

REPORT NUMBER: TR-P29008-02-NC

**VALIDATION
SIDE IMPACT POLE TEST**

**MAZDA MOTOR CORPORATION
2010 MAZDA3 I SPORT
4-DOOR SEDAN**

NHTSA NUMBER: MA5403

**PREPARED BY:
KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301**



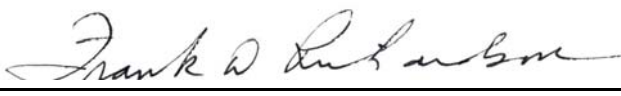
MAY 6, 2009

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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1200 NEW JERSEY AVE, SE, ROOM W43-410
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Prepared By: 
Mr. Kelsey A. Chiu, Project Engineer

Approved By: 
Mr. Frank D. Richardson, Program Manager

Approval Date: May 6, 2009

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

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16. Abstract A 31.2 km/h (19.5 mph) 75° oblique impact Side Validation test was conducted on the subject 2010 Mazda3 I Sport 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on May 6, 2009. The impact velocity was 31.67 km/h and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 27.2 deg. C. The test vehicle's post-test maximum crush was 463 mm at level 3. The test vehicle's performance was as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Passenger ATD</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>2846.4</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>51</td> </tr> <tr> <td>Combined Acetabulum and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>1910</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the vehicle at the hinges or latches. The opposite side doors did not open during the impact event.						Measurement Description	Passenger ATD			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	2846.4	Resultant Lower Spine Acceleration	G	82	51	Combined Acetabulum and Iliac Pelvic Force	N	5525	1910
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17. Key Words Validation Side Impact Pole Part 572V SID-IIs				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Washington, DC 20590																				
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SECTION 1
TEST PURPOSE AND PROCEDURE

This 75° oblique side impact test is part of the FY 2009 Side Impact Validation Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact performance in a 2010 Mazda3 I Sport 4-Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standards' Side NCAP Pole Laboratory Test Procedure, dated April 2009.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2010 Mazda3 I Sport 4-Door Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.67 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California on May 6, 2009. Pre- and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated April 2009. Camera locations and other pertinent camera information are included in Data Sheet 5 of this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Head CG Triaxial Accelerometers
- Upper Neck Load Cells
- Shoulder Displacement Transducer
- Chest Upper, Middle and Lower Rib Displacement Transducers
- Abdomen Upper and Lower Rib Displacement Transducers
- Acetabulum Load Cell
- Iliac Load Cell
- Lower Spine Triaxial Accelerometers

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C.

The following table summarizes the results of the test:

Dummy	HIC (36 ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)	
SID-IIs 5th Percentile Adult Female	2846.4	51	Acetabular	858
			Iliac Wing	1052
			Sum	1910

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1	
	Mounted	Deployed
Frontal Airbag	Yes	No
Knee Airbag	No	
Side Torso Airbag	Yes	Yes
Combination Head/Torso Side Airbag	No	
Curtain/Tube Side Airbag	Yes	Yes
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Yes	

GENERAL COMMENTS

Both the driver and left rear passenger doors remained closed and latched during and after the impact event. Neither door separated at the latch or hinge. The non-struck side doors remained closed and latched during the test. No Stoddard solvent spillage was observed during or after the impact test. The curtain airbag on the driver's side ruptured near the region of ATD head contact during the side impact pole test. The HIC₃₆ injury value exceeded the threshold. Resultant Lower Spine and Combined Pelvic Force values were all under the threshold values.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MA5403
Model Year	2010
Make	Mazda
Model	3 I Sport
Body Style	4-Door Sedan
VIN	JM1BL1SGXA1127219
Body Color	Gunmetal Blue
Delivery Date	4/27/2009
Odometer Reading (km / mi)	151 / 94
Dealer	Redlands Mazda
Transmission	5-Speed Manual
Final Drive	Front
Type / No. of Cylinders	Inline 4
Engine Displacement (L)	2.0
Engine Placement	Transverse
Roof Rack	No
Sunroof / T-Top	No
Tinted Glass	Yes
Traction Control	No
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Torso Airbag	Yes
Driver Side Head Airbag	No
Driver Curtain Airbag	Yes
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Side Torso Airbag	Yes
Pass. Side Head Airbag	No
Pass. Curtain Airbag	Yes
Pass. Knee Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Air Conditioning	Yes
AM / FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	No
Power Windows	Yes
Power Seats	Yes
Other	N/A

Does Owner's Manual provide instructions to turn off automatic door locks?

N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	Feb-09

GVWR (kg)	1768
GAWR Front (kg)	933
GAWR Rear (kg)	835

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity	2	3		5
Capacity Weight (VCW) (kg)				385.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				44.8

A

B

A-B

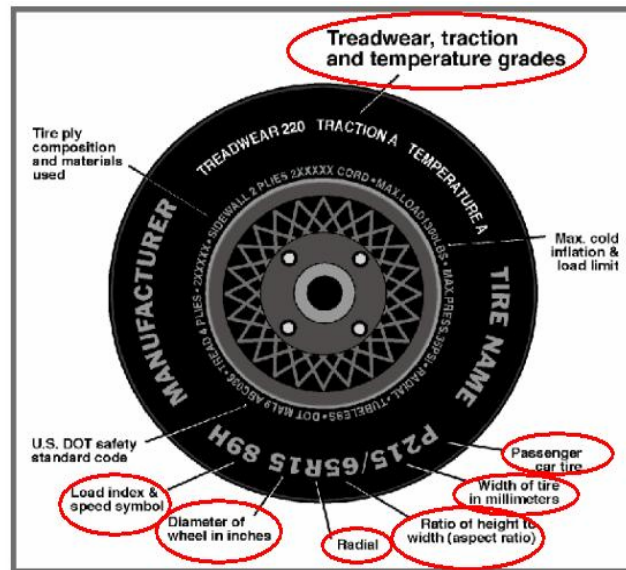
VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back	
					Fixed	Adjustable
	Bucket	Bench	Split Bench	Contoured		w/ Lever w/ Knob
Front Seat	Yes					Yes
Rear or Second Row Seat		Yes			Yes	
Third Row Seat						

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kpa)	240	240
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	EL 400 Turanza	EL 400 Turanza
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	89H	89H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Right	H48K DHE 5108	H48K DHE 5108
DOT Safety Code Left	H48K DHE 5108	H48K DHE 5108

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	385.5	259.5		396.5	292.5	
Right	kg	392.5	259.0		408.0	284.5	
Ratio	%	60.0%	40.0%	100.0%	58.2%	41.8%	100.0%
Total	kg	778.0	518.5	1296.5	804.5	577.0	1381.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1296.5	A
Actual Weight of 1 P572V ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	44.8	C
Calculated Vehicle Target Wt (TVTW)	kg	1390.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)	Deg	-0.2	-0.2	0.1
Front Passenger Sill Angle (front-to-rear)	Deg	-0.4	-0.3	-0.2
Front Bumper Angle (left-to-right)	Deg	-0.4	-0.5	-0.5
Rear Bumper Angle (left-to-right)	Deg	0.2	0.2	0.2
Vehicle CG (Aft of Front Axle)	mm	1056	1104	1127
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	-4	-2	8

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	11.5

Vehicle components removed to make target vehicle test weight:

Spare Tire (9.0 kg), Jack and Tire Tools (1.5 kg), Truck Trim (2.0)

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	1067
Actual Impact Point Aft of Front Axle	mm	1051

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

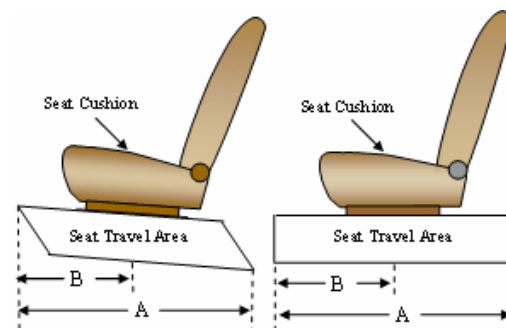
NHTSA No.: MA5403

Test Program Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09

SEAT FORE / AFT POSITIONS

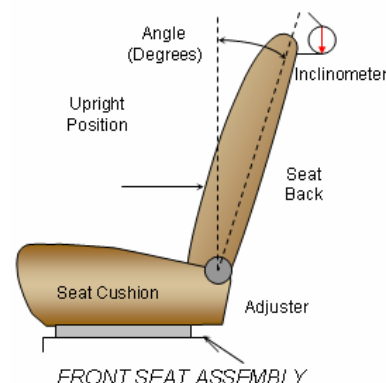
The total seat travel is measured from the forward most possible position to the rearmost possible position. The driver's seat is set to the forward most position where the ATD will not contact any interior panels.



Seating Position	Total Fore-Aft Travel	Placed in Position	Cushion Range	Placed in Position
Driver Seat	27 Detents	1st Detent	-5.1° to -0.4°	-4.8
Passenger Seat				
Rear Seat - Struck Side				
Rear Seat - Non-Struck Side				

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to level the driver ATD's (SID-IIs) head transverse instrumentation platform; seat back angle is measured at the headrest post using a digital inclinometer.



Seating Position	Degrees	Detent
Driver Seat Back Angle	2.6 @ Headrest	
Front Passenger Seat Back Angle		
Struck Side Rear Seat Back Angle		
Non-Struck Side Rear Passenger Seat Back Angle		

SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	4

DATA SHEET NO. 2 ... (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

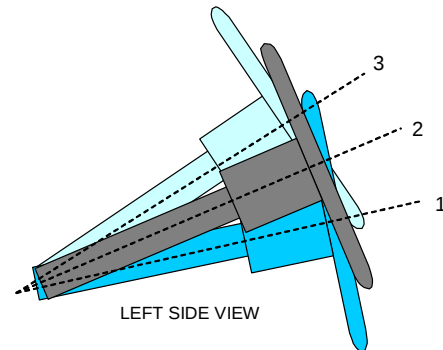
NHTSA No.: MA5403

Test Program Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel.

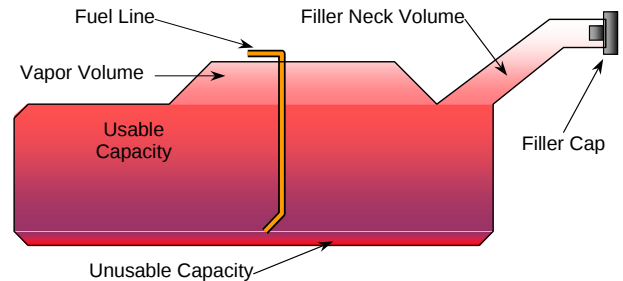


STEERING COLUMN ASSEMBLY

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	19.5	
Geometric Center Position, No. 2	22.4	
Uppermost Position, No. 3	25.4	
Telescoping Steering Wheel Travel		
Test Position	22.4	

FUEL PUMP

The test vehicle is equipped with an electric fuel pump. The fuel pump will operate when the vehicle is running or idling. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

FUEL CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank"	54.88
Usable Capacity of "Optional Tank"	
Usable Capacity of Standard Tank as Specified In Owner's Manual	55.00
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92 - 94% of Usable Capacity	50.49 to 51.59
Actual Amount of Stoddard Solvent Used	51.04
1/3 of Usable Capacity	18.29

DATA SHEET NO. 3

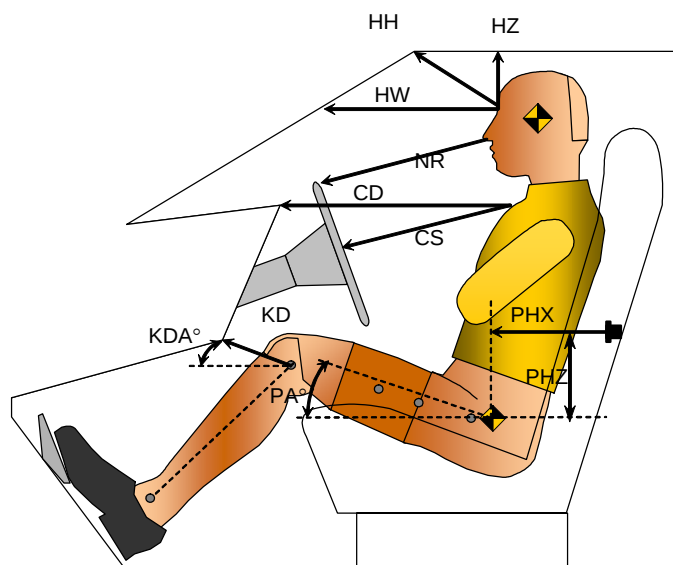
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5403

Test Program: Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09



DUMMY LONGITUDINAL CLEARANCE DIMENSIONS (S/N: 307)

Driver Code	Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	248	57.3
HW	Head to Windshield	557	
HZ	Head to Roof	178	
NR	Nose to Rim / Seat Back	211	4.7
CD	Chest to Dash / Seat Back	408	24.0
CS	Steering Wheel to Chest	151	
KDL / KDAL°	Left Knee to Dash / Seat Back	111	36.4
KDR / KADL°	Right Knee to Dash / Seat Back	75	
PA°	Pelvic Angle		17.9
PHX	H-Point to Striker (x-direction)	386	
PHZ	H-Point to Striker (z-direction)	150	
SA°	Seat Back Angle		2.6

DATA SHEET NO. 4

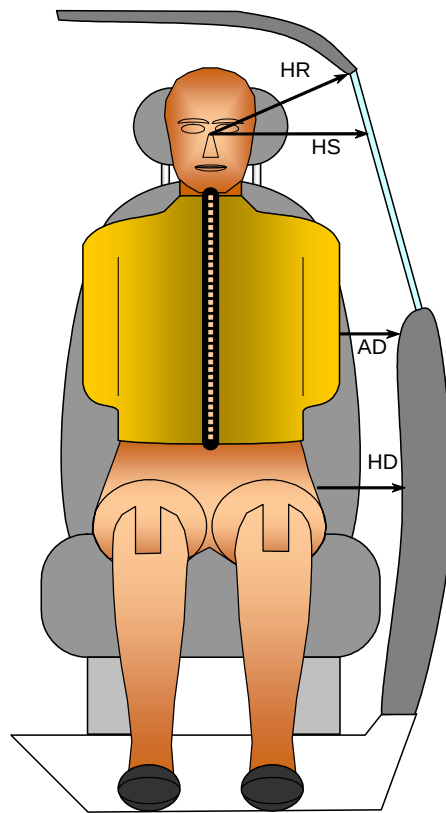
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5403

Test Program: Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09



FRONT VIEW OF DUMMY

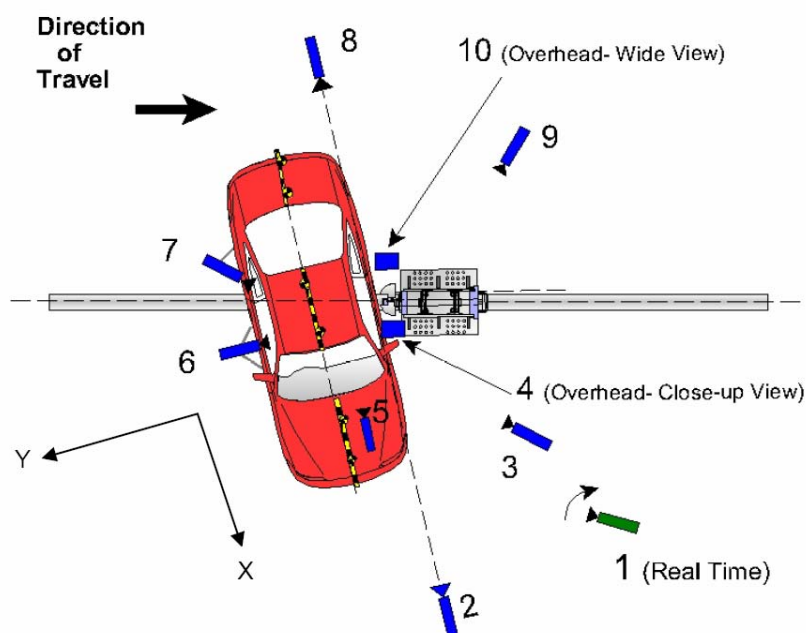
DUMMY LATERAL CLEARANCE DIMENSIONS (S/N: 307)

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	282
HS	Head to Side Window	mm	370
AD	Arm to Door	mm	152
HD	H-Point to Door	mm	198

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program: Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09



Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Real Time Pan View of Impact	9862	-54	-1175		30
2	Front Ground Level - Impact View	10971	-7082	-1200	35	1000
3	Impact Side 45° - Forward Pole View	6319	-4907	-1047	12	1000
4	Overhead Close-Up View of Impact	-134	-240	-5745	ZOOM	1000
5	On-Board - Dummy Front View	1240	395	-1195	24	400
6	On-Board - Dummy Side View	54	1945	-1055	20	1000
7	On-Board - Dummy Rear Oblique View	-1045	1958	-1024	20	1000
8	Rear Ground Level - Impact View	8473	202	-1043	35	1000
9	Impact Side 45° - Rearward Pole View	-4930	5251	-1045	24	1000
10	Overhead Wide View of Impact	11	-154	-5745	24	1000

NOTE: Vehicle was at a 15° angle to the rigid pole

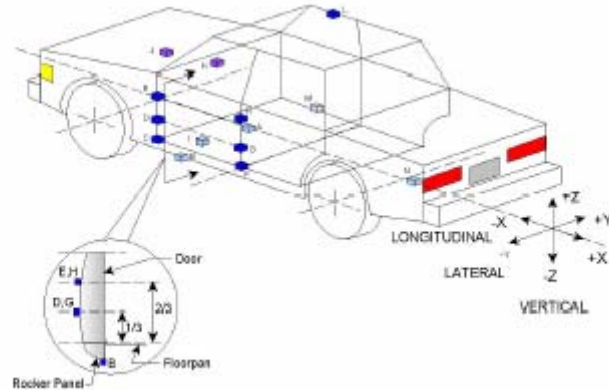
INSTRUMENTATION

	Number of Channels
Driver Dummy	23
Vehicle Structure	24
Pole Load Cells	0
Contact Switches	4
Airbag Timing Sensor	2
Total No. of Data Channels	53

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program Side Impact Validation 75° Rigid Pole Test

NHTSA No.: MA5403
 Test Date: 05/06/09



	Description	Measurements (mm)		
		X	Y	Z
A	Vehicle CG	-1750	0	370
B	Left Floor Sill	-2800	-230	190
C	A-Pillar Sill	-3060	-790	370
D	A-Pillar Lower	-3060	-790	550
E	A-Pillar Mid	-3060	-790	875
F	B-Pillar Sill	-1940	-680	420
G	B-Pillar Lower	-1940	-680	610
H	B-Pillar Mid	-1940	-680	960
I	Driver Seat	-2400	550	440
J	Engine Top	-3660	0	860
K	Firewall	-3420	0	860
L	Right Roof Sill	-2100	480	1450
M	Right Floor Sill	-1900	-455	250
N	Rear Floorpan	-650	-250	468

All measurements are made relative to the rear bumper centerline at ground level.

Reference Planes:
 X = From rear surface of vehicle, forward is negative
 Y = From centerline of vehicle, right is positive
 Z = From ground, up is positive

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

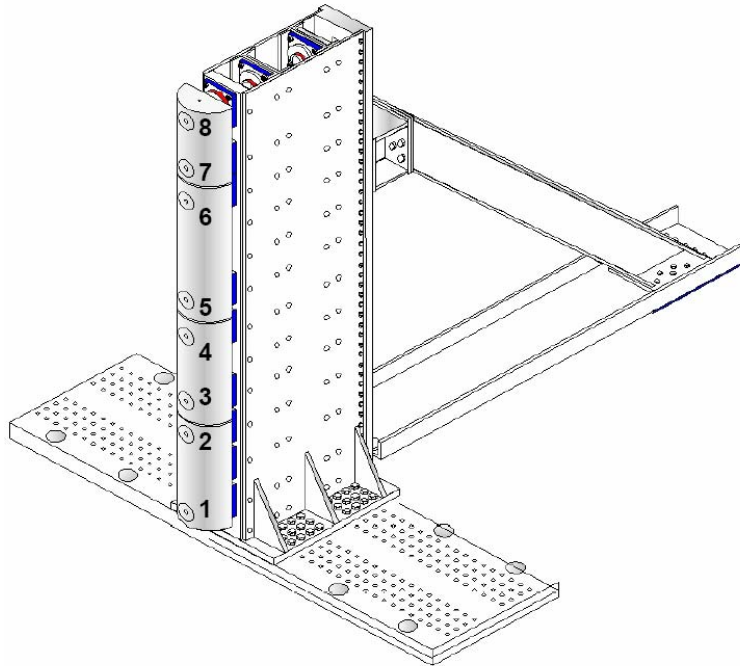
Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5403

Test Program: Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09

FOIL 300K RIGID POLE



ID	Units	Height From Ground
1	mm	*
2	mm	*
3	mm	*
4	mm	*
5	mm	*
6	mm	*
7	mm	*
8	mm	*

* An uninstrumented rigid pole was used in this test.

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy
Dummy Type/Serial No.	Part 572V SID-IIs / Serial No. 307
Head Contact	Curtain Airbag, Headrest, Seat Back
Upper Torso Contact	Side Airbag
Lower Torso Contact	Side Airbag
Left Knee Contact	Door Panel
Right Knee Contact	None

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Jammed Shut	Jammed Shut
Right Side Door Opening	Remained Closed and Operational	Remained Closed and Operational
Seat Movement	None	None
Seatback Failure	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation occurred
Sill Separation	No separation occurred
Windshield Damage	Broken
Window Damage	Left front door side window broken
Other Notable Effects	Curtain Airbag Rupture

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 2	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes
Knee Airbag	No	No	No	
Pre-Tensioners	Yes	Yes	No	No
Load Limiters	Yes			

VEHICLE SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset From Vertical Reference Line	mm	+/- 38	-16 (Left)
Trap No. 1 Velocity (Primary)	km/h	30.4 to 32.0	31.67
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 32.0	31.69

DATA SHEET NO. 9

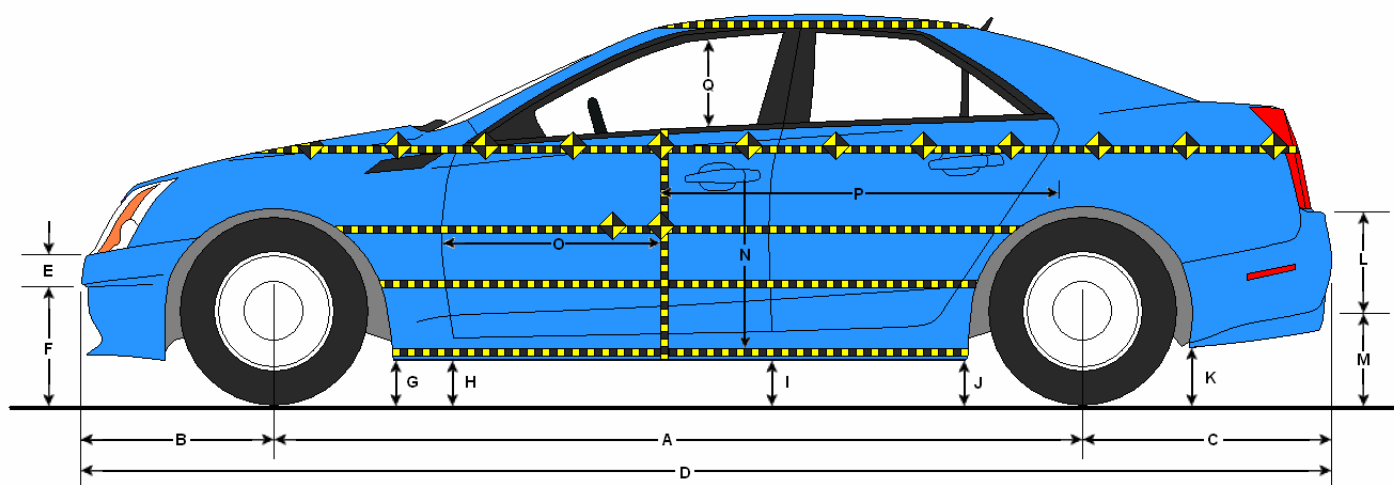
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5403

Test Program: Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09

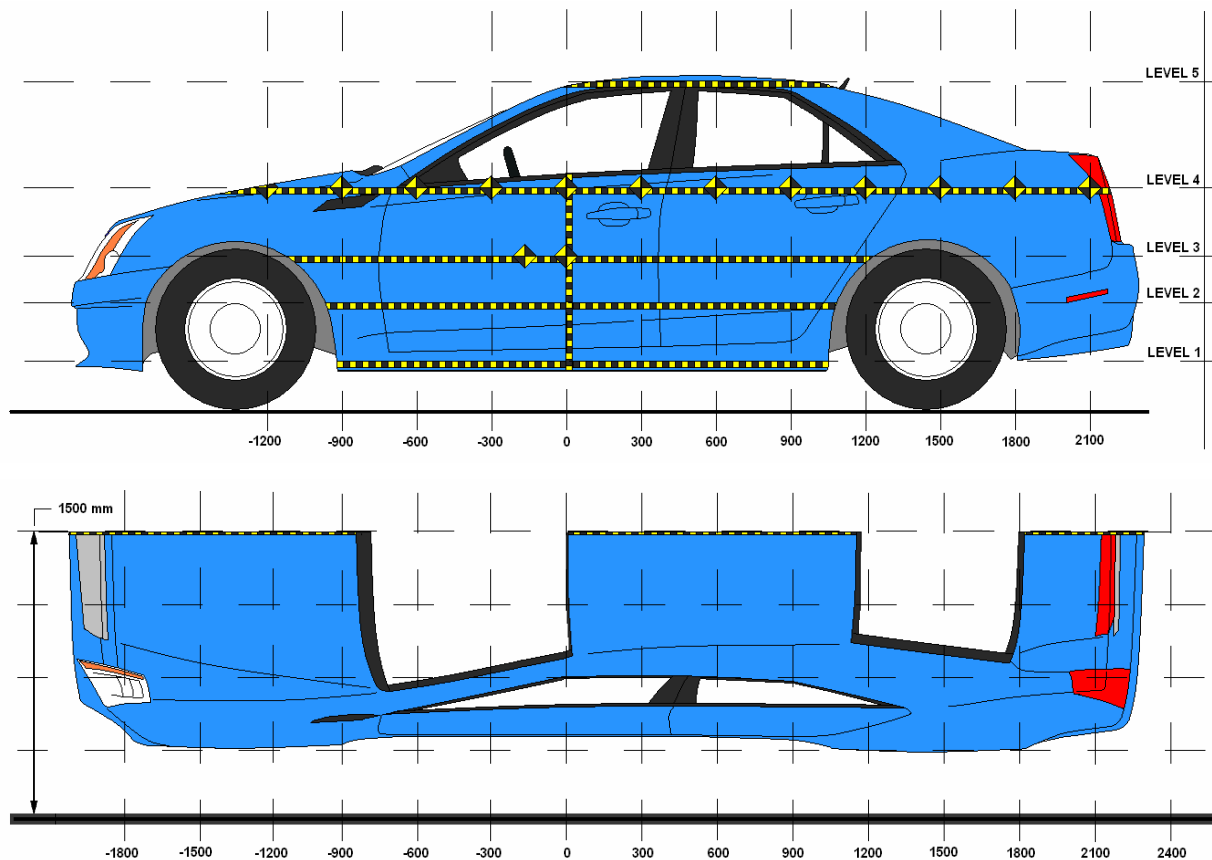


Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2639	2514	-125
B	Front Axle to FSOV	950	991	41
C	Rear Axle to RSOV	983	1007	24
D1	Total Vehicle Length at Left Side	3021	2875	-146
D2	Total Vehicle Length at Centerline	4572	4512	-60
D3	Total Vehicle Length at Right Side	3024	3041	17
E	Front Bumper Thickness	426	425	-1
F	Front Bumper Bottom to Ground	197	205	8
G	Sill Height at Front Wheel Well	215	216	1
H	Sill Height at Front Door Leading Edge	219	265	46
I	Sill Height at B-Pillar	228	252	24
J1	Sill Height at Rear Wheel Well	219	252	33
J2	Pinch Weld Height at Rear Wheel Well	179	204	25
K	Sill Aft of Rear Wheel Well	277	298	21
L	Rear Bumper Thickness	149	334	185
M	Rear Bumper Bottom to Ground	512	333	-179
N	Sill Height to Window Bottom Sill	592	694	102
O	Front Door Leading Edge to Impact CL	587	505	-82
P	Rear Door Trailing Edge to Impact CL	537	428	-109
Q	Front Window Opening	449	452	3
R	Right Side Length	3024	3041	17
S	Left Side Length	3021	2875	-146
T	Vehicle Width at B-Pillar	1747	1619	-128

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
 Test Program: Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09



NOTE: All measurements are in millimeters (mm)

Level	Description	Height Above Ground (mm)
1	Sill Top Height	257
2	Occupant H-Point Height	535
3	Mid-Door Height	636
4	Window Sill Height	893
5	Window Top Height	1416

DATA SHEET NO. 10 ... (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan

NHTSA No.: MA5403

Test Program Side Impact Validation 75° Rigid Pole Test

Test Date: 05/06/09

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				723					791					68	
-750		626	628	719			700	703	798			74	75	79	
-600	662	636	639	708		753	730	733	809		91	94	94	101	
-450	669	637	637	698		831	812	816	842		162	175	179	144	
-300	668	635	634	688		904	898	905	920		236	263	271	232	
-150	667	633	632	679		978	990	995	1012		311	357	363	333	
0	667	632	629	671		1076	1089	1092	1105		409	457	463	434	
150	666	630	627	663		1038	1061	1069	1094	1210	372	431	442	431	
300	665	630	626	655	932	939	946	953	980	1139	274	316	327	325	207
450	665	630	625	649	918	861	844	846	868	1075	196	214	221	219	157
600	664	631	626	643	916	807	790	788	809	1033	143	159	162	166	117
750	664	632	627	641	917	763	749	754	778	1015	99	117	127	137	98
900	664	634	630	641	925	720	724	731	749	1006	56	90	101	108	81
1050	664	634	632	642	942	693	691	702	723	1012	29	57	70	81	70
1200		622	625	663			647	661	702			25	36	39	
1350			618	646				662	676				44	30	
1500				649				250	691					42	
1650				655					693					38	
1800															
1950															
2100															
2250															
2400															
2550															
2700															
2850															
3000															

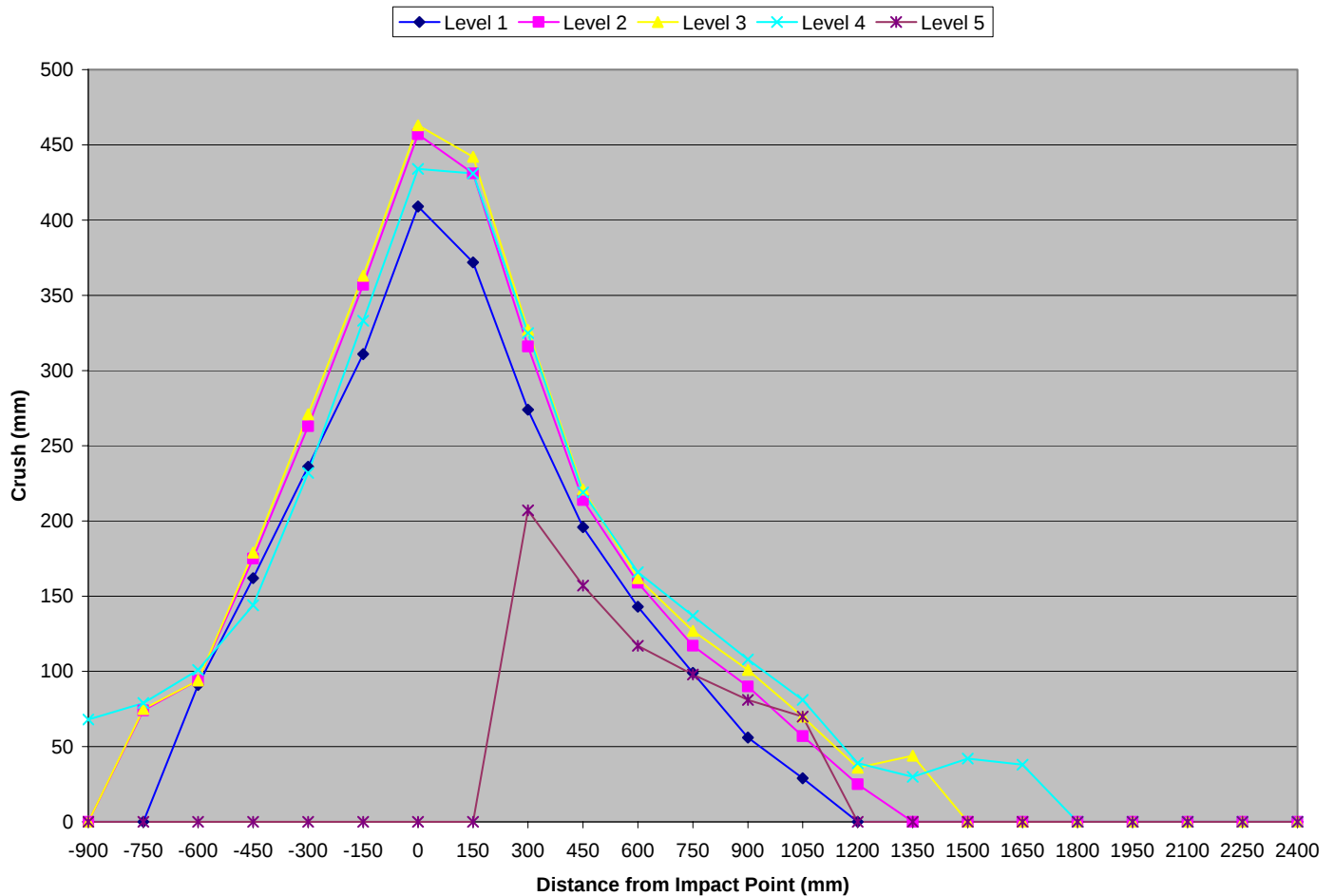
MAXIMUM CRUSH DATA

	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	409	457	463	434	207
Distance From Impact	mm	0	0	0	0	0

DATA SHEET NO. 10 ... (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
Test Program Side Impact Validation 75° Rigid Pole Test

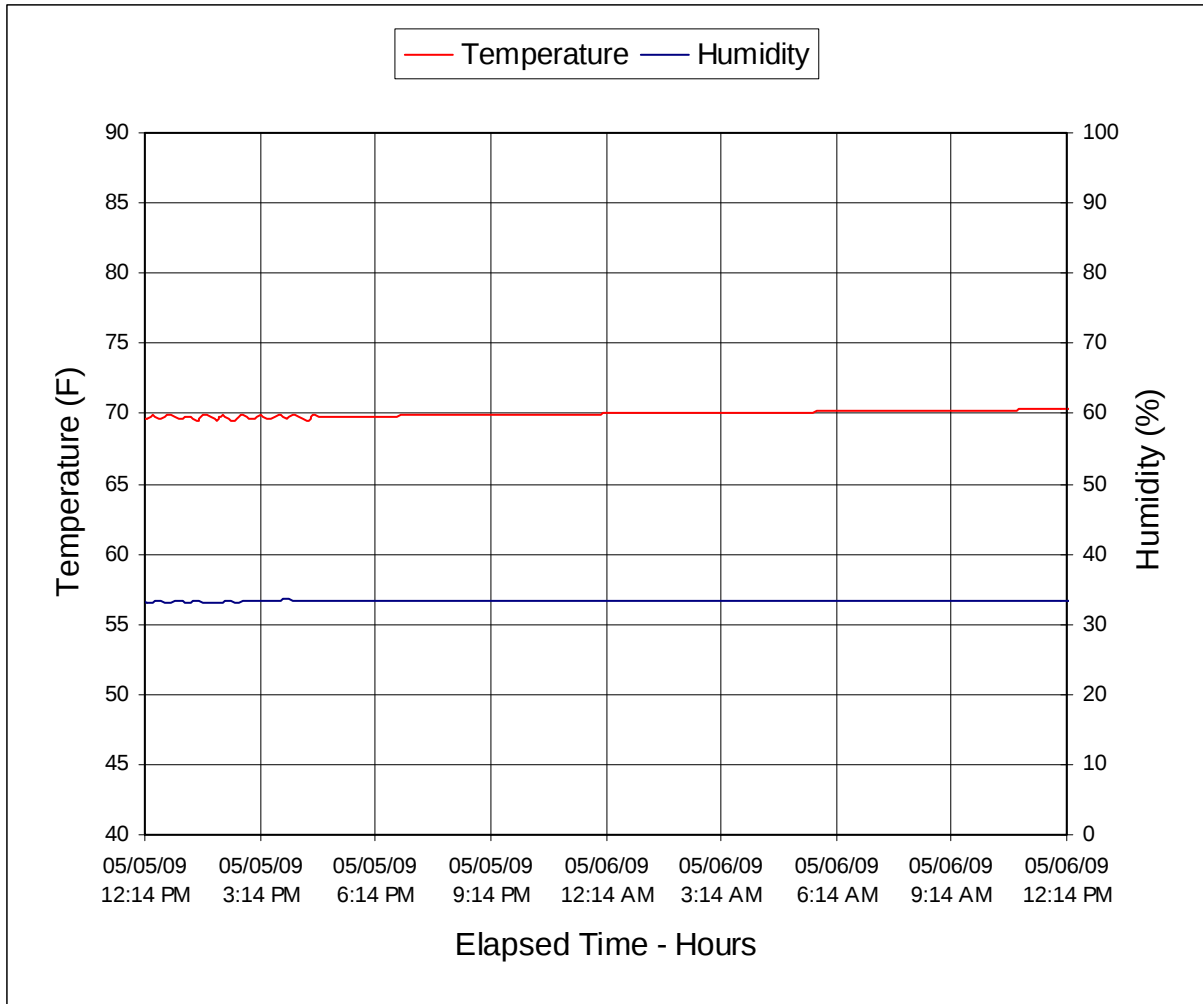
NHTSA No.: MA5403
Test Date: 05/06/09



DATA SHEET NO. 11

DUMMY / VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan NHTSA No.: MA5403
Test Program Side Impact Validation 75° Rigid Pole Test Test Date: 05/06/09



APPENDIX A
PHOTOGRAPHS

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3	Pre-Test Frontal View of the Test Vehicle	A-2
4	Post-Test Frontal View of Test Vehicle	A-2
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6	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-3
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9	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
10	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-5
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17	Pre-Test Left Side View of Pole Positioned Against Vehicle	A-9
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19	Pre-Test Close-Up View of Impact Point Target	A-10
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23	Pre-Test Left Side View of Dummy Showing Belt, Chalking, And Contact Switches (Door Open)	A-12
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25	Post-Test Left Side View of Dummy Shoulder and Top View	A-13
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27	Pre-Test View of Steering Wheel	A-14
28	Pre-Test Close-Up Left Side View of Driver Seat Track Showing Seat Positioning	A-14
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30	Pre-Test Dummy and Door Clearance View	A-15

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33	Post-Test Right Side View of Dummy and Front Seat Occupant Compartment (Through Window with Dummy)	A-17
34	Pre-Test Inner Door Panel View	A-17
35	Post-Test Inner Door Panel View (With Dummy Removed)	A-18
36	Post-Test Dummy Head Contact View	A-18
37	Post-Test Dummy Pelvis Contact View	A-19
38	Pre-Test Fuel Filler Cap View	A-19
39	Post-Test Fuel Filler Cap View	A-20
40	Close-Up View of Vehicle's Certification Label	A-20
41	Close-Up View of Vehicle's Tire Information Placard	A-21
42	Pre-Test Pole Barrier Front View	A-21
43	Post-Test Pole Barrier Front View	A-22
44	Pre-Test Pole Barrier Side View	A-22
45	Post-Test Pole Barrier Side View	A-23
46	Pre-Test Ballast View	A-23
47	Post-Test Primary Speed Trap Read-Out	A-24
48	Post-Test Redundant Speed Trap Read-Out	A-24
49	Impact Event	A-25
50	Vehicle's Monroney Label	A-25
51	Head Restraint Use and Adjustment from Vehicle Owner's Manual	A-26



FIGURE 1. As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 2. As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 3. Pre-Test Frontal View of Test Vehicle

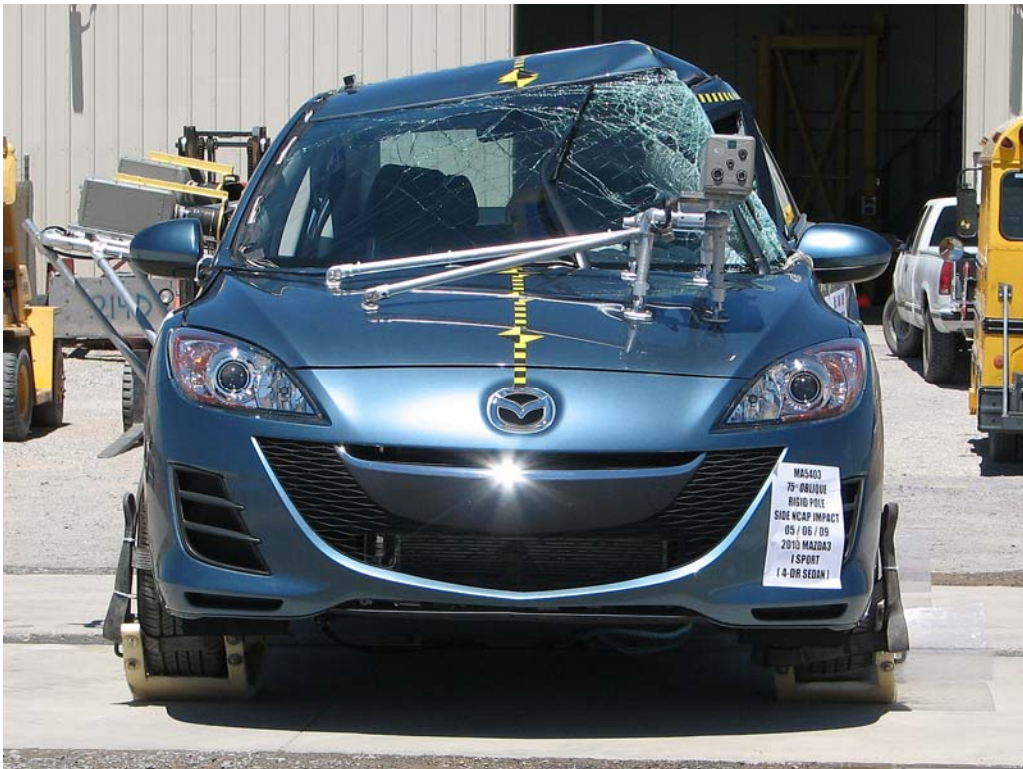


FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 6. Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 7. Pre-Test Left Side View of Test Vehicle



FIGURE 8. Post-Test Left Side View of Test Vehicle



FIGURE 9. Pre-Test Left Rear ¾ View of Test Vehicle



FIGURE 10. Post-Test Left Rear ¾ View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle



FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Side View of Test Vehicle



FIGURE 14. Post-Test Right Side View of Test Vehicle

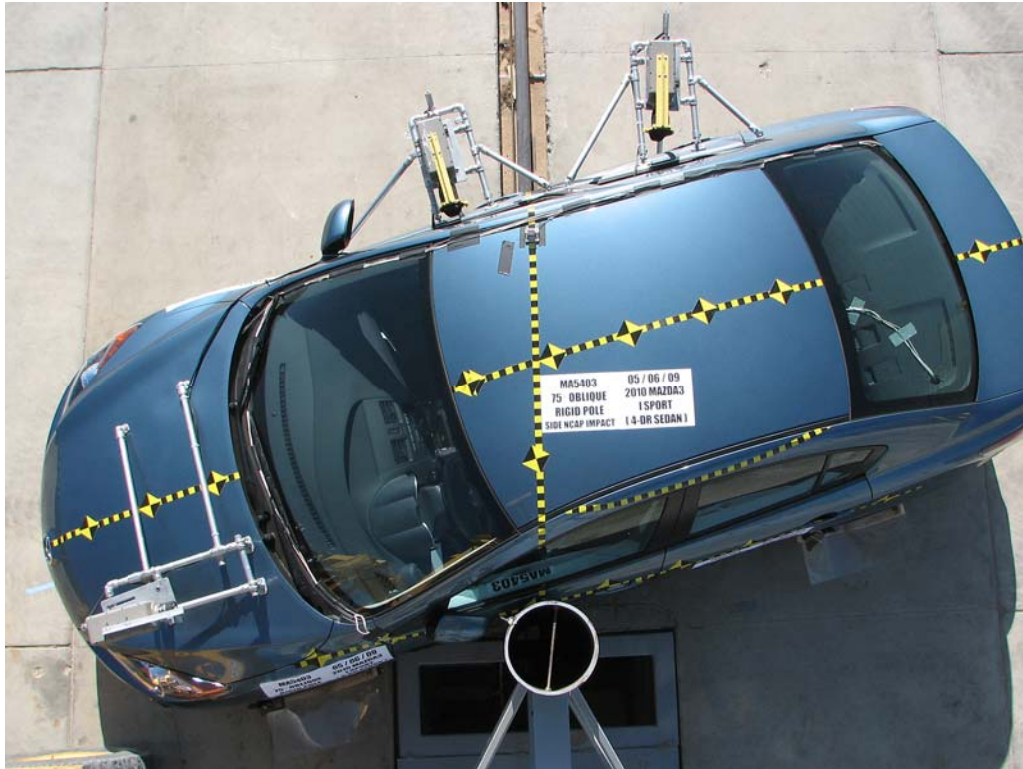


FIGURE 15. Pre-Test Overhead View of Test Vehicle and Pole

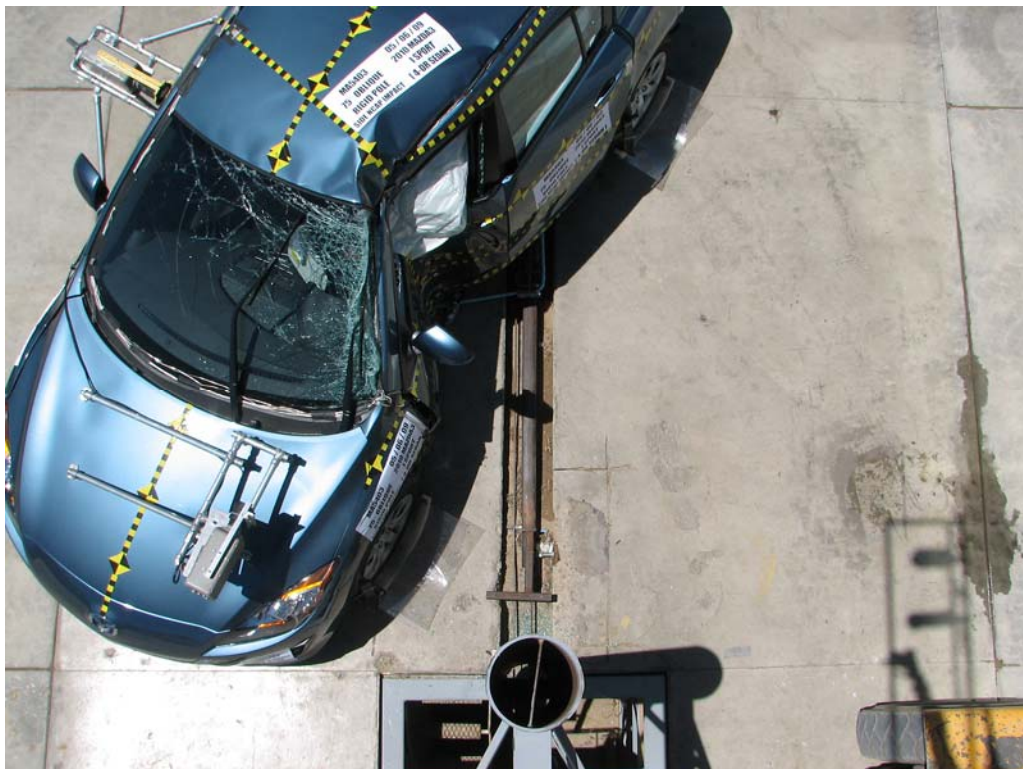


FIGURE 16. Post-Test Overhead View of Test Vehicle and Pole



FIGURE 17. Pre-Test Left Side View of Pole Positioned Against Vehicle



FIGURE 18. Pre-Test Right Side View of Pole Positioned Against Vehicle

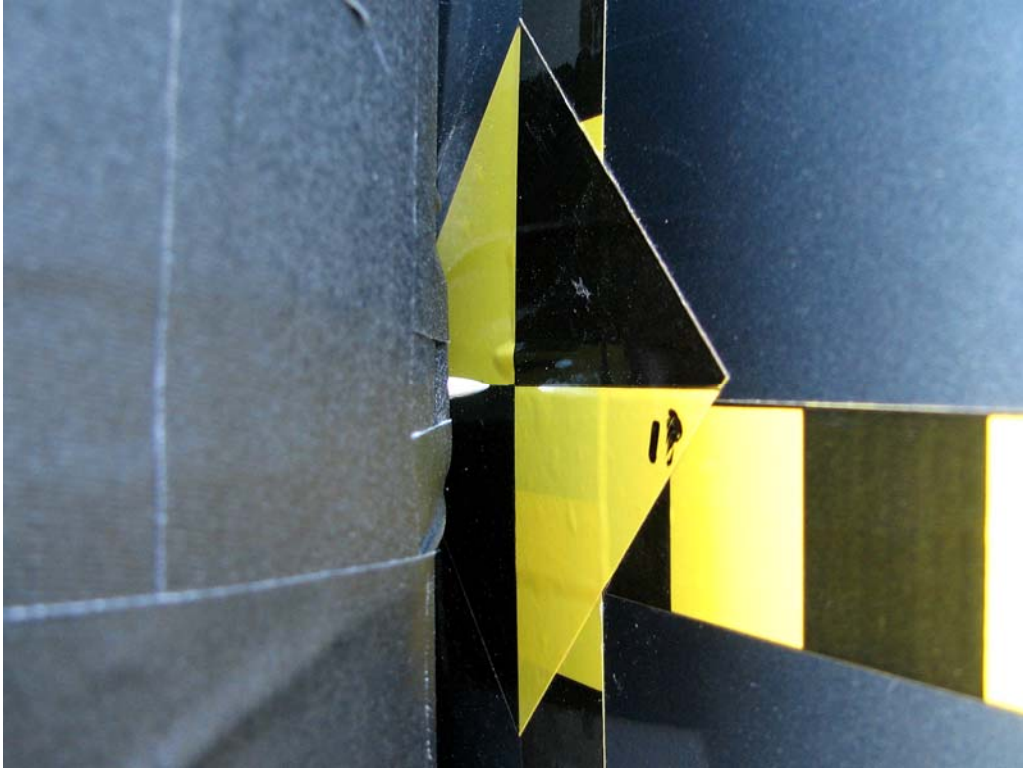


FIGURE 19. Pre-Test Close-Up View of Impact Point Target

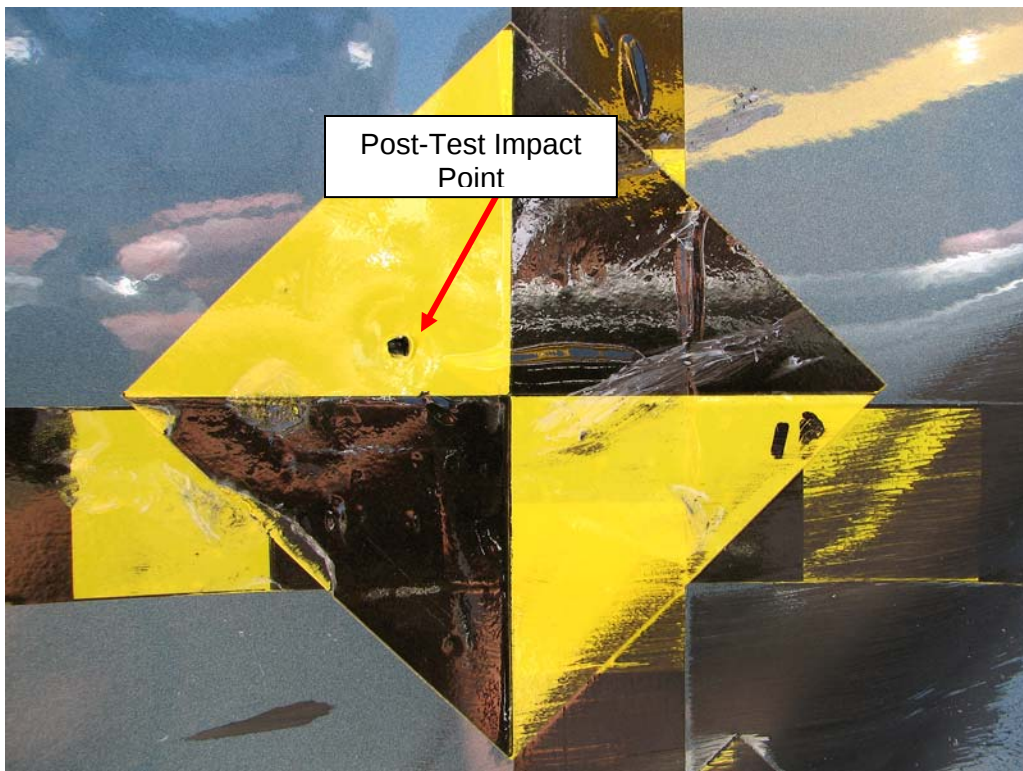


FIGURE 20. Post-Test Close-Up View of the Impact Point Target
Showing Impact Point Location



FIGURE 21. Pre-Test Front Close-Up View of Dummy (Through Front Window)



FIGURE 22. Post-Test Front Close-Up View of Dummy (Through Front Window)



FIGURE 23. Pre-Test Left Side View of Dummy Showing Belt, Chalking, and Contact Switches (Door Open)



FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Door Top View



FIGURE 26. Pre-Test Placement of Dummy Feet



FIGURE 27. Pre-Test View of Steering Wheel



FIGURE 28. Pre-Test Close-Up Left Side View of Driver Seat Track Showing Seat Positioning



FIGURE 29. Pre-Test Close-Up Left Side View of Driver Seat Back Showing Seat Back Positioning



FIGURE 30. Pre-Test Dummy and Door Clearance View



FIGURE 31. Post-Test Dummy and Door Clearance View



FIGURE 32. Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment
(Through Window with Dummy)



FIGURE 33. Post-Test Right Side View of Dummy and Front Seat Occupant Compartment (Through Window with Dummy)



FIGURE 34. Pre-Test Inner Door Panel View



FIGURE 35. Post-Test Inner Door Panel View (With Dummy Removed)



FIGURE 36. Post-Test Dummy Head Contact View



FIGURE 37. Post-Test Dummy Pelvis Contact View



FIGURE 38. Pre-Test Fuel Filler Cap View



FIGURE 39. Post-Test Fuel Filler Cap View

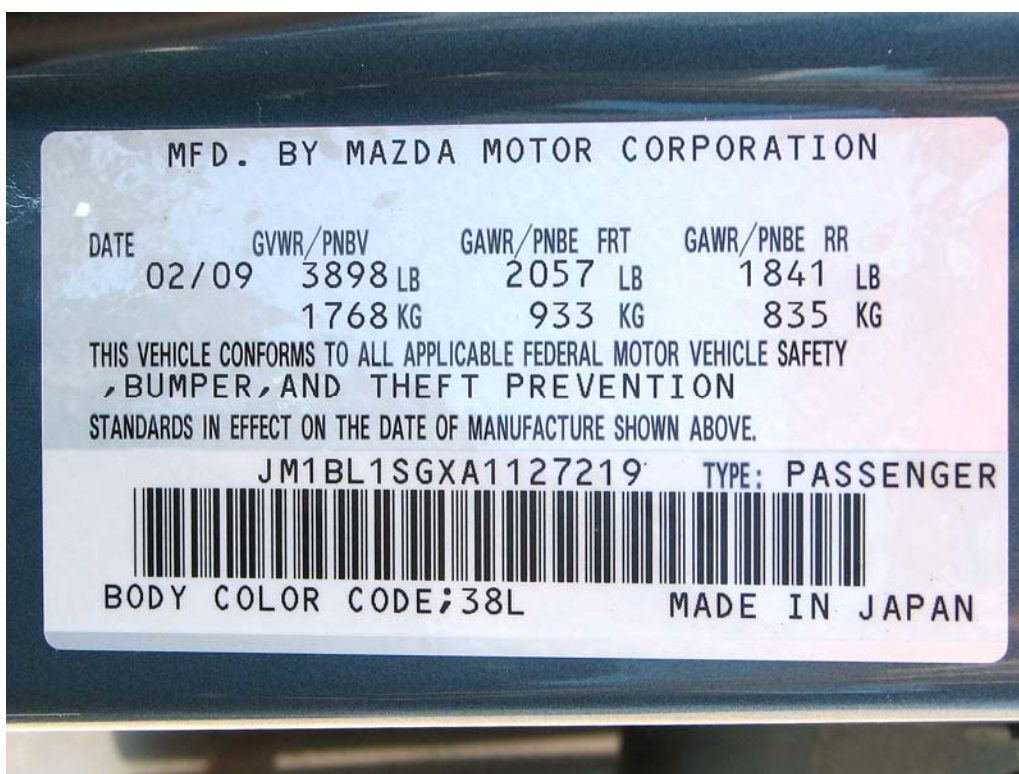


FIGURE 40. Close-Up View of Vehicle's Certification Label

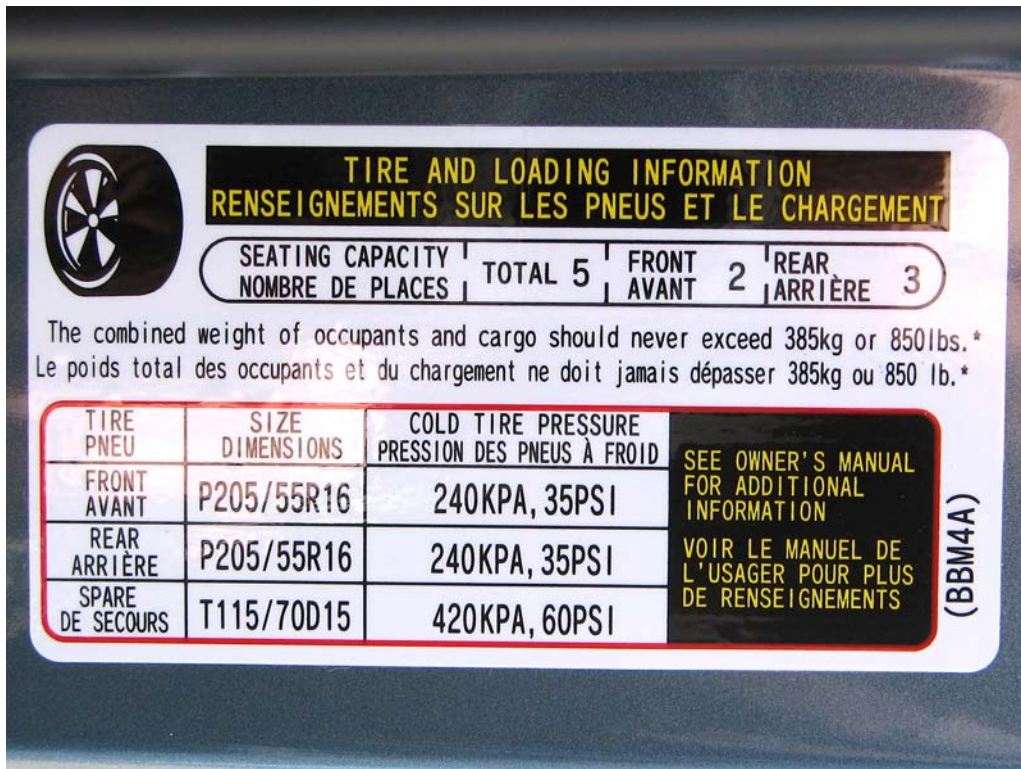


FIGURE 41. Close-Up View of Vehicle's Tire Information Placard



FIGURE 42. Pre-Test Pole Barrier Front View



FIGURE 43. Post-Test Pole Barrier Front View



FIGURE 44. Pre-Test Pole Barrier Side View



FIGURE 45. Post-Test Pole Barrier Side View



FIGURE 46. Pre-Test Ballast View



FIGURE 47. Post-Test Primary Speed Trap Read-Out

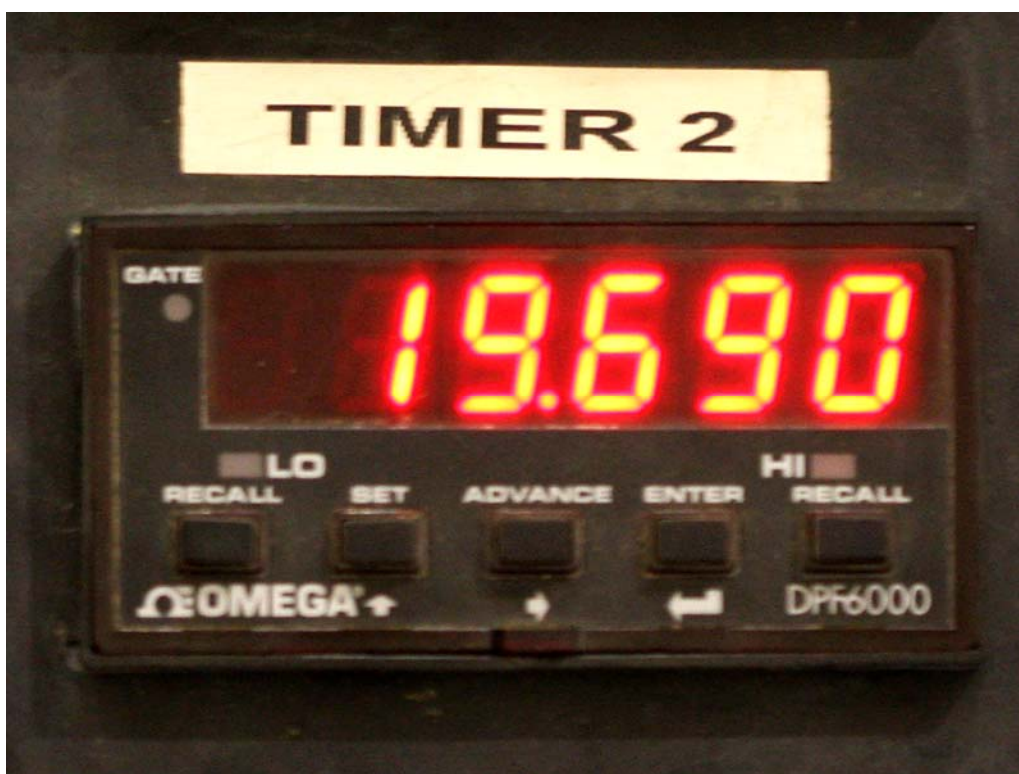


FIGURE 48. Post-Test Redundant Speed Trap Read-Out



FIGURE 49. Impact Event

2010 mazda 3
Model: 2010 MAZDA3 I4-4DOOR SPORT
Exterior Color: GUNMETAL BLUE
Interior Color: BLACK

EPA Fuel Economy Estimates

CITY MPG
25
Expected range for most drivers
20 to 30 mpg

Estimated Annual Fuel Cost
\$1,017
based on 15,000 miles at \$1.90 per gallon

Highway MPG
33
Expected range for most drivers
27 to 39 mpg

Combined Fuel Economy
28
This Vehicle

PARTS CONTENT INFORMATION:

FOR VEHICLES IN THIS CATEGORY:
U.S./CANADIAN PARTS CONTENT: 91%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 99%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: Mazda, JAPAN
COUNTRY OF ORIGIN: JAPAN
ENGINE: JAPAN
TRANSMISSION: JAPAN

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- 2.5L DOHC 16-VALVE V-6 ENGINE
- 5-SPEED MANUAL TRANSMISSION
- FRONT-DRIVE
- INDEPENDENT FRONT/REAR SUSPENSION
- FRONT & REAR STABILIZER BARS

EXTERIOR FEATURES

- 16-SPoke STEEL WHEELS
- POSSIBLE ALL-SEASON TIRES
- HALOGEN HEADLIGHTS
- VARIABLE-INTERMITTENT FRONT WIPERS

INTERIOR FEATURES

- CLOTH SEATS & CARPET FLOOR MATS
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- AM/FM/CD W/MP 4-SPEAKER AUDIO
- STEERING WHEEL AUDIO CONTROLS
- TILT & TELESCOPIC STEERING COLUMN
- AUXILIARY AUDIO INPUT JACK
- POWER WINDOWS W/DRIVER-SIDE ONE-TOUCH DOWN
- TWO 12V POWER OUTLETS

SAFETY AND SECURITY FEATURES

- 36-MONTH/50,000 MILE "BUMPER-TO-BUMPER WARRANTY"
- 60 MONTH / 60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- ADVANCED DUAL FRONT AIR BAGS - SRS

OPTIONAL EQUIPMENT

OPTIONAL EQUIPMENT	MSRP*
CE1 PZEV EMISSION	NO CHARGE
Total Vehicle and Options	\$15,975
Delivery, Processing and Handling Fee	\$675
Total MSRP*	\$16,650

Environmental Performance

Protect the environment, choose vehicles with higher scores:

Global Warming Score
8
1
2
3
4
5
6
7
8
9
10
Cleanest

Smog Score
9
1
2
3
4
5
6
7
8
9
10
Cleanest

GOVERNMENT SAFETY RATINGS

Frontal Crash
Driver: Not Rated
Passenger: Not Rated

Side Crash
Front seat: Not Rated
Rear seat: Not Rated

Rollover
Not Rated

Environmental Performance

This vehicle is equipped with bumpers that can withstand an impact of 2.5 miles per hour with no damage to the vehicle's body and safety systems, although the bumper and related components may sustain damage. The bumper system on this vehicle conforms to the current federal bumper standard of 2.5 miles per hour.

SOLD TO: 41978
ROGERO MAZDA
1307 KETTERING LOOP
ONTARIO, CA 91761

SHIP TO: 41978
ROGERO MAZDA
1307 KETTERING LOOP
ONTARIO, CA 91761

JM1BL1SGXA1127219
MAZDAUSA.COM

FIGURE 50. Vehicle's Monroney Label

▼ Armrest

The rear armrest in the center of the rear seatback can be used (no occupant in the center seat) or placed upright.



Head Restraints

Head restraints are intended to help protect you and the passengers from neck injury.

⚠ WARNING

Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted:

Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

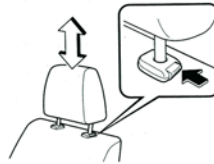
Height adjustment

To raise a head restraint, pull it up to the desired position.

To lower the head restraint, press the stop-catch release, then push the head restraint down.

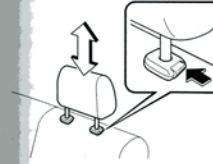
Adjust the head restraint so that the top is even with the top of the passenger's ears, never the passenger's neck to prevent injury.

Front seat



2-12

Rear seat



Removal/Installation

To remove the head restraint, pull it up while pressing the stop-catch.

To install the head restraint, press the uprights into the holes while pressing the stop-catch.

⚠ WARNING

Always drive with the head restraints set up when seats are being used and make sure they are properly set up:

Driving with the head restraints not set up is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

▼ Active Head Restraints

The active head restraints are equipped on the front seats.

In a rear-end collision, the active head restraints use the force applied by the occupant on the seatback to instantaneously move the head restraints in the forward direction, reducing excessive rearward tilting of the head and reducing the load on the neck. The active head restraints are also highly effective at reducing whip-lash injuries which commonly occur in rear-end collisions at low to mid-range vehicle speeds.



⚠ WARNING

- Always adjust the head restraints properly as specified in this section. Failure to do so can reduce the effectiveness of the active head restraint.
- Do not attach any accessories such as a TV screen to a front seatback and/or a front head restraint. Also do not place heavy items or thick items, or both in the seatback pocket. Doing so could reduce the effectiveness of the active head restraint in a rear-end collision.

2-13

FIGURE 51. Head Restraint Use and Adjustment from Vehicle Owner's Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver Dummy Instrumentation Plots

<u>Number</u>		<u>Page No.</u>
1	Driver Head Acceleration (X) vs. Time Primary	B-1
2	Driver Head Acceleration (Y) vs. Time Primary	B-1
3	Driver Head Acceleration (Z) vs. Time Primary	B-1
4	Driver Head Resultant Acceleration vs. Time Primary	B-1
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-2
7	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-2
9	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
10	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-3
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

The following additional data plots for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:

www.NHTSA.dot.gov

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant

Driver Head Acceleration (Y) Redundant

Driver Head Acceleration (Z) Redundant

Driver Upper Neck Force (X)

Driver Upper Neck Force (Y)

Driver Upper Neck Force (Z)

Driver Upper Neck Moment About X

Driver Upper Neck Moment About Y

Driver Upper Neck Moment About Z

Driver Shoulder Deflection (Y)

Driver Upper Thorax Rib Deflection (Y)

Driver Middle Thorax Rib Deflection (Y)

Driver Lower Thorax Rib Deflection (Y)

Driver Upper Abdomen Rib Deflection (Y)

Driver Lower Abdomen Rib Deflection (Y)

Driver Shoulder Contact Switch

Driver Torso Contact Switch

Driver Pelvis Contact Switch

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)

Vehicle Center of Gravity Acceleration (Y)

Vehicle Center of Gravity Acceleration (Z)

Vehicle Center of Gravity Angular Rate Acceleration About X (Roll)

Vehicle Center of Gravity Angular Rate Acceleration About Y (Pitch)

Vehicle Center of Gravity Angular Rate Acceleration About Z (Yaw)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration (Y)

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy H-Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

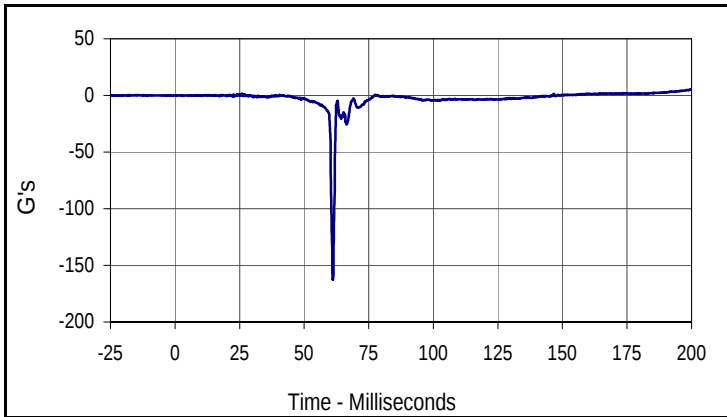
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Driver Side Airbag Timing

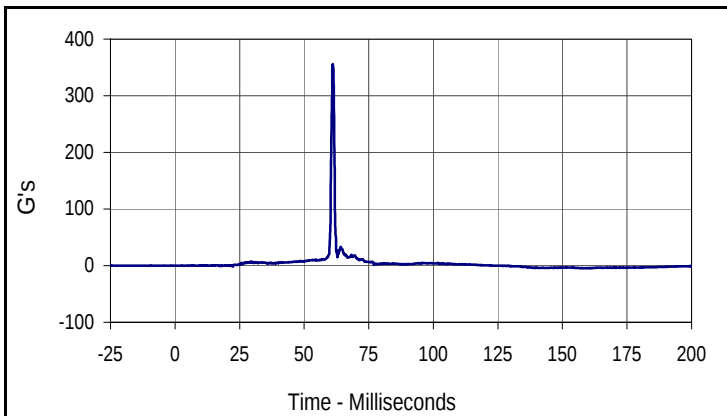
Driver Side Curtain Airbag Timing

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: Side Impact Validation 75° Rigid Pole Test

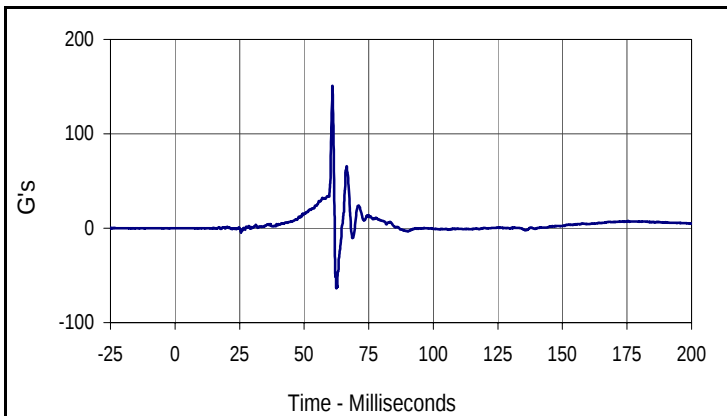
Test Date: 5/6/09
 NHTSA No.: MA5403



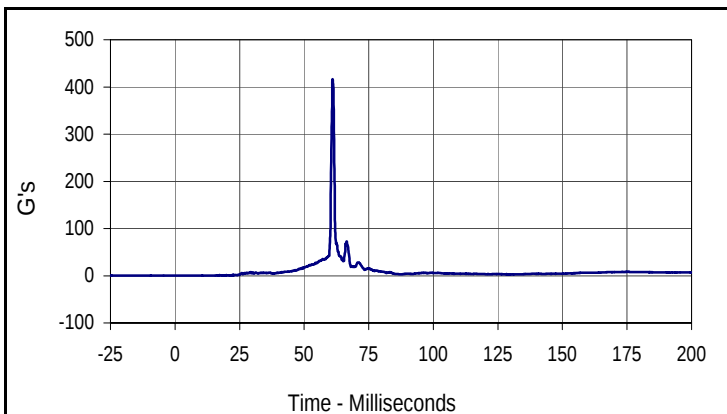
Curve Description			
Driver Head X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
5.2	199.8	-162.8	61.1



Curve Description			
Driver Head Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
355.9	61.1	-4.5	159.0



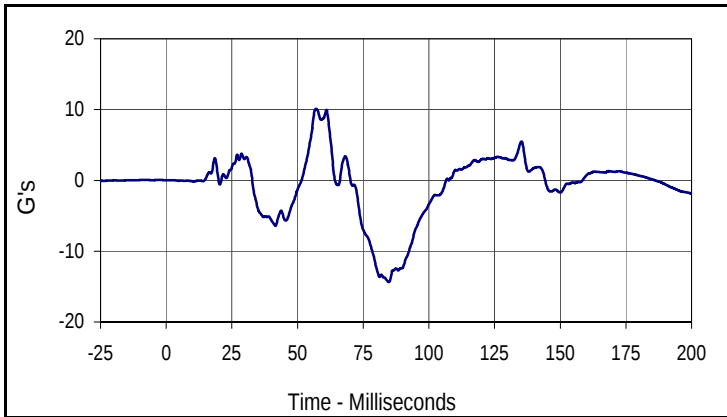
Curve Description			
Driver Head Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
150.7	61.0	-63.7	62.5



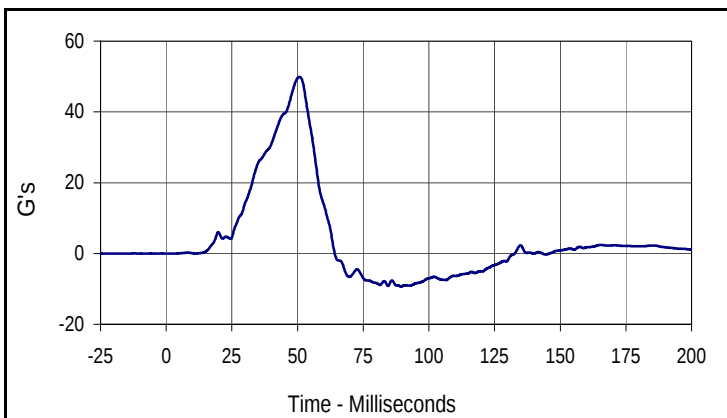
Curve Description			
Driver Head Primary Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
416.4	61.0	0.0	1.8

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: Side Impact Validation 75° Rigid Pole Test

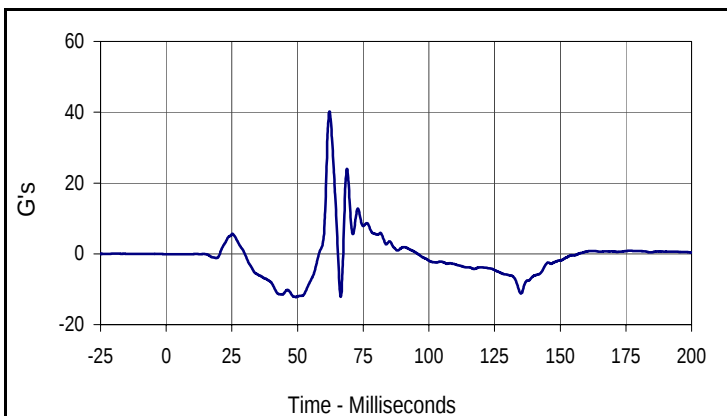
Test Date: 5/6/09
 NHTSA No.: MA5403



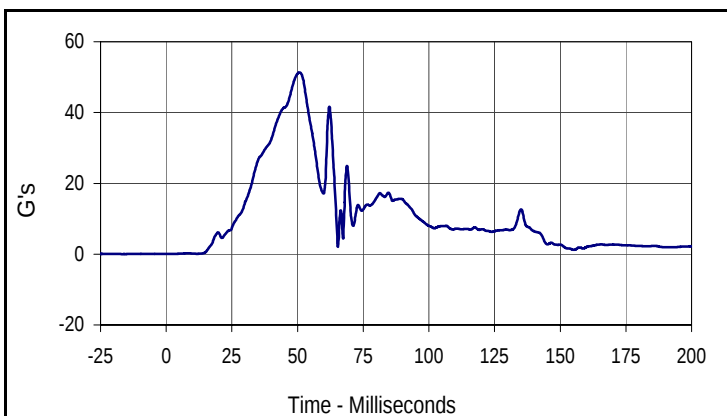
Curve Description			
Driver Lower Spine X			
CURNO	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
10.1	57.0	-14.4	84.7



Curve Description			
Driver Lower Spine Y			
CURNO	Type	SAE Class	Units
020	FIL	180	G's
Max	Time	Min	Time
49.9	50.7	-9.4	89.4



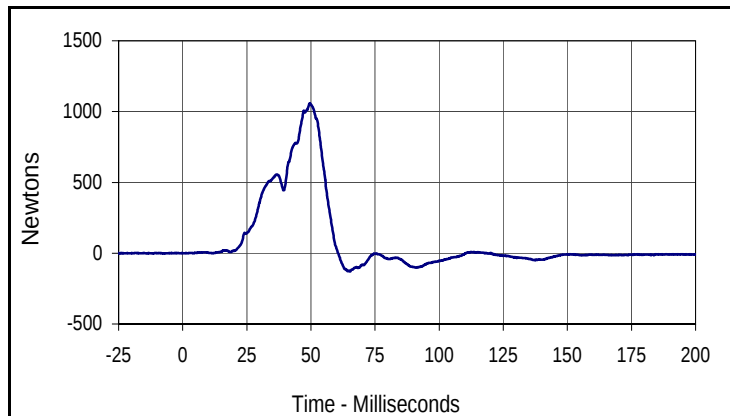
Curve Description			
Driver Lower Spine Z			
CURNO	Type	SAE Class	Units
021	FIL	180	G's
Max	Time	Min	Time
40.2	62.2	-12.2	49.3



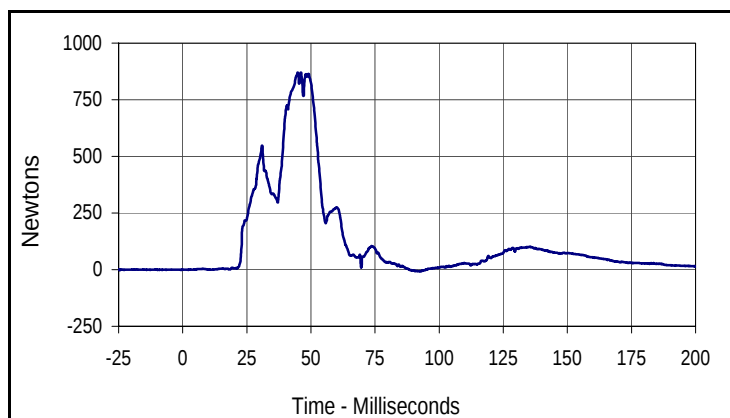
Curve Description			
Driver Lower Spine Resultant			
CURNO	Type	SAE Class	Units
019	RES	180	G's
Max	Time	Min	Time
51.3	50.7	0.1	11.8

Test Vehicle: 2010 Mazda3 I Sport 4-Door Sedan
 Test Program: Side Impact Validation 75° Rigid Pole Test

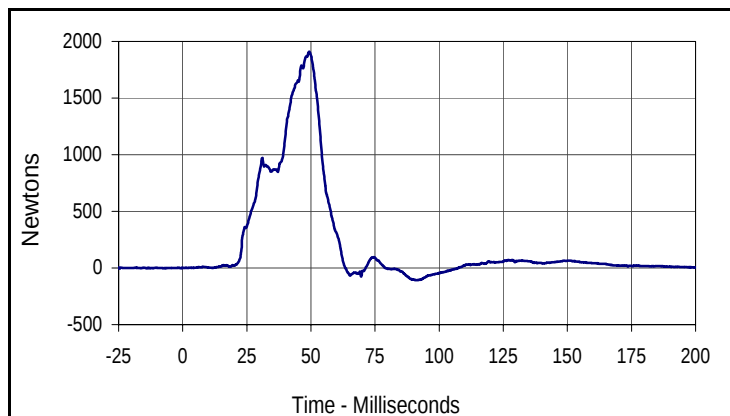
Test Date: 5/6/09
 NHTSA No.: MA5403



Curve Description			
Driver Left Iliac Wing Force Y			
CURNO	Type	SAE Class	Units
022	FIL	600	Newtons
Max	Time	Min	Time
1057.8	49.6	-129.2	65.2



Curve Description			
Driver Left Acetabulum Force Y			
CURNO	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
869.8	46.1	-7.7	92.0



Curve Description			
Driver Total Pelvic Force			
CURNO	Type	SAE Class	Units
022	SUM	600	Newtons
Max	Time	Min	Time
1909.6	49.3	-107.6	90.8

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

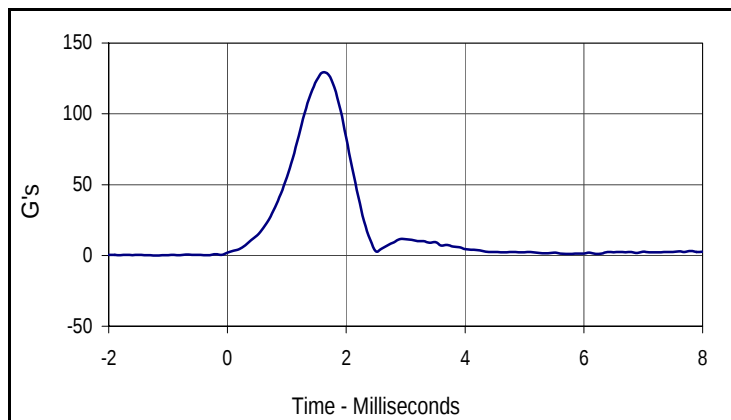
APPENDIX C
PRE-TEST SID IIS CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 307

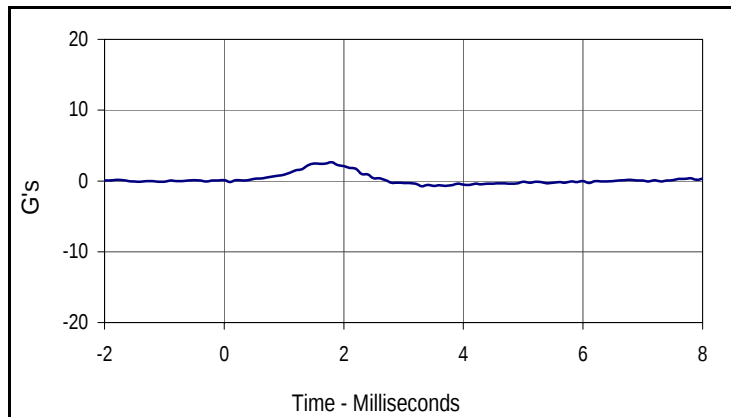
Test Date: 5/2/09
 Test I.D.: HDP04B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	129.1	Pass
Peak Longitudinal Acceleration	G's	≤15	2.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.1	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
129.1	1.6	0.0	-1.2



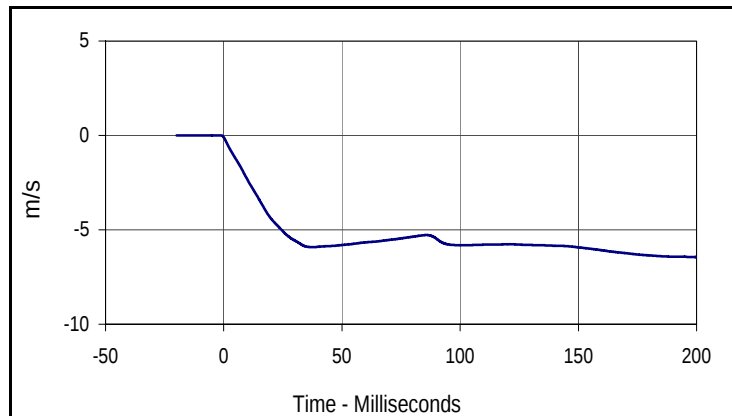
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.6	1.8	-0.7	3.3

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 307

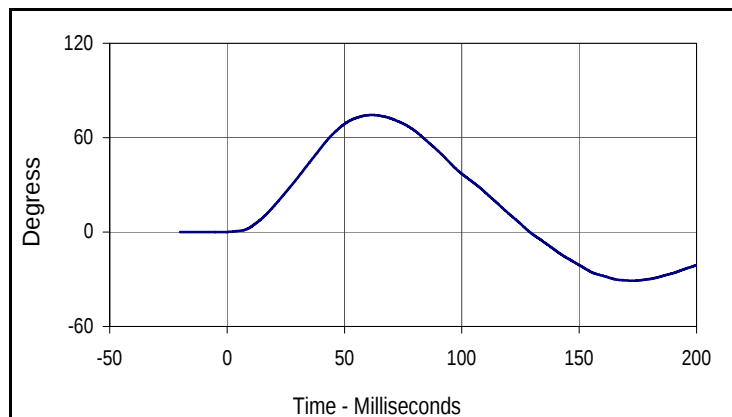
Test Date: 5/2/09
 Test I.D.: NBP04B



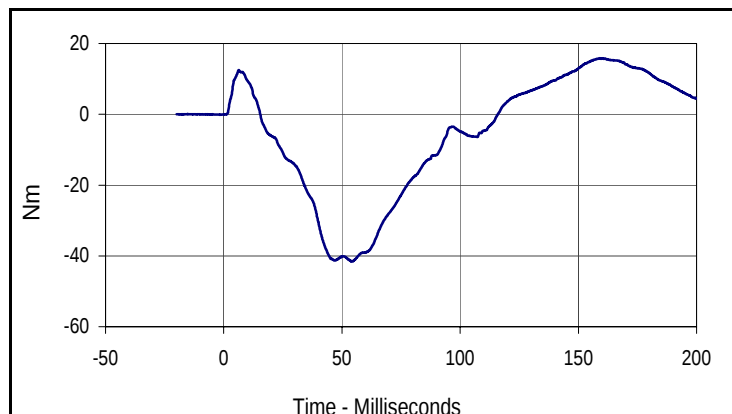
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.60	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.3	Pass
	15 msec	m/s	-3.30 to -4.10	-3.4	Pass
	20 msec	m/s	-4.40 to -5.40	-4.4	Pass
	25 msec	m/s	-5.40 to -6.10	-5.4	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.18	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	74.4	Pass
	Time	msec	50.0 to 70.0	61.5	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-41.6	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	116.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-1.5	-6.4	200.0



Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
74.4	61.5	-31.0	173.0



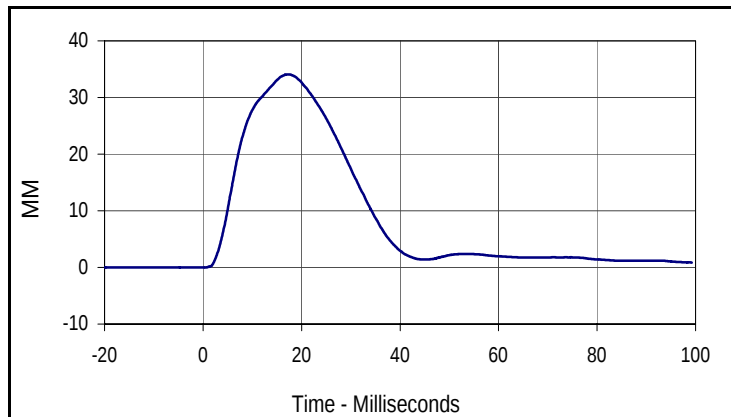
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.8	158.9	-41.6	54.3

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 307

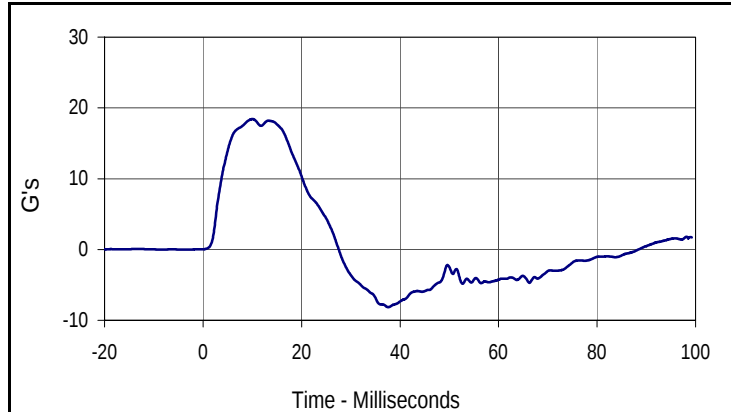
Test Date: 5/2/09
 Test I.D.: SHP04B



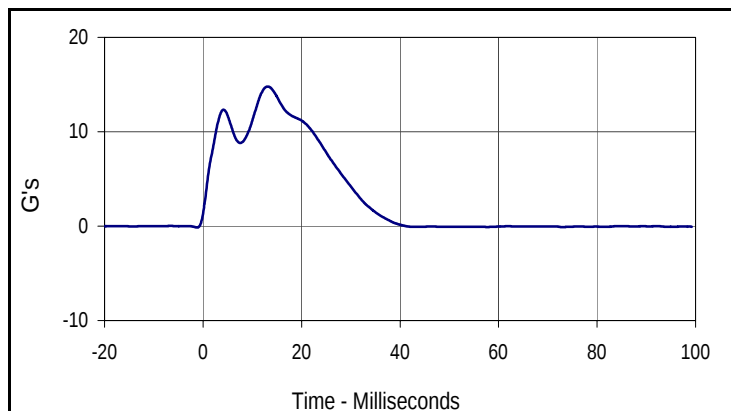
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Shoulder Deflection	MM	28 to 37	34.1	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	18.4	Pass
Peak Impactor Acceleration	G's	13 to 18	14.8	Pass
Overall Test Results			Pass	



Curve Description			
Shoulder Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.1	17.2	0.0	-11.9



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.4	10.1	-8.2	37.6



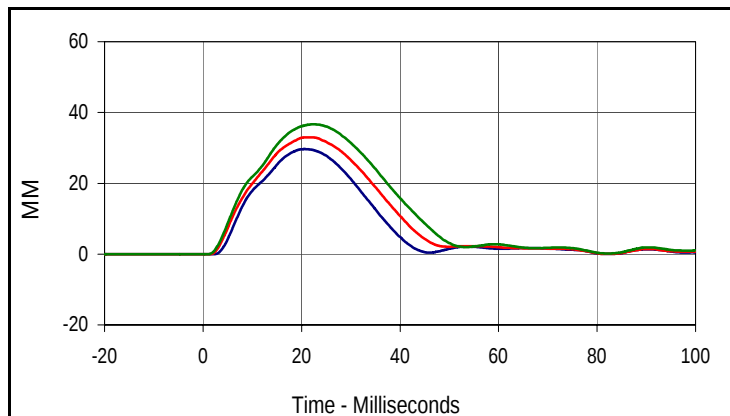
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
14.8	13.1	-0.1	-1.2

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 307

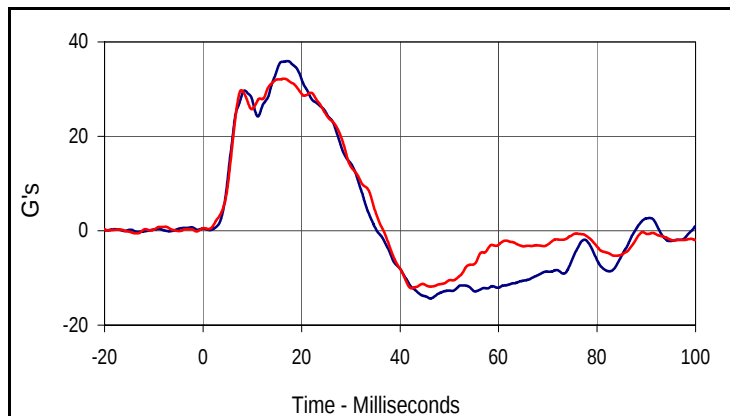
Test Date: 5/2/09
 Test I.D.: TAP04B



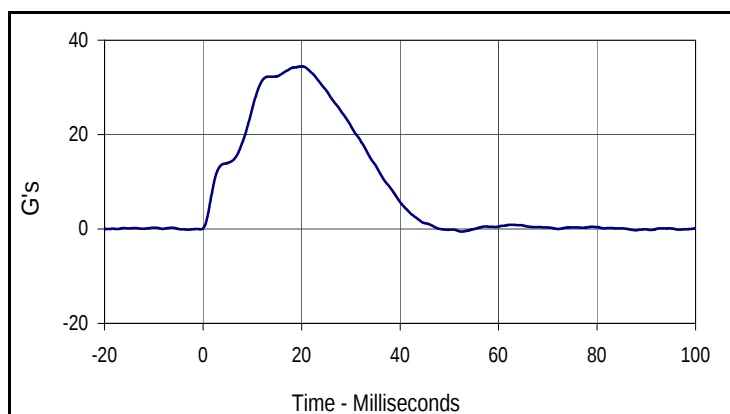
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.71	Pass
Shoulder Deflection	MM	31 to 40	37.1	Pass
Upper Thorax Rib Deflection	MM	26 to 32	29.7	Pass
Middle Abdominal Rib Deflection	MM	30 to 36	33.0	Pass
Lower Abdominal Rib Deflection	MM	32 to 38	36.7	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	36.0	Pass
Peak Lower Spine Y Acceleration	G's	28 to 35	32.2	Pass
Peak Impactor Acceleration	G's	31 to 36	34.5	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.7	20.6	0.0	-18.4
Middle Thorax Deflection			
Max	Time	Min	Time
33.0	21.4	0.0	-3.4
Lower Thorax Deflection			
Max	Time	Min	Time
36.7	22.3	0.0	-19.5



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
36.0	17.2	-14.3	46.1
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.2	16.5	-12.2	42.3



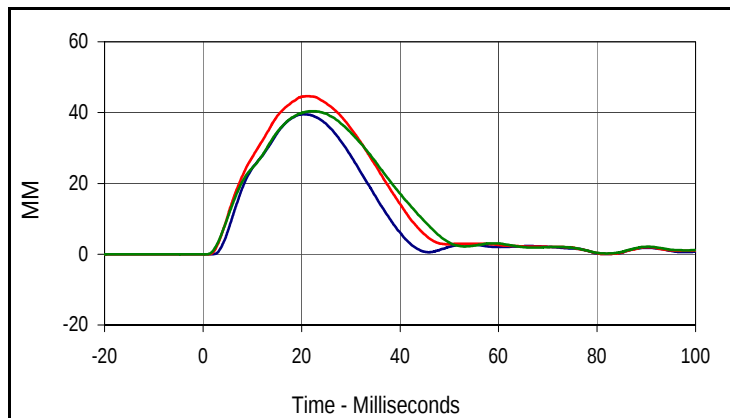
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.5	20.1	-0.5	52.5

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 307

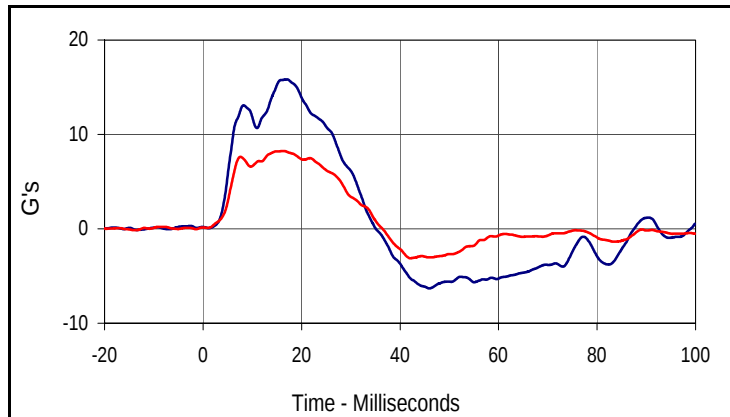
Test Date: 5/2/09
 Test I.D.: TOP04B



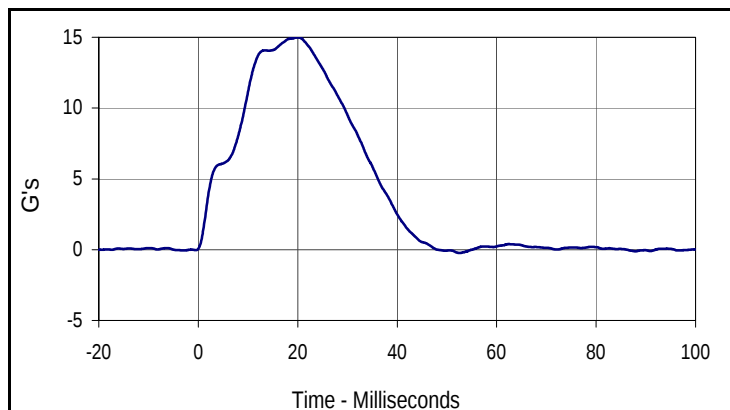
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.26	Pass
Upper Thorax Rib Deflection	MM	33 to 40	39.5	Pass
Middle Abdominal Rib Deflection	MM	39 to 45	44.6	Pass
Lower Abdominal Rib Deflection	MM	36 to 43	40.4	Pass
Peak Upper Spine Y Acceleration	G's	14 to 17	15.8	Pass
Peak Lower Spine Y Acceleration	G's	7 to 10	8.2	Pass
Peak Impactor Acceleration	G's	12 to 16	15.0	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.5	20.4	0.0	-18.6
Middle Thorax Deflection			
Max	Time	Min	Time
44.6	21.2	0.0	-3.6
Lower Thorax Deflection			
Max	Time	Min	Time
40.4	22.1	0.0	-19.7



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.8	17.0	-6.3	45.9
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
8.2	16.3	-3.1	42.1



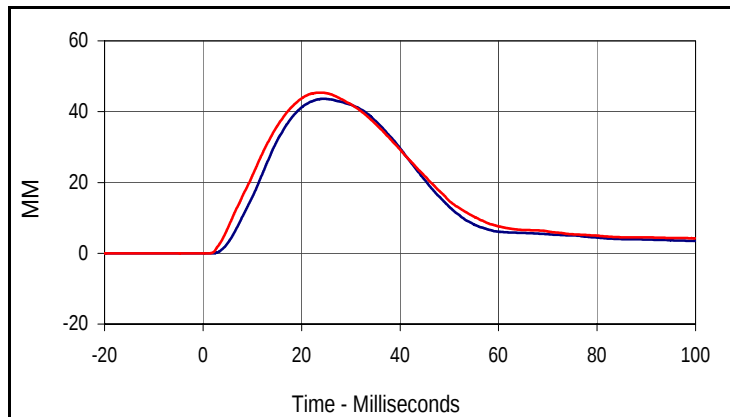
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.0	20.1	-0.2	52.5

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 307

Test Date: 5/2/09
 Test I.D.: ABP04B

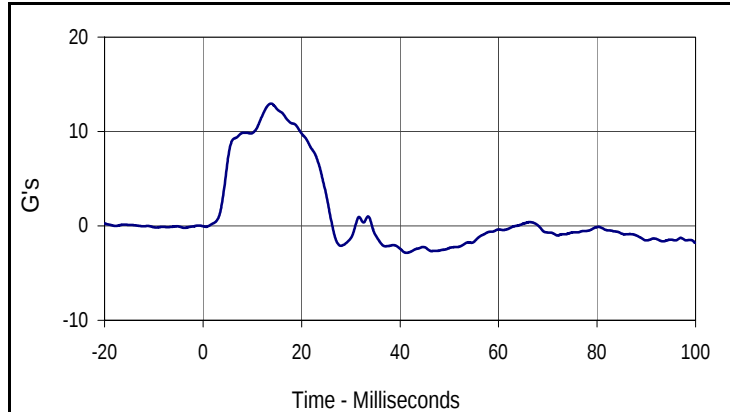


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.30 to 4.50	4.43	Pass
Upper Abdominal Rib Deflection	MM	39 to 47	43.6	Pass
Lower Abdominal Rib Deflection	MM	37 to 46	45.4	Pass
Peak Lower Spine Y Acceleration	G's	11 to 14	13.0	Pass
Peak Impactor Acceleration	G's	12 to 16	13.2	Pass
Overall Test Results			Pass	

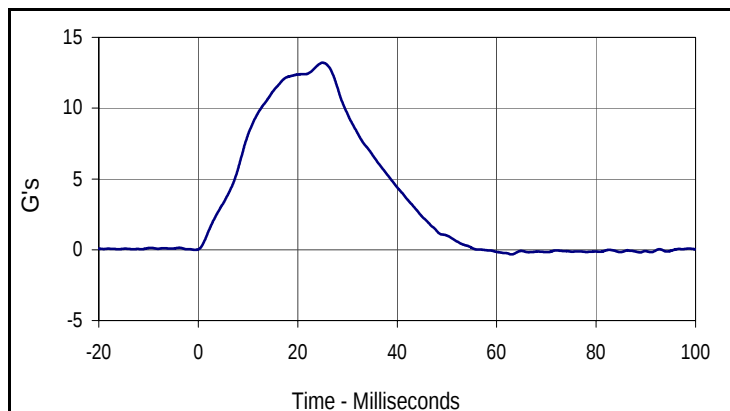


Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
43.6	24.6	0.0	1.3

Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
45.4	24.0	0.0	-20.0



Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
13.0	13.8	-2.9	41.3



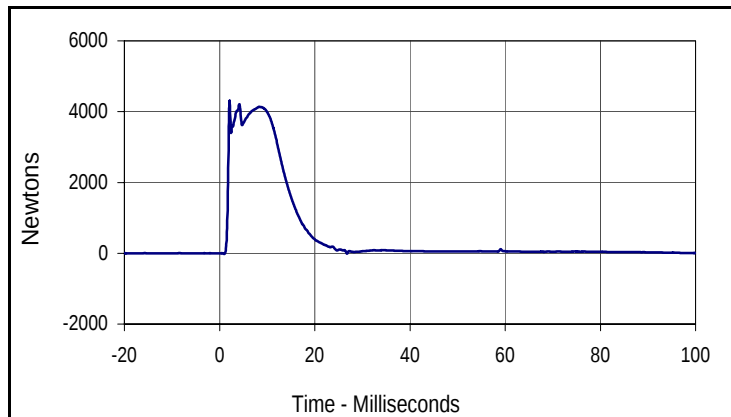
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
13.2	25.0	-0.3	63.0

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 307

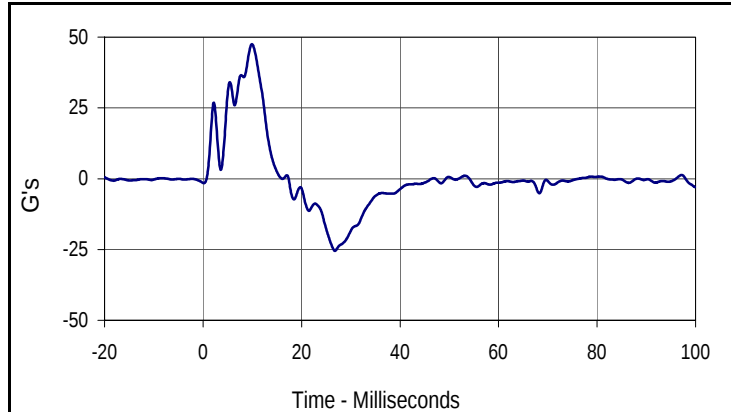
Test Date: 5/2/09
 Test I.D.: PAP04B



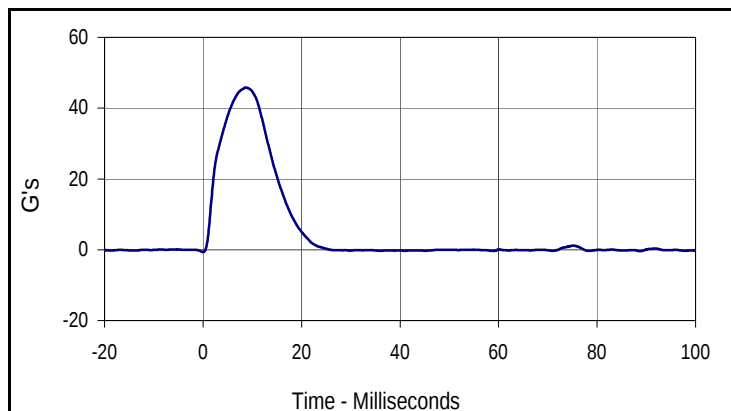
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.63	Pass
Peak Acetabulum Force	Newtons	3800 to 4600	4305.6	Pass
Peak Pelvis Y Acceleration	G's	41 to 50	47.5	Pass
Peak Impactor Acceleration	G's	38 to 47	45.8	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4305.6	2.1	-16.1	1.0



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
47.5	9.9	-25.4	26.8



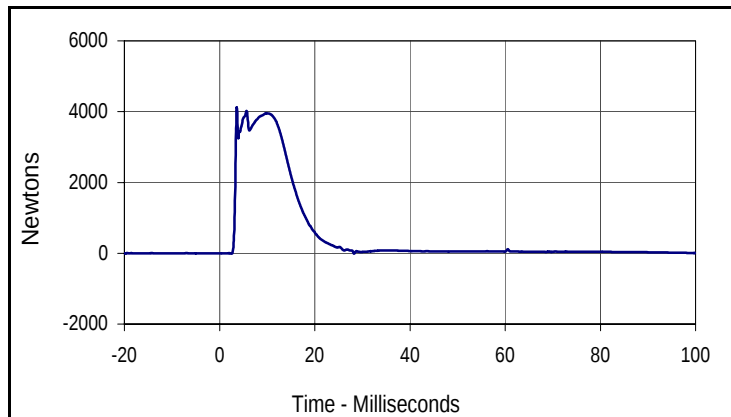
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.8	8.7	-0.6	0.0

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

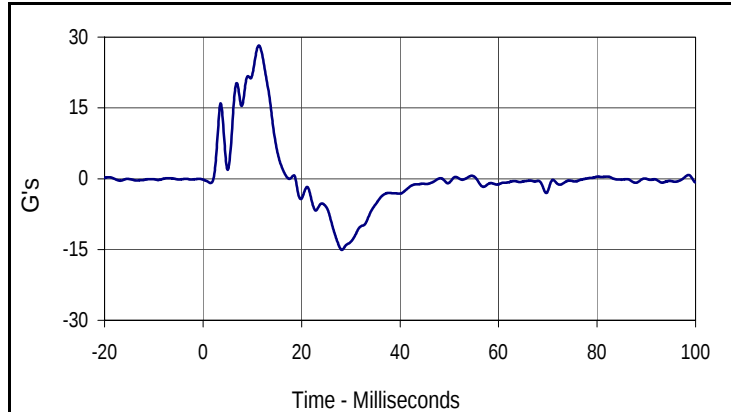
Test Date: 5/2/09
 Test I.D.: ILP04B



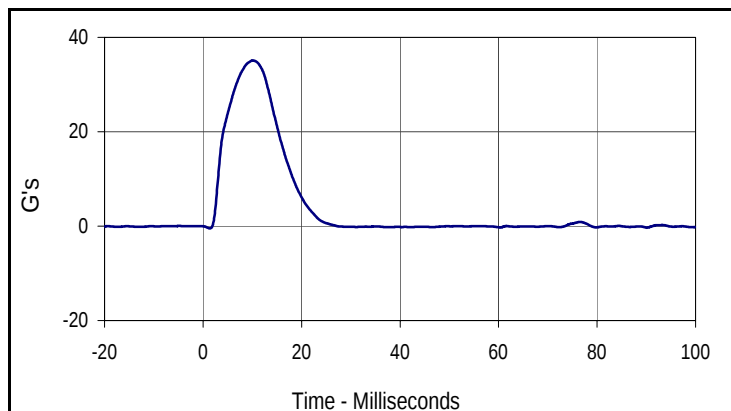
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.24	Pass
Peak Iliac Force	Newtons	3700 to 4500	4117.6	Pass
Peak Pelvis Y Acceleration	G's	27 to 33	28.2	Pass
Peak Impactor Acceleration	G's	34 to 40	35.1	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4117.6	3.6	-15.4	2.5



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
28.2	11.3	-15.1	28.2



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
35.1	10.1	-0.5	1.4

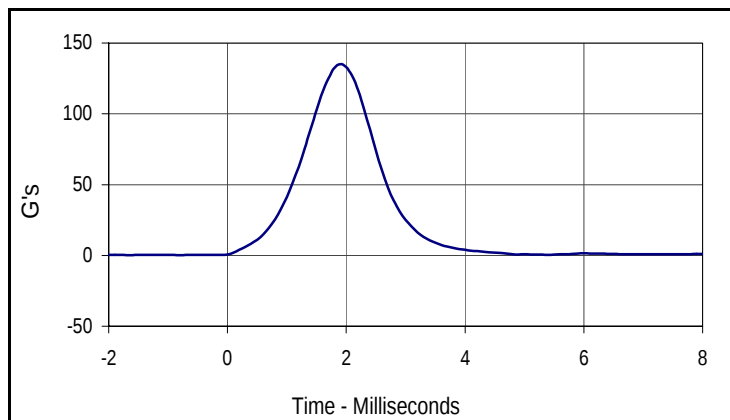
APPENDIX C
POST-TEST SID IIS CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 307

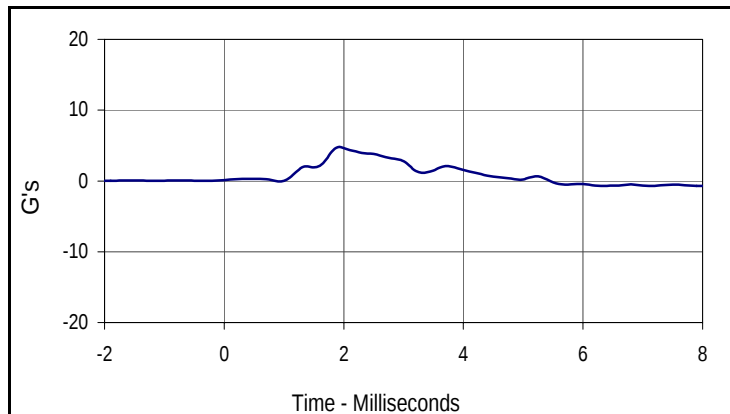
Test Date: 5/11/09
 Test I.D.: HDP05A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	135.0	Pass
Peak Longitudinal Acceleration	G's	≤15	4.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.0	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
135.0	1.9	0.3	-1.6



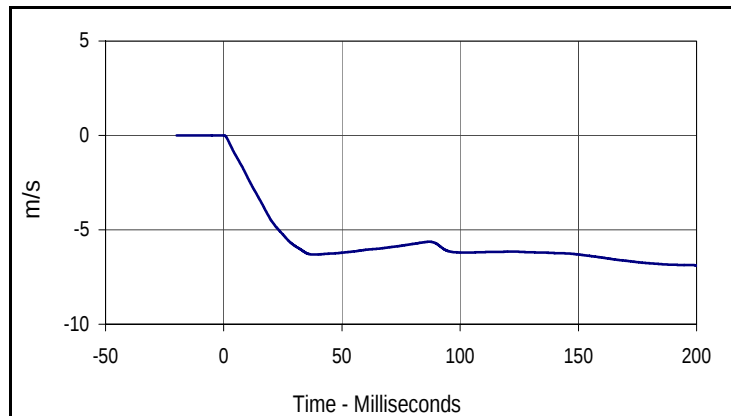
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.7	1.9	-0.5	5.7

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 307

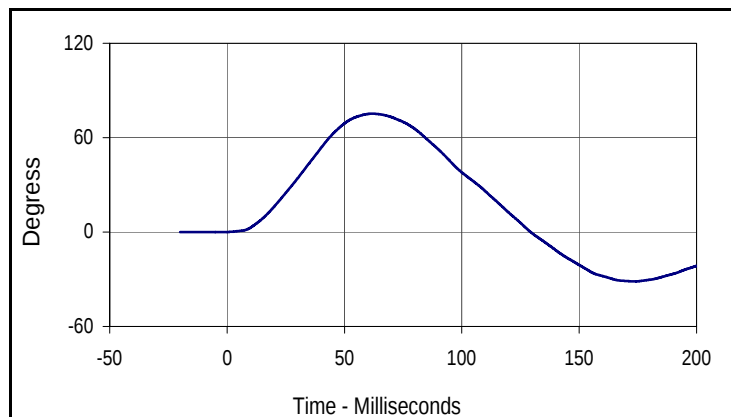
Test Date: 5/11/09
 Test I.D.: NBP05A



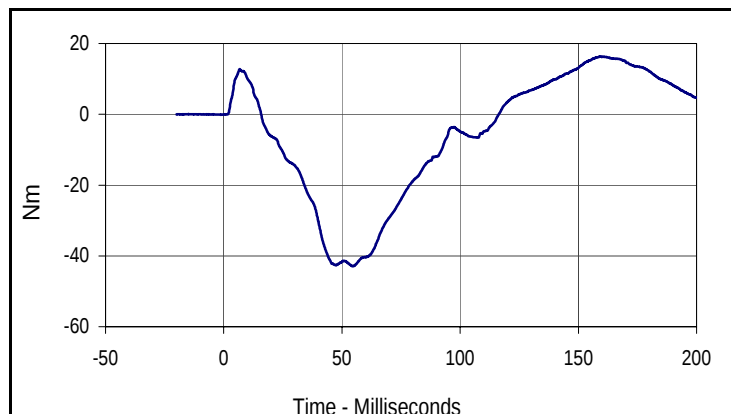
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.59	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.2	Pass
	15 msec	m/s	-3.30 to -4.10	-3.4	Pass
	20 msec	m/s	-4.40 to -5.40	-4.5	Pass
	25 msec	m/s	-5.40 to -6.10	-5.4	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.18	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	75.2	Pass
	Time	msec	50.0 to 70.0	61.9	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-42.9	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	116.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.3	-6.9	200.0



Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
75.2	61.9	-31.4	173.4



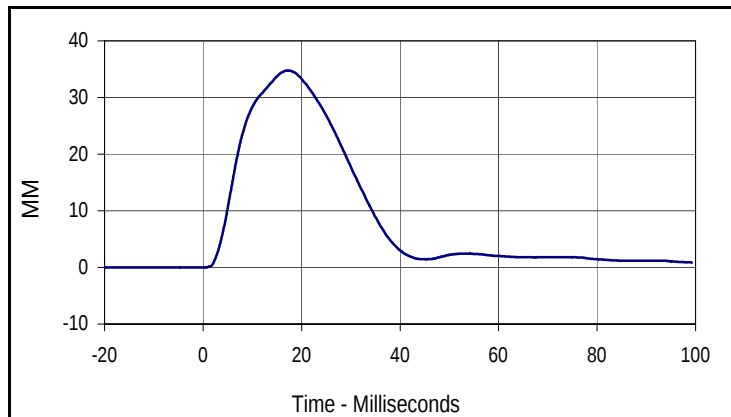
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.3	159.3	-42.9	54.7

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 307

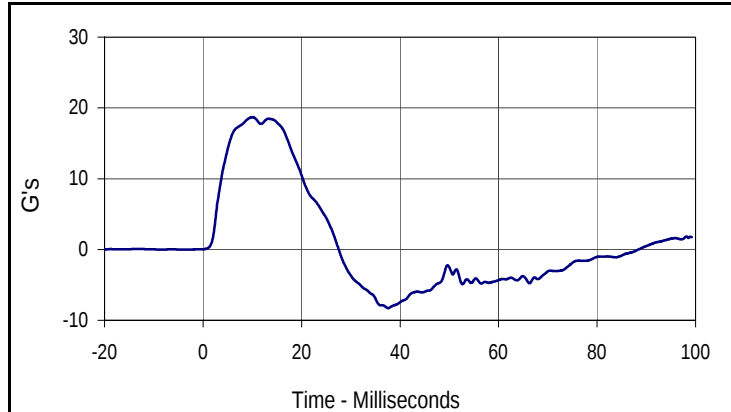
Test Date: 5/11/09
 Test I.D.: SHP05A



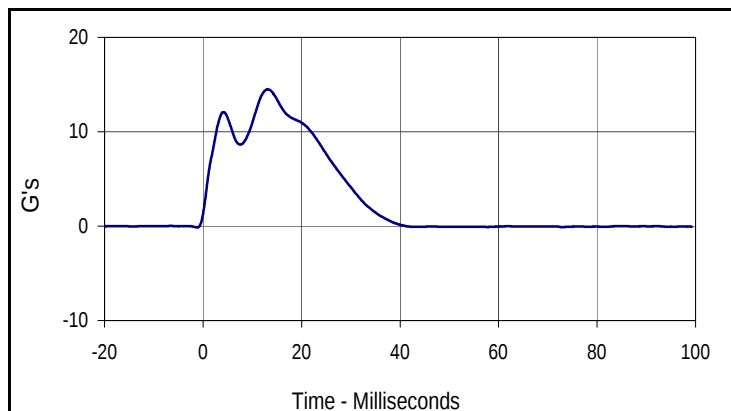
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.25	Pass
Shoulder Deflection	MM	28 to 37	34.8	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	18.7	Pass
Peak Impactor Acceleration	G's	13 to 18	14.5	Pass
Overall Test Results			Pass	



Curve Description			
Shoulder Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.8	17.2	0.0	-11.9



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.7	10.1	-8.3	37.6



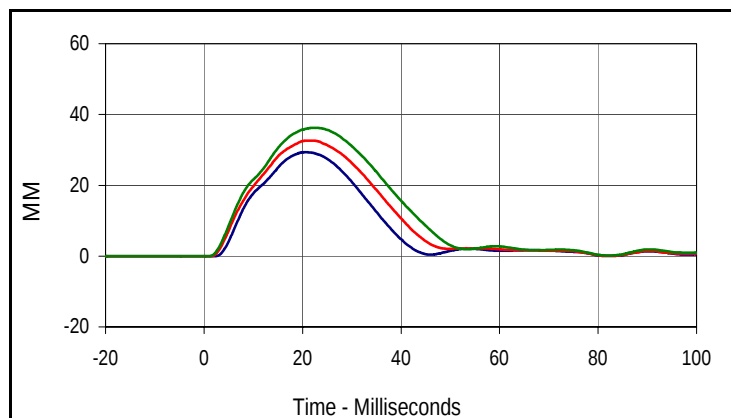
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
14.5	13.1	-0.1	-1.2

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 307

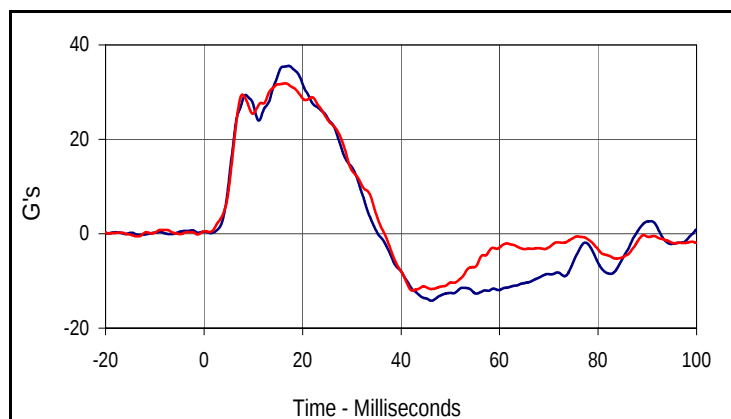
Test Date: 5/11/09
 Test I.D.: TAP05A



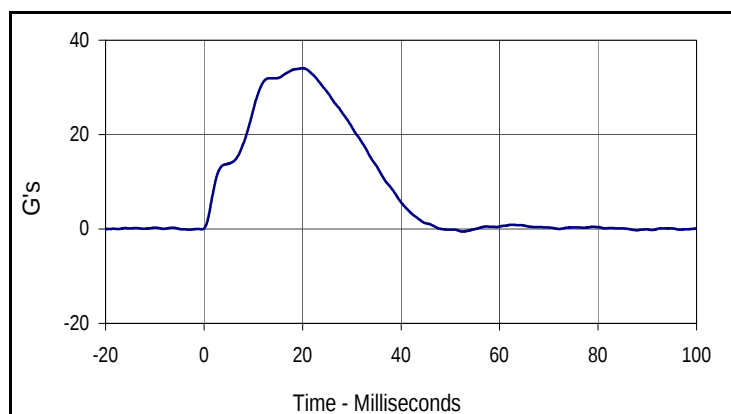
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.66	Pass
Shoulder Deflection	MM	31 to 40	36.7	Pass
Upper Thorax Rib Deflection	MM	26 to 32	29.3	Pass
Middle Abdominal Rib Deflection	MM	30 to 36	32.6	Pass
Lower Abdominal Rib Deflection	MM	32 to 38	36.3	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	35.6	Pass
Peak Lower Spine Y Acceleration	G's	28 to 35	31.8	Pass
Peak Impactor Acceleration	G's	31 to 36	34.1	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.3	20.6	0.0	-18.4
Middle Thorax Deflection			
Max	Time	Min	Time
32.6	21.4	0.0	-3.4
Lower Thorax Deflection			
Max	Time	Min	Time
36.3	22.3	0.0	-19.5



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
35.6	17.2	-14.2	46.1
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.8	16.5	-12.0	42.3



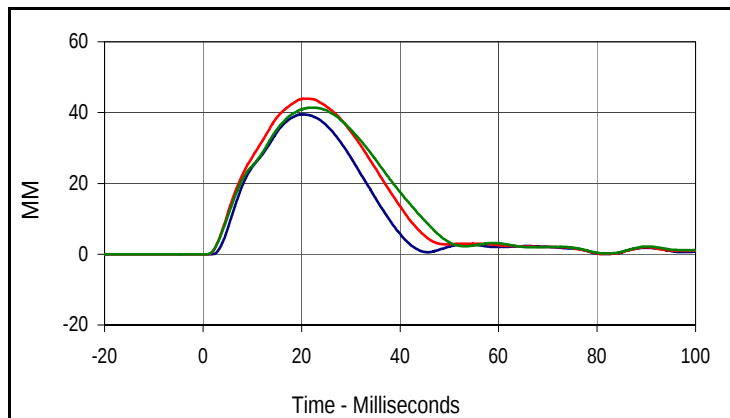
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.1	20.1	-0.5	52.5

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 307

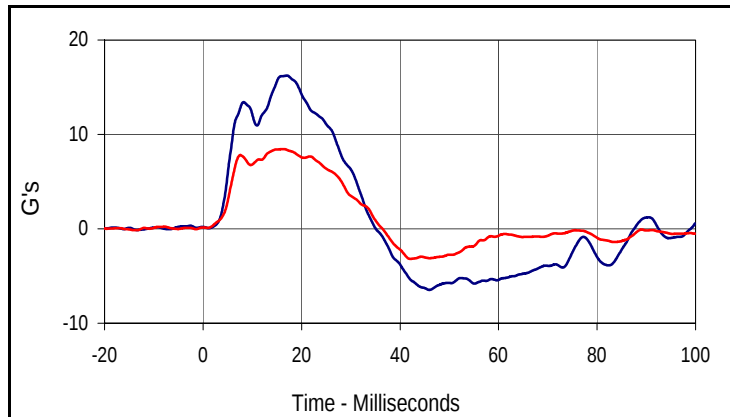
Test Date: 5/11/09
 Test I.D.: TOP05A



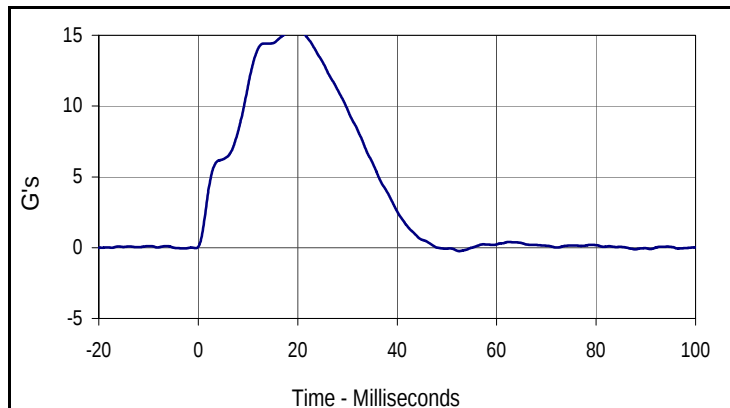
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.24	Pass
Upper Thorax Rib Deflection	MM	33 to 40	39.5	Pass
Middle Abdominal Rib Deflection	MM	39 to 45	43.9	Pass
Lower Abdominal Rib Deflection	MM	36 to 43	41.4	Pass
Peak Upper Spine Y Acceleration	G's	14 to 17	16.2	Pass
Peak Lower Spine Y Acceleration	G's	7 to 10	8.5	Pass
Peak Impactor Acceleration	G's	12 to 16	15.4	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.5	20.2	0.0	-18.8
Middle Thorax Deflection			
Max	Time	Min	Time
43.9	21.0	0.0	-3.8
Lower Thorax Deflection			
Max	Time	Min	Time
41.4	22.1	0.0	-19.7



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
16.2	17.0	-6.5	45.9
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
8.5	16.3	-3.2	42.1



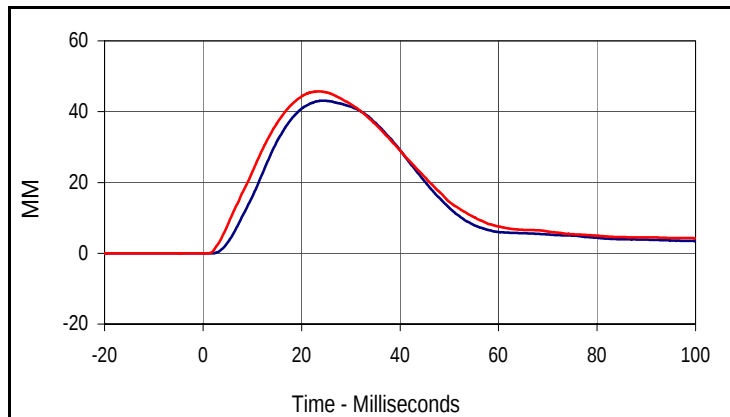
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.4	20.1	-0.2	52.5

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 307

Test Date: 5/11/09
 Test I.D.: ABP05A

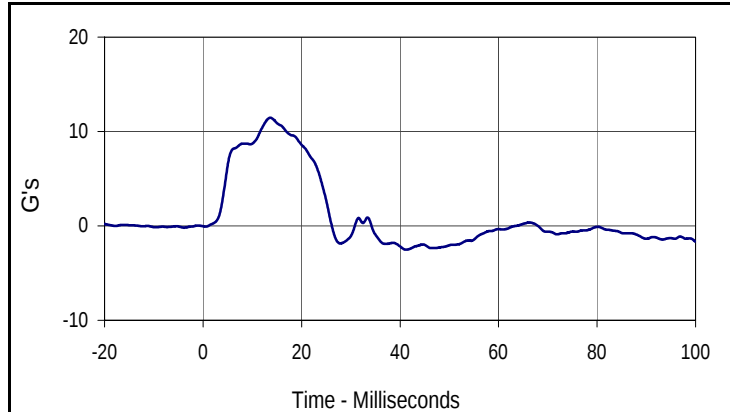


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.30 to 4.50	4.38	Pass
Upper Abdominal Rib Deflection	MM	39 to 47	43.1	Pass
Lower Abdominal Rib Deflection	MM	37 to 46	45.7	Pass
Peak Lower Spine Y Acceleration	G's	11 to 14	11.5	Pass
Peak Impactor Acceleration	G's	12 to 16	13.2	Pass
Overall Test Results			Pass	

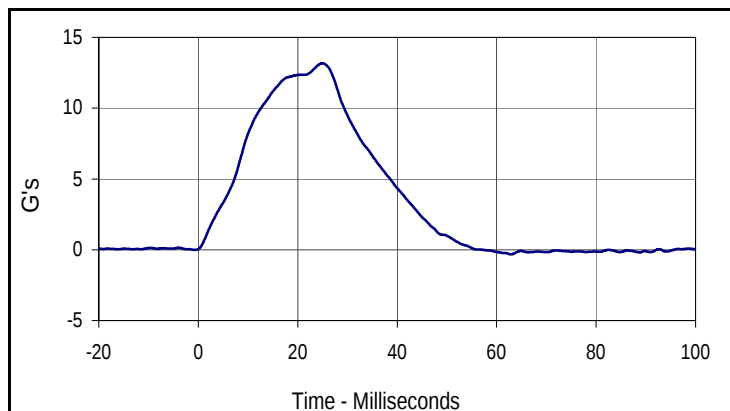


Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
43.1	24.5	0.0	1.2

Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
45.7	23.7	0.0	-15.0



Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
11.5	13.7	-2.5	41.2



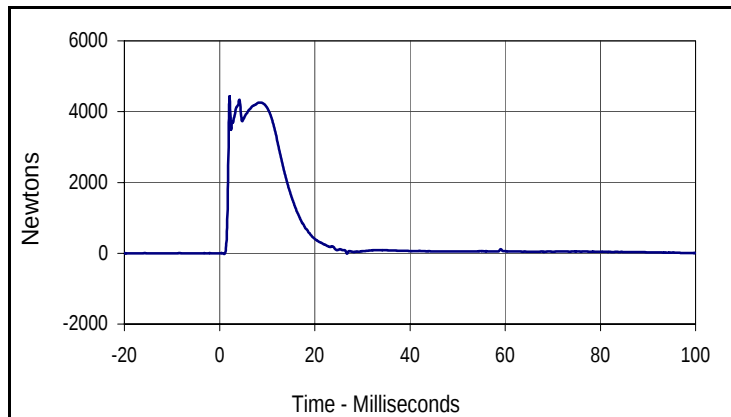
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
13.2	24.9	-0.3	62.9

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 307

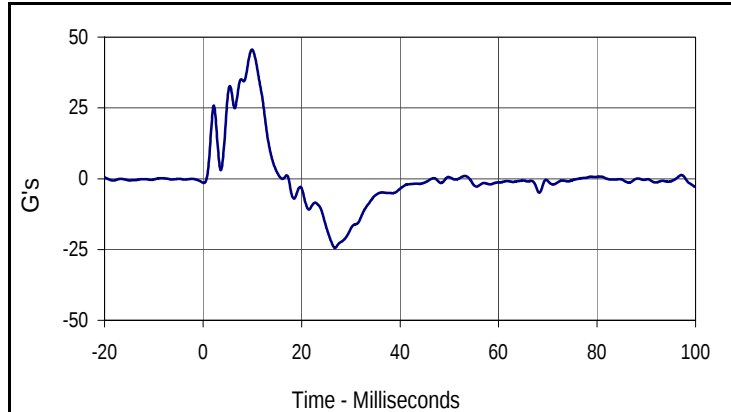
Test Date: 5/11/09
 Test I.D.: PAP05A



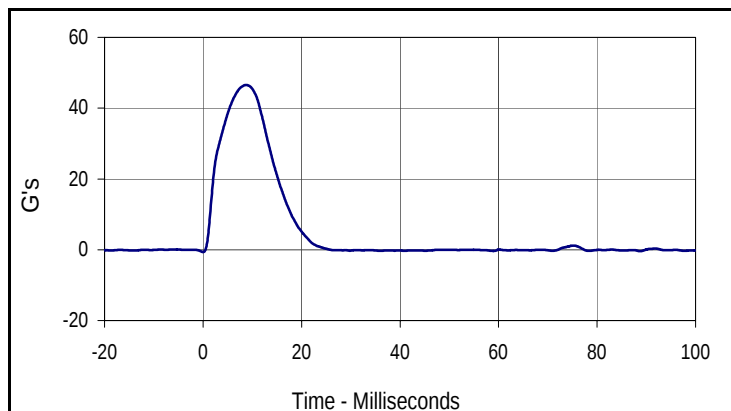
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.79	Pass
Peak Acetabulum Force	Newtons	3800 to 4600	4435.8	Pass
Peak Pelvis Y Acceleration	G's	41 to 50	45.6	Pass
Peak Impactor Acceleration	G's	38 to 47	46.6	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4435.8	2.1	-16.6	1.0



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
45.6	9.9	-24.4	26.8



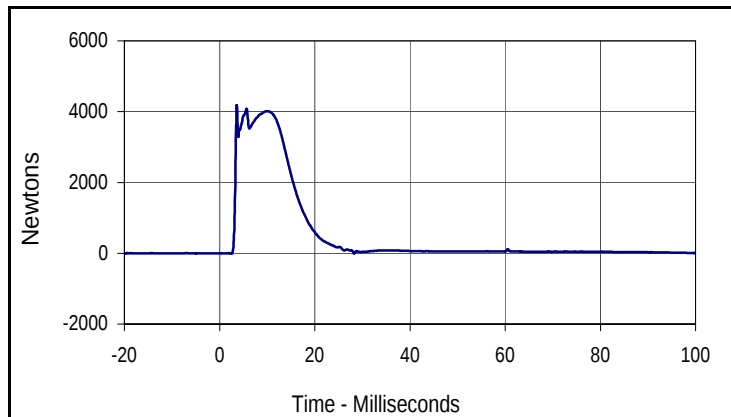
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
46.6	8.7	-0.7	0.0

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

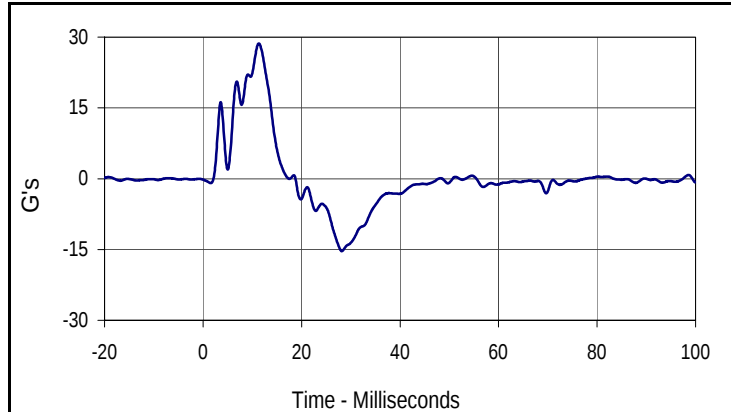
Test Date: 5/11/09
 Test I.D.: ILP05A



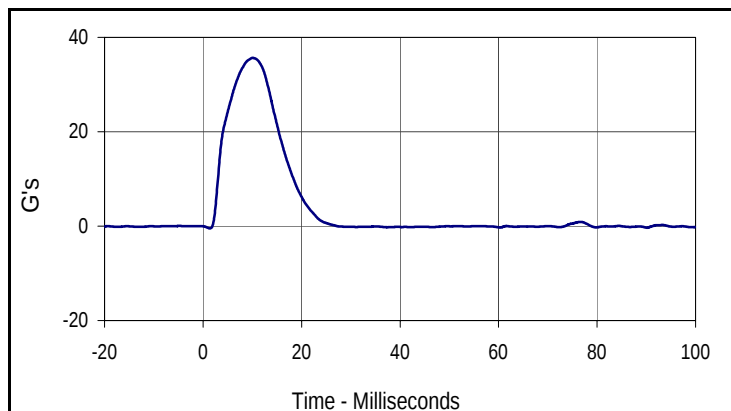
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.21	Pass
Peak Iliac Force	Newtons	3700 to 4500	4179.3	Pass
Peak Pelvis Y Acceleration	G's	27 to 33	28.7	Pass
Peak Impactor Acceleration	G's	34 to 40	35.6	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4179.3	3.6	-15.7	2.5



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
28.7	11.3	-15.4	28.2



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
35.6	10.1	-0.5	1.4