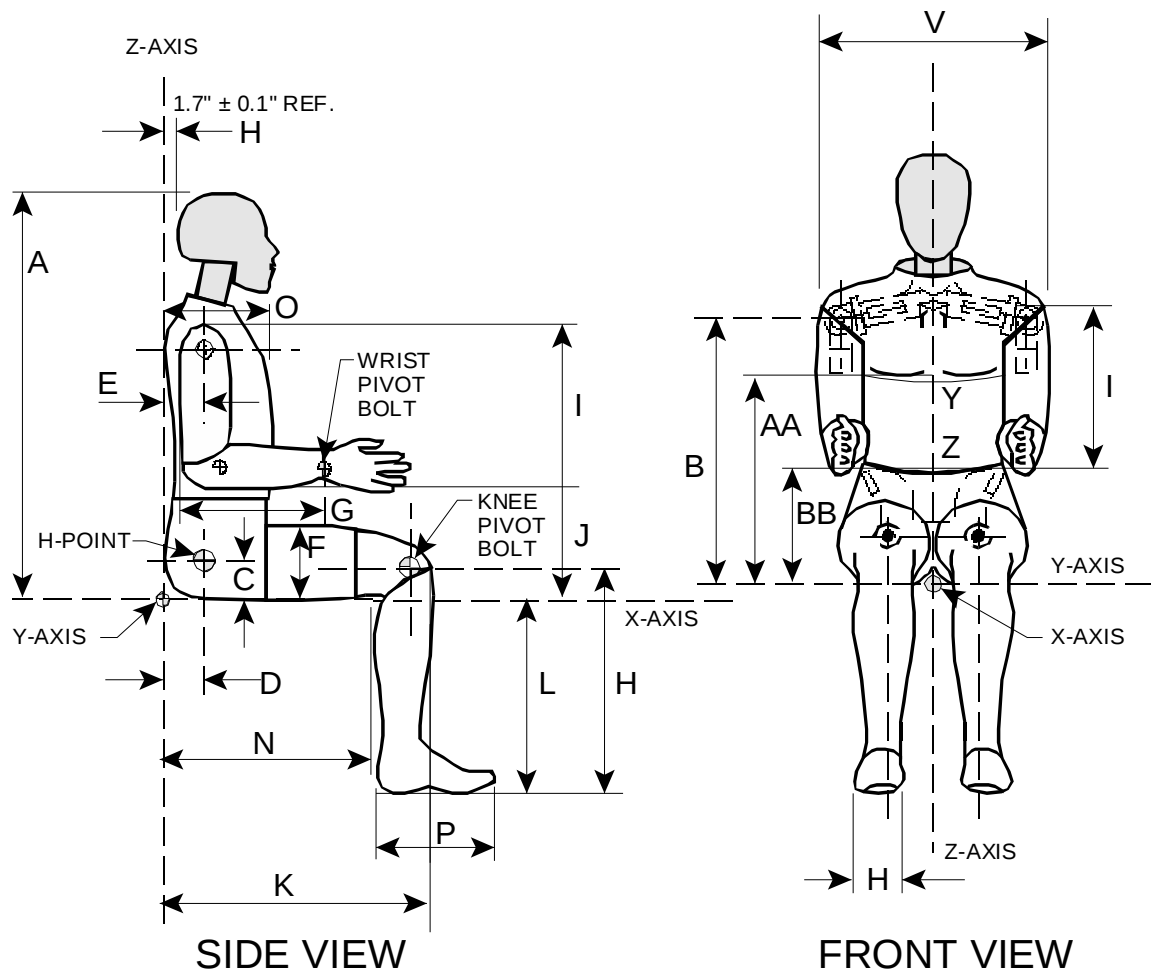
Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	4/21/09
#2/Right Front Passenger	064	4/21/09

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
NECK FLEXION TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
NECK EXTENSION TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
THORAX IMPACT TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
KNEE IMPACT TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
EXTERNAL DIMENSIONS

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
HEAD DROP TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
NECK FLEXION TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
NECK EXTENSION TEST

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

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

Remarks:

Laboratory Technician: Alex Rudniski

PART 572E
THORAX IMPACT TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
KNEE IMPACT TEST

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

PART 572E
EXTERNAL DIMENSIONS

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

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

Remarks:

Laboratory Technician:

Alex Rudniski

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	P58871	11/24/08	05/23/09
	Y	ENDEVCO	P51281	11/24/08	05/23/09
	Z	ENDEVCO	P51209	11/24/08	05/23/09
Head	X (R)	ENDEVCO	P52155	11/24/08	05/23/09
	Y (R)	ENDEVCO	P51274	11/24/08	05/23/09
	Z (R)	ENDEVCO	P15526	03/25/09	09/21/09
Neck Load Cell	X	DENTON	1916Fx	05/19/08	11/15/08
	Y	DENTON	1916Fy	05/19/08	11/15/08
	Z	DENTON	1916Fz	05/19/08	11/15/08
Neck Moment	X	DENTON	1916Mx	05/19/08	11/15/08
	Y	DENTON	1916My	05/19/08	11/15/08
	Z	DENTON	1916Mz	05/19/08	11/15/08
Chest	X	ENDEVCO	P52157	11/24/08	05/23/09
	Y	ENDEVCO	P52018	11/25/08	05/24/09
	Z	ENDEVCO	P52133	11/25/08	05/24/09
Chest	X (R)	ENDEVCO	P52156	11/24/08	05/23/09
	Y (R)	ENDEVCO	P49179	11/25/08	05/24/09
	Z (R)	ENDEVCO	P38188	03/24/09	09/20/09
Chest Deflection	X	SERVO	61	06/25/08	12/22/08
Pelvic	X	ENDEVCO	P58743	12/02/08	05/31/09
	Y	ENDEVCO	P58766	12/02/08	05/31/09
	Z	ENDEVCO	P58767	12/02/08	05/31/09

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	1532	05/19/08	11/15/08
Right Femur Load Cell	Fz	DENTON	1526	03/06/09	09/02/09
Left Upper Tibia	Mx	DENTON	91UMx	06/16/08	12/13/08
	My	DENTON	91UMy	06/16/08	12/13/08
Left Lower Tibia	Fz	DENTON	91LFz	06/16/08	12/13/08
	Mx	DENTON	91LMx	06/16/08	12/13/08
	My	DENTON	91LMy	06/16/08	12/13/08
Right Upper Tibia	Mx	DENTON	265Mx	06/16/08	12/13/08
	My	DENTON	265My	06/16/08	12/13/08
Right Lower Tibia	Fz	DENTON	178Fz	06/16/08	12/13/08
	Mx	DENTON	178Mx	06/16/08	12/13/08
	My	DENTON	178My	06/16/08	12/13/08
Left Foot Rear	X	ENTRAN	02I02I16-A05	11/25/08	05/24/09
	Z	ENTRAN	00L20-A30	11/24/08	05/23/09
Left Foot Front	Z	ENTRAN	00L20-A22	11/24/08	05/23/09
Right Foot Rear	X	ENDEVCO	J29805	12/06/08	06/04/09
	Z	ENTRAN	00L20-A29	11/24/08	05/23/09
Right Foot Front	Z	ENTRAN	03E03E20-N12	11/24/08	05/23/09
Lap Belt Load Cell		First Technology	156	04/02/09	09/29/09
Shoulder Belt Load Cell		First Technology	159	04/02/09	09/29/09

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	P52011	12/03/08	06/01/09
	Y	ENDEVCO	P52128	12/03/08	06/01/09
	Z	ENDEVCO	P51990	12/03/08	06/01/09
Head	X (R)	ENDEVCO	P51303	12/03/08	06/01/09
	Y (R)	ENDEVCO	P51985	12/03/08	06/01/09
	Z (R)	ENDEVCO	P51294	12/03/08	06/01/09
Neck Load Cell	X	DENTON	2019Fx	05/19/08	11/15/08
	Y	DENTON	2019Fy	05/19/08	11/15/08
	Z	DENTON	2019Fz	05/19/08	11/15/08
Neck Moment	X	DENTON	2019Mx	05/19/08	11/15/08
	Y	DENTON	2019My	05/19/08	11/15/08
	Z	DENTON	2019Mz	05/19/08	11/15/08
Chest	X	ENDEVCO	P52000	12/02/08	05/31/09
	Y	ENDEVCO	P49163	12/02/08	05/31/09
	Z	ENDEVCO	P52009	12/02/08	05/31/09
Chest	X (R)	ENDEVCO	P52035	12/02/08	05/31/09
	Y (R)	ENDEVCO	P52030	12/02/08	05/31/09
	Z (R)	ENDEVCO	P52030	12/03/08	06/01/09
Chest Deflection	X	SERVO	64	06/24/08	12/21/08
Pelvic	X	ENDEVCO	P17285	03/03/09	08/30/09
	Y	ENDEVCO	P17837	04/01/09	09/28/09
	Z	ENDEVCO	P17553	04/02/09	09/29/09

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	1525	05/19/08	11/15/08
Right Femur Load Cell	Fz	DENTON	1533	05/19/08	11/15/08
Left Upper Tibia	Mx	DENTON	374Mx	05/19/08	11/15/08
	My	DENTON	374My	05/19/08	11/15/08
Left Lower Tibia	Fz	DENTON	372Fz	05/19/08	11/15/08
	Mx	DENTON	372My	05/19/08	11/15/08
	My	DENTON	372My	05/19/08	11/15/08
Right Upper Tibia	Mx	DENTON	404Mx	05/19/08	11/15/08
	My	DENTON	404My	05/19/08	11/15/08
Right Lower Tibia	Fz	DENTON	396Fz	05/19/08	11/15/08
	Mx	DENTON	396Mx	05/19/08	11/15/08
	My	DENTON	396My	05/19/08	11/15/08
Left Foot Rear	X	ENDEVCO	P16286	03/03/09	08/30/09
	Z	ENDEVCO	P52152	12/03/08	06/01/09
Left Foot Front	Z	ENDEVCO	P52082	12/03/08	06/01/09
Right Foot Rear	X	ENDEVCO	P52025	12/03/08	06/01/09
	Z	ENDEVCO	P51873	12/03/08	06/01/09
Right Foot Front	Z	ENDEVCO	P58987	12/03/08	06/01/09
Lap Belt Load Cell		First Technology	173	04/02/09	09/29/09
Shoulder Belt Load Cell		First Technology	178	04/02/09	09/29/09

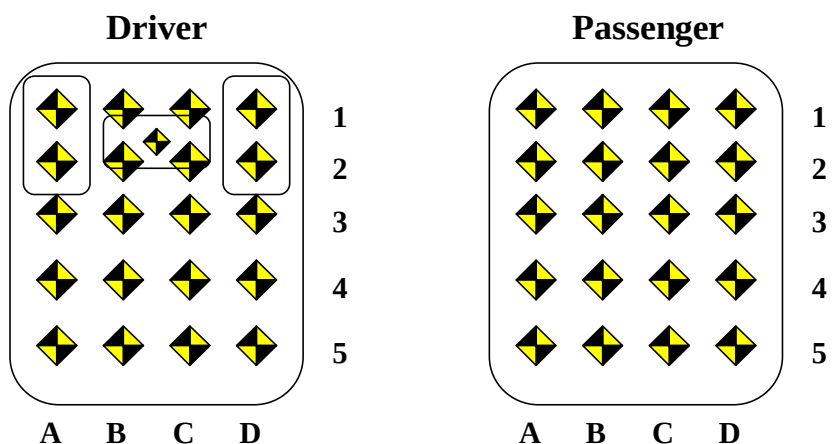
INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ENDEVCO	P23939	03/03/09	08/30/09
Right Rear Seat Crossmember X	ENDEVCO	P35789	03/02/09	08/29/09
Top of Engine	ICS	FA2481	04/16/09	10/13/09
Bottom of Engine	GS SENSORS	9440-006	04/16/09	10/13/09
Right Disc Brake Caliper	GS SENSORS	9440-011	04/16/09	10/13/09
Left Disc Brake Caliper	ICS	FA2483	04/16/09	10/13/09
Left Seat Rear Crossmember Z	ENDEVCO	P23993	03/03/09	08/30/09
Right Seat Rear Crossmember Z	ENDEVCO	P35803	03/02/09	08/29/09

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

DRIVER SIDE INTRUSION MEASUREMENTS

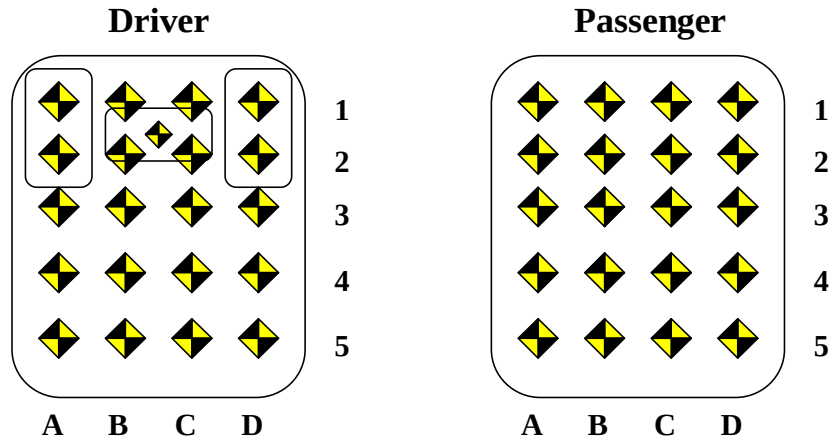


Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3171	-554	369	3162	-553	366	9	-1	3
B1	3291	-433	372	3283	-434	377	8	1	-5
C1	3293	-302	369	3282	-304	369	11	2	0
D1	3289	-181	367	3275	-184	365	14	3	2
A2	3127	-556	314	3123	-556	308	4	0	6
B2	3197	-430	309	3193	-435	305	4	5	4
C2	3190	-303	307	3187	-308	295	3	5	12
D2	3167	-175	302	3176	-179	287	-9	4	15
A3	3085	-555	269	3085	-562	261	0	7	8
B3	3092	-432	263	3092	-436	248	0	4	15
C3	3086	-299	262	3088	-306	239	-2	7	23
D3	3080	-174	265	3083	-179	233	-3	5	32
A4	3018	-553	264	3014	-560	249	4	7	15
B4	3010	-428	262	3010	-435	240	0	7	22
C4	3004	-299	260	3007	-301	234	-3	2	26
D4	2998	-170	262	3002	-174	232	-4	4	30
A5	2928	-558	268	2927	-563	256	1	5	12
B5	2927	-430	264	2929	-432	246	-2	2	18
C5	2925	-297	264	2928	-300	240	-3	3	24
D5	2920	-174	263	2924	-176	238	-4	2	25
BP	3151	-298	431	3133	-308	444	18	10	-13
G	2906	-508	714	2905	-509	712	1	1	2
H	2860	-201	711	2865	-203	707	-5	2	4
L	2671	-343	922	2740	-343	910	-69	0	12
AB	2633	-577	326	2634	-574	312	-1	-3	14

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	3286	164	390	3276	161	377	10	3	13
B1	3288	288	388	3283	284	377	5	4	11
C1	3288	425	390	3288	420	381	0	5	9
D1	3240	551	391	3239	546	387	1	5	4
A2	3188	164	317	3189	163	293	-1	1	24
B2	3195	286	317	3193	289	301	2	-3	16
C2	3195	422	316	3196	421	304	-1	1	12
D2	3187	552	316	3189	552	310	-2	0	6
A3	3073	158	267	3079	162	230	-6	-4	37
B3	3090	287	264	3095	292	239	-5	-5	25
C3	3092	420	264	3095	421	246	-3	-1	18
D3	3093	546	265	3096	551	254	-3	-5	11
A4	3013	160	264	3021	162	229	-8	-2	35
B4	3014	285	261	3020	288	232	-6	-3	29
C4	3013	419	260	3019	422	240	-6	-3	20
D4	3010	545	260	3014	549	249	-4	-4	11
A5	2932	164	274	2940	166	241	-8	-2	33
B5	2934	287	263	2939	290	239	-5	-3	24
C5	2931	419	262	2935	421	245	-4	-2	17
D5	2929	544	260	2938	547	250	-9	-3	10
R	2861	236	709	2872	232	707	-11	4	2
S	2907	530	710	2910	527	705	-3	3	5
AB	2636	580	320	2636	576	304	0	4	16

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

AB = Front outboard seat anchor bolt