REPORT NUMBER: SPNCAP-KAR-11-026

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

MAZDA MOTOR CORPORATION
2011 MAZDA3 I SPORT 4-DOOR SEDAN

NHTSA No: MB5400

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

OCTOBER 11, 2010

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

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Approval Date: October 25, 2010

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date: _____

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COTR, New Car Assessment Program
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Date: _____

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15. Supplementary Notes

16. Abstract

A 32.2 km/h (20 mph) 75° oblique impact Side NCAP test was conducted on the subject 2011 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 October 11, 2010.

The impact velocity was 32.54 km/h and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 30.5° C. The test vehicle's post-test maximum crush was 504 mm at level 3. The test vehicle's performance was as follows:

Measurement Description	Passenger ATD		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	321.4
Resultant Lower Spine Acceleration	G	82	52
Combined Acetabulur and Iliac Pelvic Force	N	5525	4922

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.

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs	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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TABLE OF CONTENTS

Section		Page
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4

Data Sheet		Page
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	8
3	Dummy Longitudinal Clearance Dimensions	10
4	Dummy Lateral Clearance Dimensions	11
5	Camera and Instrumentation Data	12
6	Vehicle Accelerometer Data	13
7	Rigid Pole Load Cell Data	14
8	Post-Test Observations	15
9	Vehicle Profile Measurements	16
10	Vehicle Exterior Crush Measurements	17
11	FMVSS No. 301 Fuel System Integrity Post-Impact Data	20
12	Dummy/Vehicle Temperature Stabilization	21

Appendix		Page
A	Photographs	A
B	Vehicle and Dummy Response Data Plots	B
C	Dummy Configuration and Performance Verification Data	C

SECTION 1
TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2011 Mazda3 I Sport 4-Door Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated January 25, 2010.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2011 Mazda3 I Sport 4-Door Sedan. The subject vehicle was towed into the rigid pole at an angle of 75.4° and a velocity of 32.54 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California, on October 11, 2010. Pre-test 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 January 25, 2010. Camera location and other pertinent camera information are included in this report.

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

Head CG Triaxial Accelerometers
Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
Abdomen Upper and Lower Rib Displacement Potentiometers
Lower Spine Triaxial Accelerometers
Illiac Load Cell
Acetabulum Load Cell

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

The following table summarizes the results of the test:

Dummy	HIC (36ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)	
SID-IIs 5th Percentile Adult Female	321	52	Iliac Wing	2193
			Acetabulur	2786
			Sum	4922

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes	No	No	
Other				

GENERAL COMMENTS

Both of the struck side doors of the test vehicle remained closed and latched and were jammed shut after the impact. There was no separation at the hinges or the latches. The non-struck side doors remained closed and latched. There were no driver injury values that exceeded their limits. There was no FMVSS 301 Stoddard solvent spillage as a result of the impact.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

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	^oF	^oC	=(tf -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 PARAMATER DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5400
Model Year	2011
Make	Mazda
Model	Mazda3 I Sport
Body Style	4-Door Sedan
VIN	JM1BL1UG4B1364335
Body Color	Gun Metal Blue
Delivery Date	9/4/2010
Odometer Reading (km / mi)	87/54
Dealer	Tuttle-Click Mazda
Transmission	5-Speed Automatic
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	No
Traction Control	Yes
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 Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Toso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	Yes
Bucket Seats	Yes
Tilt Steering	Yes
Other	
Other	

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation
Date of Manufacture	Jul-10

GVWR (kg)	1800
GAWR Front (kg)	967
GAWR Rear (kg)	833

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

VEHICLE SEAT TYPE

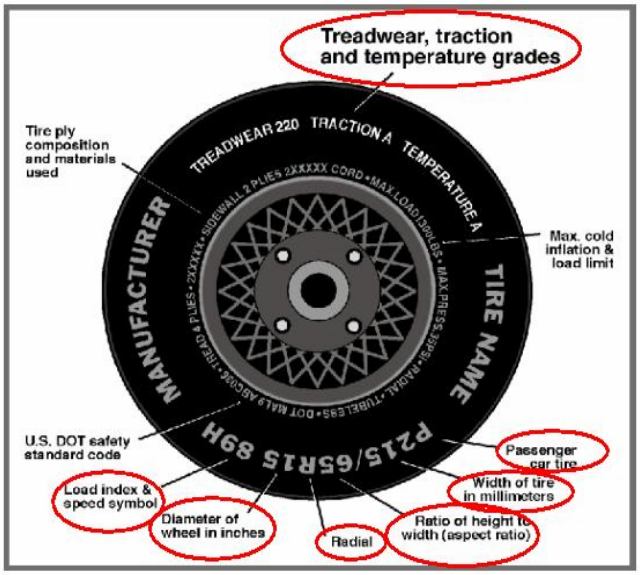
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



VEHICLE TIRE INFORMATION

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 Model	Turanza EL400	Turanza EL400
Tire Manufacturer	Bridgestone	Bridgestone
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 DHE2910	H48K DHE2910
DOT Safety Code Left	H48K DHE2910	H48K DHE2910

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	409.0	263.5		436.0	285.5		424.5	306.5	
Right	kg	397.0	253.0		417.5	270.0		398.0	287.5	
Ratio	%	60.9%	39.1%	100.0%	60.6%	39.4%	100.0%	58.1%	41.9%	100.0%
Total	kg	806.0	516.5	1322.5	853.5	555.5	1409.0	822.5	594.0	1416.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1322.5	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	1416.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)	Deg	-0.3	-0.3	0.2
Front Passenger Sill Angle (front-to-rear)	Deg	-0.7	-0.6	-0.5
Front Bumper Angle (left-to-right)	Deg	-0.3	-0.3	-0.3
Rear Bumper Angle (left-to-right)	Deg	-1.5	-1.5	-1.7
Vehicle CG (Aft of Front Axle)	mm	1032	1042	1108
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	13	18	24

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	46.0
Weight of Vehicle Components Removed	kg	51.5

Vehicle components removed to make Target Vehicle Test Weight:

Tail lights (2.5 kg), Spare tire and tools (12.5 kg), Trunk liner (3.0 kg), Muffler (10.5 kg), Bumper and cover (16.0 kg), Outboard mirrors (2.0 kg), Non-struck side door panels (5.0 kg)

TEST VEHICLE IMPACT POINT DATA

Measurement Description	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1075
Actual Impact Point (Aft of Front Axle)	mm	1068
Impact Point Difference (- forward/+ rearward)	mm	-7

DATA SHEET NO. 2

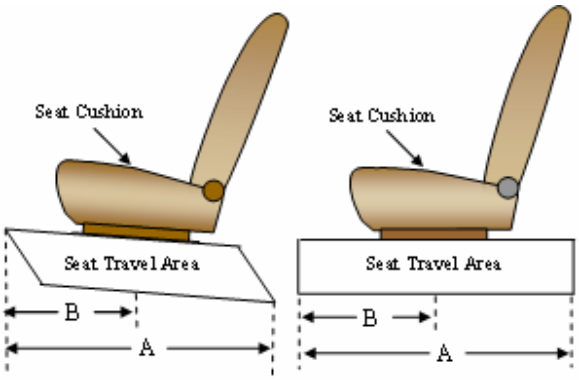
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rearmost possible position with the seat set at mid angle and lowest height. The driver's seat is set to the forward most position where the ATD will not contact any interior panels at the mid angle and mid height positions.

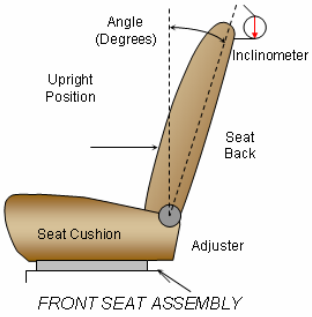


SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position	Cushion Range	Placed in Position
Driver Seat	254 mm	28 mm	8.9 - 13.9	11.4
Front Passenger Seat	257 mm	28 mm	Fixed	Fixed
Rear Seat - Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Seat - Non-Struck Side	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE POSITIONING

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.



SEAT BACK ANGLE POSITIONS

Seating Position	Degrees	Detent
Driver Seat Back Angle w/Seated Dummy	2.9	
Front Passenger Seat Back Angle	2.9	
Struck Side Rear Seat Back Angle	Fixed	Fixed
Non-Struck Side Rear Seat Back Angle	Fixed	Fixed

SEAT BELT UPPER ANCHORAGE POSITIONING

The seat belt upper anchorage is positioned to the manufacturer's design position for a 5th percentile adult female ATD. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	0

DATA SHEET NO. 2 … (CONTINUED)

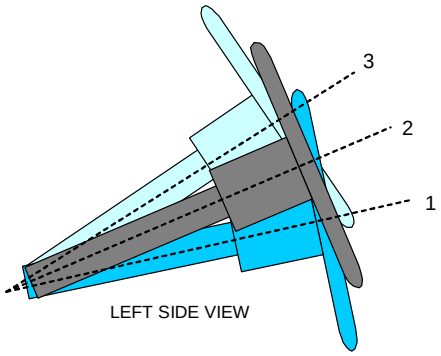
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

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 placed across the rim of the steering wheel for angle.



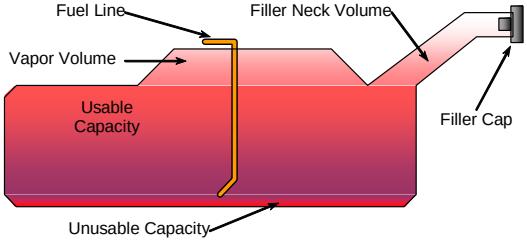
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Angle (°)	Fore-Aft Position (mm)
Lowermost Position, No. 1	20.0	115
Geometric Center Position, No. 2	22.9	139
Uppermost Position, No. 3	25.8	163
Steering Wheel Travel	5.8	48
Test Position	22.8	138

FUEL PUMP

The test vehicle is equipped with an electric fuel pump. The fuel pump operates when the starter or engine is activated. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

FUEL CAPACITY DATA

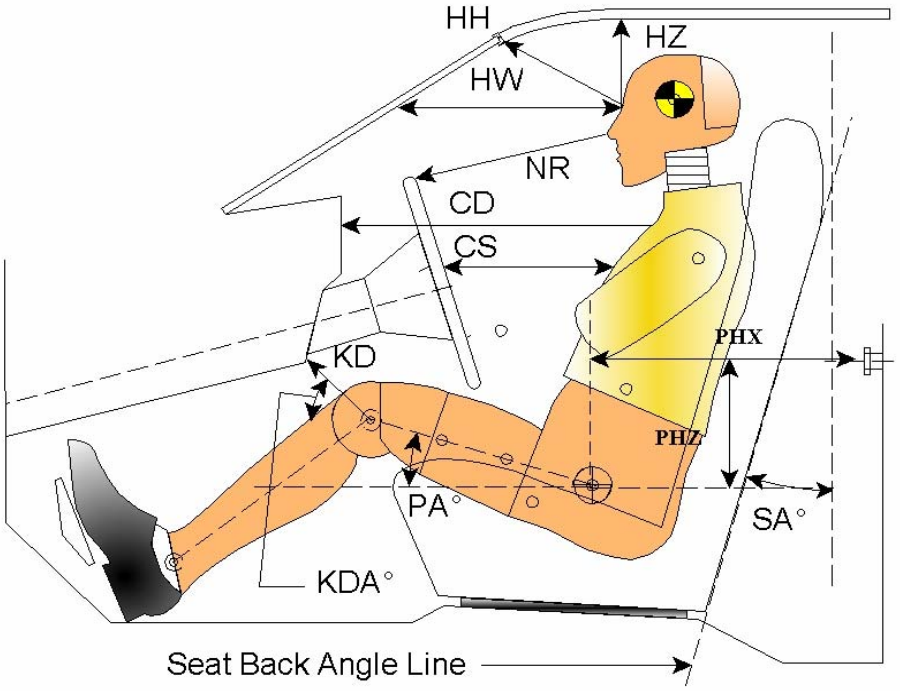
Description	Liters
Usable Capacity of "Standard Tank"	54.88
Usable Capacity of "Optional Tank"	
Usable Capacity of Standard Tank as Specified In Owner's Manual	
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92 - 94% of Usable Capacity	50.49 to 51.59
Actual Amount of Stoddard Solvent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

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



DUMMY LONGITUDINAL CLEARANCE DIMENSIONS (S/N: 307)

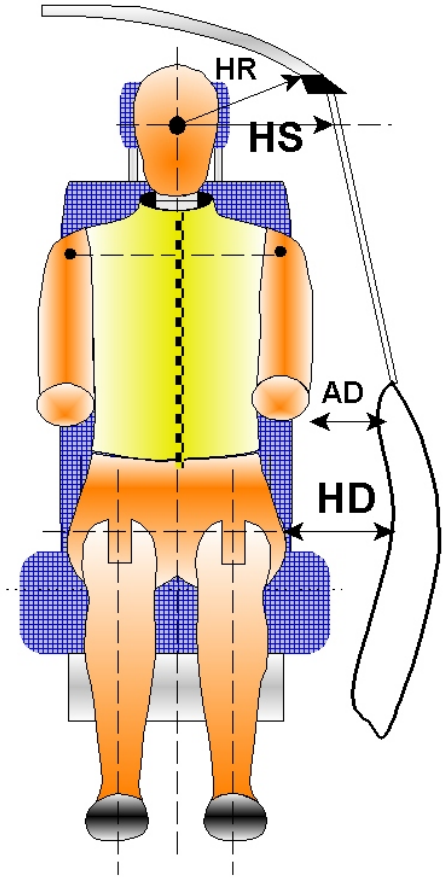
Driver Code	Description	Driver	
		Length (mm)	Angle (º)
HH	Head to Header	226	56.4
HW	Head to Windshield	562	
HZ	Head to Roof	172	
NR	Nose to Rim	220	12.3
CD	Chest to Dash	407	17.8
CS	Chest to Steering Wheel	142	3.3
KDL / KDAL°	Left Knee to Dash	95	32.4
KDR / KDAR°	Right Knee to Dash	67	
PA°	Pelvic Angle		18.7
PHX	H-Point to Striker (x-direction)	375	
PHZ	H-Point to Striker (z-direction)	129	
SA°	Seat Back Angle		2.9

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



DUMMY LATERAL CLEARANCE DIMENSIONS (S/N: 307)

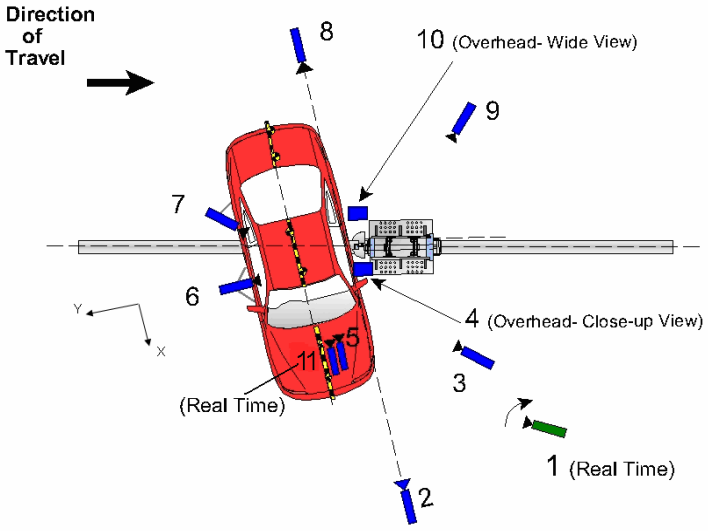
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	235
HS	Head to Side Window	mm	352
AD	Arm to Door	mm	91
HD	H-Point to Door	mm	207

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



Reference: +X = Forward of Vehicle (from Point of Impact)
+Y = Right of Vehicle (from Point of Impact)
+Z = Down (from Ground)

CAMERA LOCATIONS

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.28	0.52	-1.27	35	400
6	On-Board - Dummy Side View	-0.22	1.45	-1.15	14	1000
7	On-Board - Dummy Rear Oblique View	-0.84	1.46	-1.16	20	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.33	0.55	-1.25		30

* All measurements accurate to ± 3 mm

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

INSTRUMENTATION

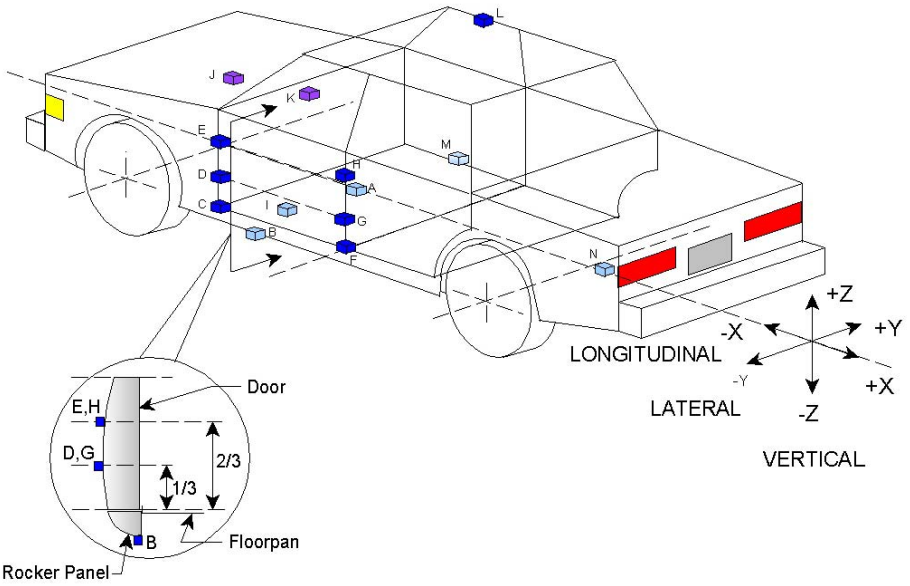
	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells	8
Contact Switches	3
Airbag Timing Sensor	2
Total No. of Data Channels	50

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



VEHICLE ACCELEROMETER LOCATIONS

	Sensor Description	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG Accelerometer	1750	0	-240
	Vehicle CG ARS	1750	0	-240
B	Left Floor Sill	2540	-720	-180
C	A-Pillar Sill	2960	-770	-340
D	A-Pillar Lower	2960	-770	-570
E	A-Pillar Mid	2960	-770	-740
F	B-Pillar Sill	1905	-730	-440
G	B-Pillar Lower	1905	-730	-640
H	B-Pillar Mid	1905	-730	-820
I	Driver Seat	2160	-555	-300
J	Engine Top	3630	0	-820
K	Firewall	3280	115	-840
L	Right Roof Sill	2070	510	-1435
M	Right Floor Sill	1910	675	-265
N	Rear Floorpan	840	-290	-530

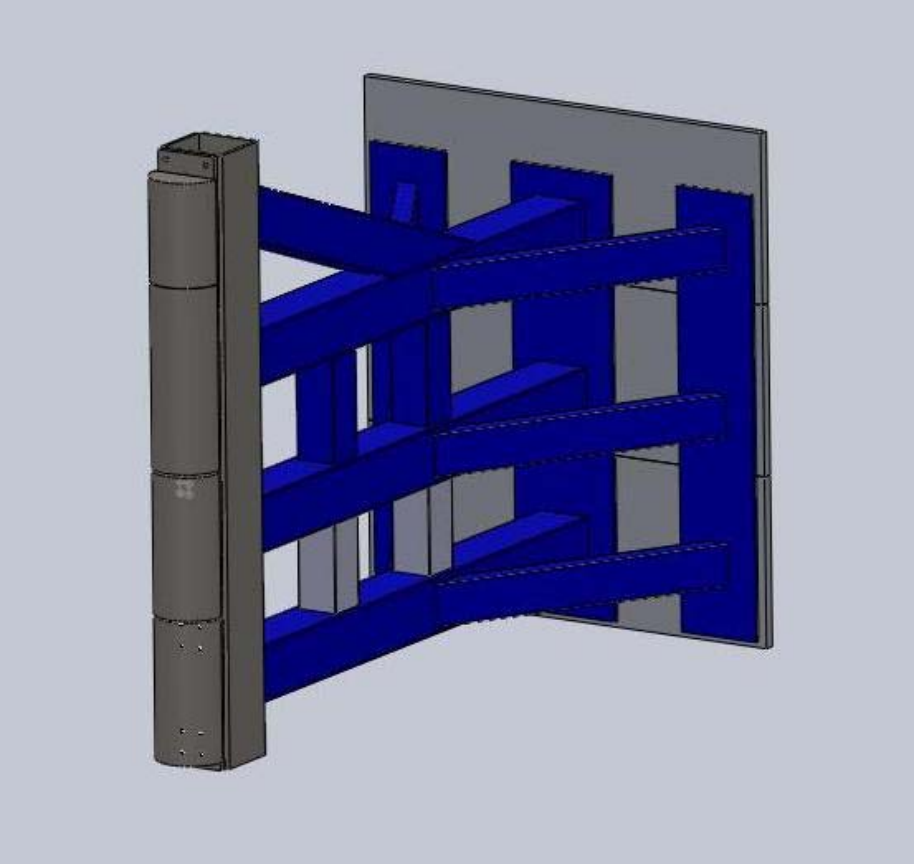
Reference: X = + Forward
Y = + To Right
Z = + Down

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	87
2	mm	468
3	mm	648
4	mm	978
5	mm	1168
6	mm	1651
7	mm	1816
8	mm	2057

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy
Dummy Type/Serial No.	P572V (SID-IIs) / Serial No. 299
Head Contact	Curtain Airbag, Seat Back
Upper Torso Contact	Torso/Pelvis Airbag
Lower Torso Contact	Torso/Pelvis Airbag, Door Panel
Left Knee Contact	Door panel, Right knee
Right Knee Contact	Left knee

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 STRUCUTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation occurred
Sill Seperation	No separation occurred
Windshield Damage	Broken
Window Damage	Left front window broken
Other Notable Effects	Unibody seam separation behind center console

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Installed	Deployed	Installed	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes	No	No	
Other				

VEHICLE SPEED AND IMPACT DATA

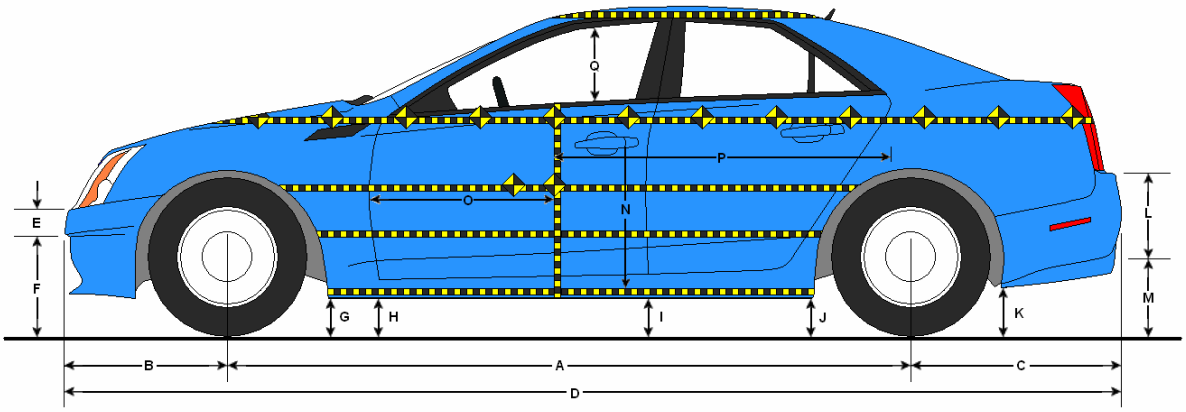
Measured Parameter	Units	Requirement	Value
Horizontal Offset From Vertical Reference Line	mm	+/- 38	-7 (Left)
Trap No. 1 Velocity (Primary)	km/h	30.4 to 33.0	32.5
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 33.0	32.5

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2642	2502	-140
B	Front Axle to FSOV	963	999	36
C	Rear Axle to RSOV	863	900	37
D1	Total Vehicle Length at Left Side	3012	2837	-175
D2	Total Vehicle Length at Centerline	4409	4401	-8
D3	Total Vehicle Length at Right Side	3011	3029	18
E	Front Bumper Thickness	156	160	4
F	Front Bumper Bottom to Ground	377	411	34
G	Sill Height at Front Wheel Well	190	209	19
H	Sill Height at Front Door Leading Edge	192	210	18
I	Sill Height at B-Pillar	201	246	45
J1	Sill Height at Rear Wheel Well	207	249	42
J2	Pinch Weld Height at Rear Wheel Well	169	219	50
K	Sill Aft of Rear Wheel Well	461	496	35
L	Rear Bumper Thickness	91	89	-2
M	Rear Bumper Bottom to Ground	598	625	27
N	Sill Height to Window Bottom Sill	594	684	90
O	Front Door Leading Edge to Impact CL	625	491	-134
P	Rear Door Trailing Edge to Impact CL	1412	1245	-167
Q	Front Window Opening	446	467	21
R	Right Side Length	3011	3029	18
S	Left Side Length	3012	2837	-175
T	Vehicle Width at B-Pillar	1747	1613	-134

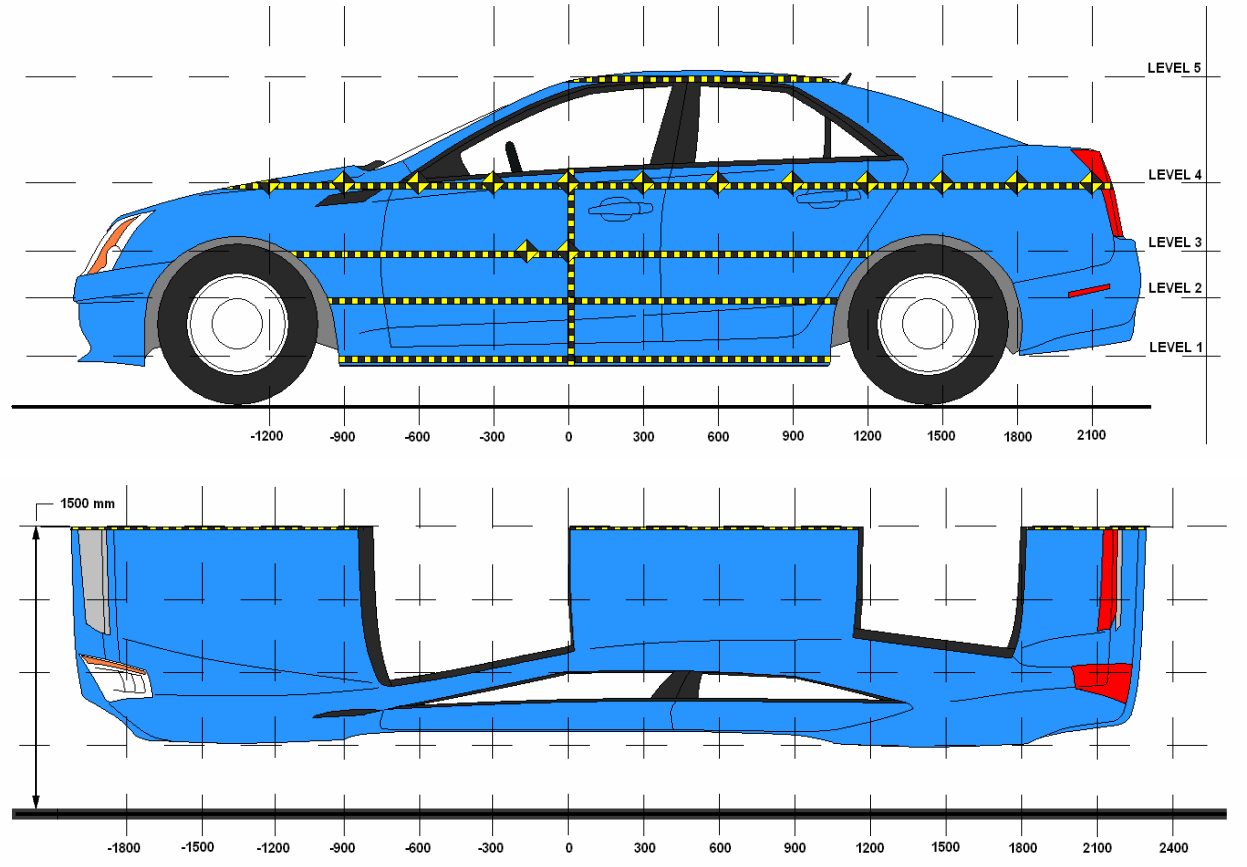
* All measurements accurate to ± 3 mm

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



NOTE: All measurements are in millimeters (mm)

Level	Description	Height Above Ground (mm)
1	Sill Top Height	244
2	Occupant H-Point Height	540
3	Mid-Door Height	628
4	Window Sill Height	909
5	Window Top Height	1382

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900			623	752				698	818				75	66	
-750		627	629	731			704	713	826			77	84	95	
-600	666	638	639	729		774	754	757	836		108	116	118	107	
-450	671	638	638	721		859	839	842	880		188	201	204	159	
-300	671	637	635	699		935	929	936	951		264	292	301	252	
-150	671	635	633	691		1039	1031	1039	1051		368	396	406	360	
0	671	634	630	683	902	1114	1130	1134	1150	1189	443	496	504	467	287
150	671	632	629	676	893	1095	1096	1104	1124	1128	424	464	475	448	235
300	672	632	628	667	893	974	981	992	1004	1071	302	349	364	337	178
450	672	633	628	662	894	888	867	868	891	1024	216	234	240	229	130
600	673	635	629	656	895	829	813	809	837	998	156	178	180	181	103
750	674	636	631	651	900	780	771	773	802	989	106	135	142	151	89
900	674	639	634	648	904	737	741	747	769	984	63	102	113	121	80
1050	674	640	637	650		697	699	713	741		23	59	76	91	
1200			630	634				668	697				38	63	
1350			624	654				673	691				49	37	
1500				657					704					47	
1650				665					706					41	
1800				674					708					34	
1950				691					718					27	
2100															
2250															
2400															
2550															
2700															
2850															

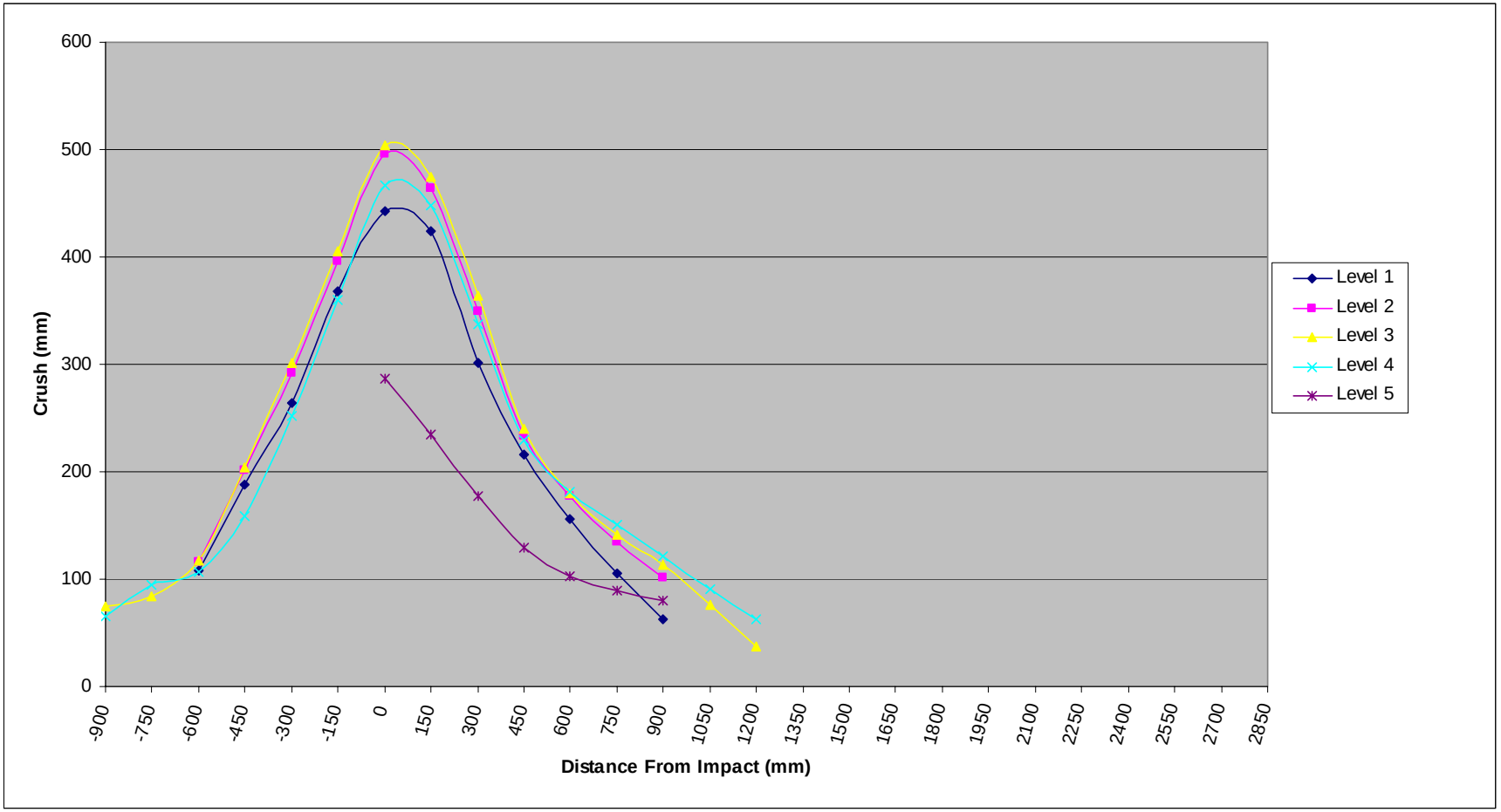
MAXIMUM CRUSH DATA

	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	443	496	504	467	287
Distance From Impact	mm	0	0	0	0	0

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Mazda3 I Sport 4-Door Sedan	NHTSA No.	MB5400
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole	Test Date:	10/11/10



DATA SHEET NO. 11

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

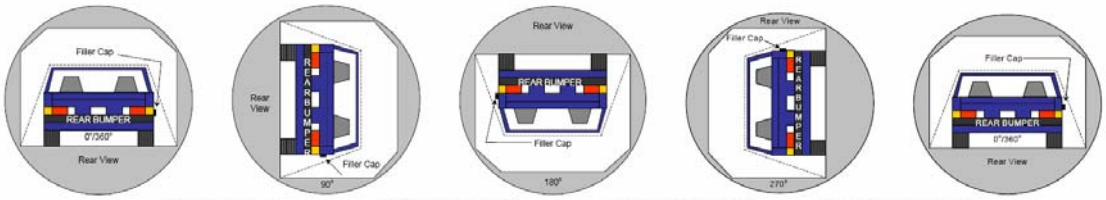
Temperature at Time of Impact: 30.5° C Test Time: 11:37 PM

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

D. Spillage Details: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	86	300	386
90° To 180°	77	300	377
180° To 270°	81	320	401
270° To 360°	75	300	375

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0			
90° To 180°	0			
180° To 270°	0	0		
270° To 360°	0			

SOLVENT SPILLAGE LOCATION TABLE

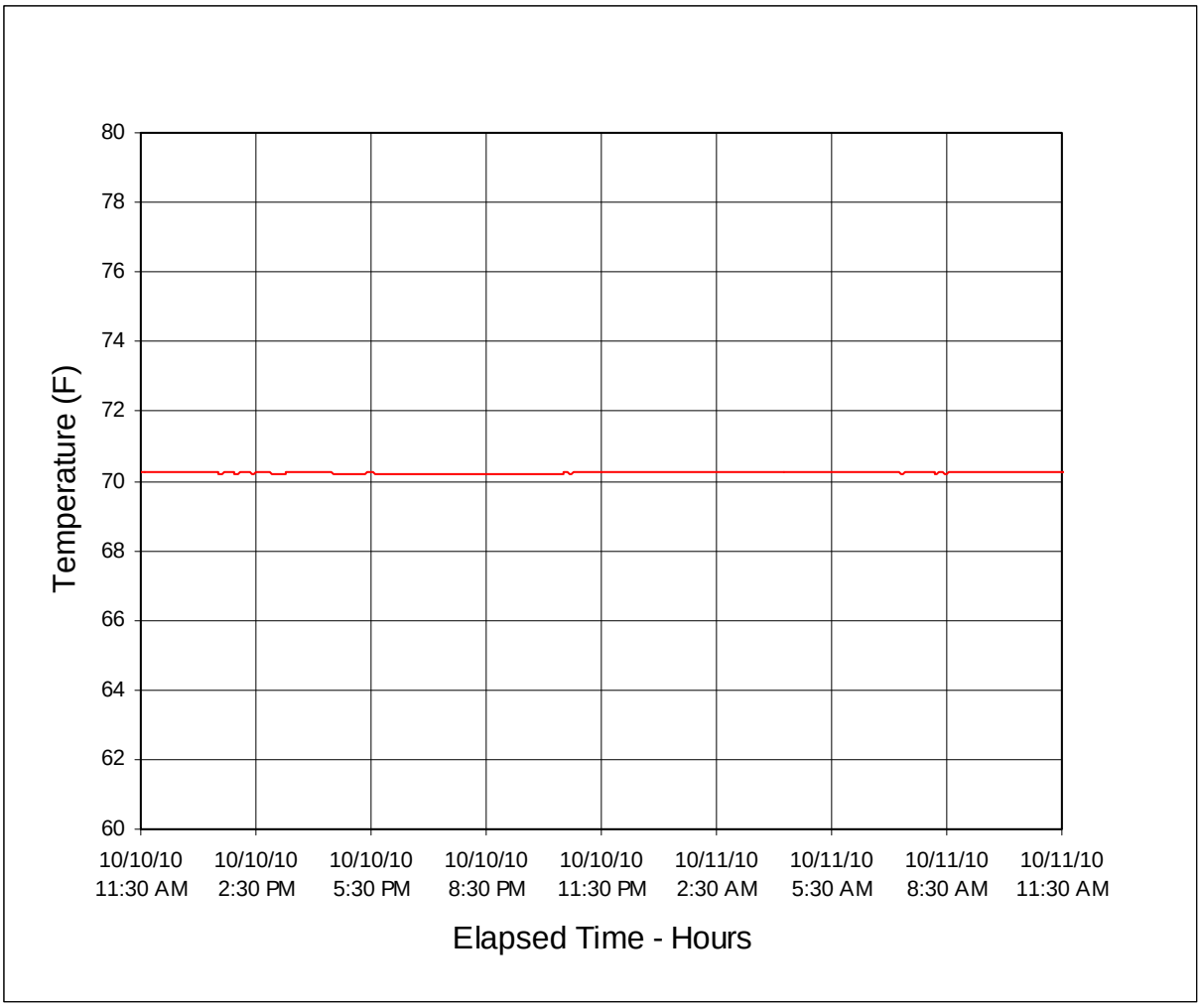
Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2011 Mazda3 I Sport 4-Door Sedan NHTSA No. MB5400

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 10/11/10



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure		Page
1	As Delivered Right Front Three-Quarter View of Test Vehicle	A-1
2	As Delivered Left Rear Three-Quarter View of Test Vehicle	A-1
3	Pre-Test Frontal View of Test Vehicle	A-2
4	Post-Test Frontal View of Test Vehicle	A-2
5	Pre-Test Left Front Three-Quarter View of Test Vehicle	A-3
6	Post-Test Left Front Three-Quarter View of Test Vehicle	A-3
7	Pre-Test Left Side View of Test Vehicle	A-4
8	Post-Test Left Side View of Test Vehicle	A-4
9	Pre-Test Left Rear Three-Quarter View of Test Vehicle	A-5
10	Post-Test Left Rear Three-Quarter View of Test Vehicle	A-5
11	Pre-Test Rear View of Test Vehicle	A-6
12	Post-Test Rear View of Test Vehicle	A-6
13	Pre-Test Right Side View of Test Vehicle	A-7
14	Post-Test Right Side View of Test Vehicle	A-7
15	Pre-Test Overhead View of Test Vehicle and Pole	A-8
16	Post-Test Overhead View of Test Vehicle and Pole	A-8
17	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle at Impact Point	A-9
18	Pre-Test Right Side View of Pole Positioned Against Side of Vehicle at Impact Point	A-9
19	Pre-Test Close-Up View of Impact Point Target	A-10
20	Post-Test Close-Up View of Impact Point Target Showing Impact Location	A-10
21	Pre-Test Front Close-Up View of Dummy	A-11
22	Post-Test Front Close-Up View of Dummy	A-11
23	Pre-Test Left Side View of Dummy Showing Belt, Chalking, and Contact Switches	A-12
24	Pre-Test Left Side View of Dummy Shoulder and Driver Door Top View	A-12
25	Post-Test Left Side View of Dummy Shoulder and Driver Door Top View	A-13
26	Pre-Test Frontal View of Seat Back Prior to Dummy	A-13
27	Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint	A-14
28	Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning	A-14
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-15
30	Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-15
31	Pre-Test View of Dummy's Head Showing Dummy's Head is Level	A-16
32	Pre-Test Placement of Dummy's Feet	A-16
33	Pre-Test View of Belt Anchorage for Dummy	A-17
34	Pre-Test Left Side View of Steering Wheel	A-17
35	Pre-Test View of Parking Brake	A-18

TABLE OF PHOTOGRAPHS … (CONTINUED)

Figure		Page
36	Pre-Test Close-Up Left Side View of Driver Seat Track	A-18
37	Pre-Test Close-Up Left Side View of Driver Seat Track	A-19
38	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-19
39	Pre-Test Dummy and Driver Door Clearance View	A-20
40	Post-Test Dummy and Driver Door Clearance View	A-20
41	Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment	A-21
42	Post-Test Right Side View of Dummy and Front Seat Occupant Compartment	A-21
43	Pre-Test Inner Driver Door Panel View	A-22
44	Post-Test Inner Driver Door Panel View Showing Dummy Contact Locations	A-22
45	Post-Test Dummy Close-Up Head Contact with Vehicle Interior View	A-23
46	Post-Test Dummy Close-Up Head Contact with Side Airbag View	A-23
47	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-24
48	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-24
49	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-25
50	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-25
51	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-26
52	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-26
53	Close-Up View of Vehicle’s Certification Label	A-27
54	Close-Up View of Vehicle’s Tire Information Placard or Label	A-27
55	Pre-Test Pole Barrier Front View	A-28
56	Post-Test Pole Barrier Front View	A-28
57	Pre-Test Pole Barrier Side View	A-29
58	Post-Test Pole Barrier Side View	A-29
59	Pre-Test Ballast View	A-30
60	Post-Test Primary and Redundant Speed Trap Read-Out	A-30
61	FMVSS No. 301-305 Rollover 0 Degrees	A-31
62	FMVSS No. 301-305 Rollover 90 Degrees	A-31
63	FMVSS No. 301-305 Rollover 180 Degrees	A-32
64	FMVSS No. 301-305 Rollover 270 Degrees	A-32
65	FMVSS No. 301-305 Rollover 360 Degrees	A-33
66	Impact Event	A-33
67	Monroney Label	A-34
68	Head Restraint Use and Adjustment Information from Vehicle Manual	A-34

FIGURE 1. As-Delivered Right Front Three-Quarter View of Test Vehicle

FIGURE 2. As-Delivered Left Rear Three-Quarter 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 Three-Quarter View of Test Vehicle

FIGURE 6. Post-Test Left Front Three-Quarter 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 Three-Quarter View of Test Vehicle

FIGURE 10. Post-Test Left Rear Three-Quarter 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

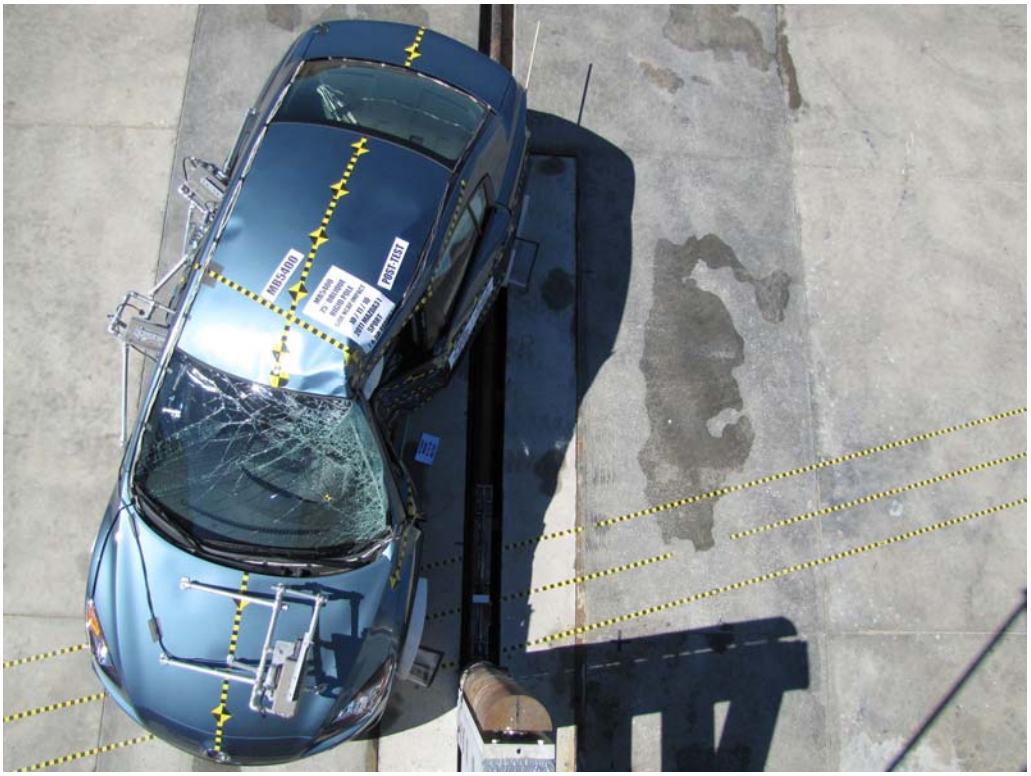


FIGURE 16. Post-Test Overhead View of Test Vehicle and Pole

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

FIGURE 18. Pre-Test Right Side View of Pole
Positioned Against Side of Vehicle at Ideal Impact Point

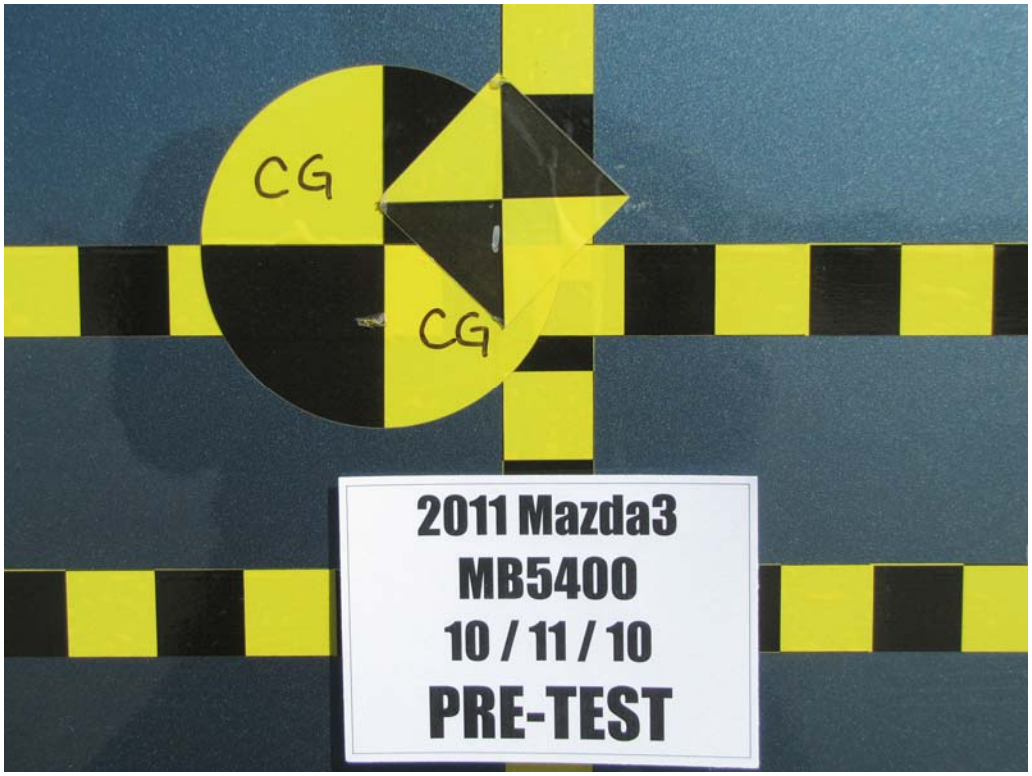


FIGURE 19. Pre-Test Close-Up View of Impact Point Target

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

FIGURE 21. Pre-Test Front Close-Up View of Dummy

FIGURE 22. Post-Test Front Close-Up View of Dummy

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

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

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

FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy

FIGURE 27. Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint

FIGURE 28. Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning

FIGURE 29. Pre-Test Overhead View of Dummy Thighs on Seat Pan

FIGURE 30. Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket

FIGURE 31. Pre-Test View of Dummy's Head Showing Dummy's Head Is Level

FIGURE 32. Pre-Test Placement of Dummy's Feet

FIGURE 33. Pre-Test View of Belt Anchorage for Dummy

FIGURE 34. Pre-Test Left Side View of Steering Wheel

FIGURE 35. Pre-Test View of Parking Brake

FIGURE 36. Pre-Test Close-Up Left Side View of Driver Seat Track

FIGURE 37. Pre-Test Close-Up Left Side View of Driver Seat Back

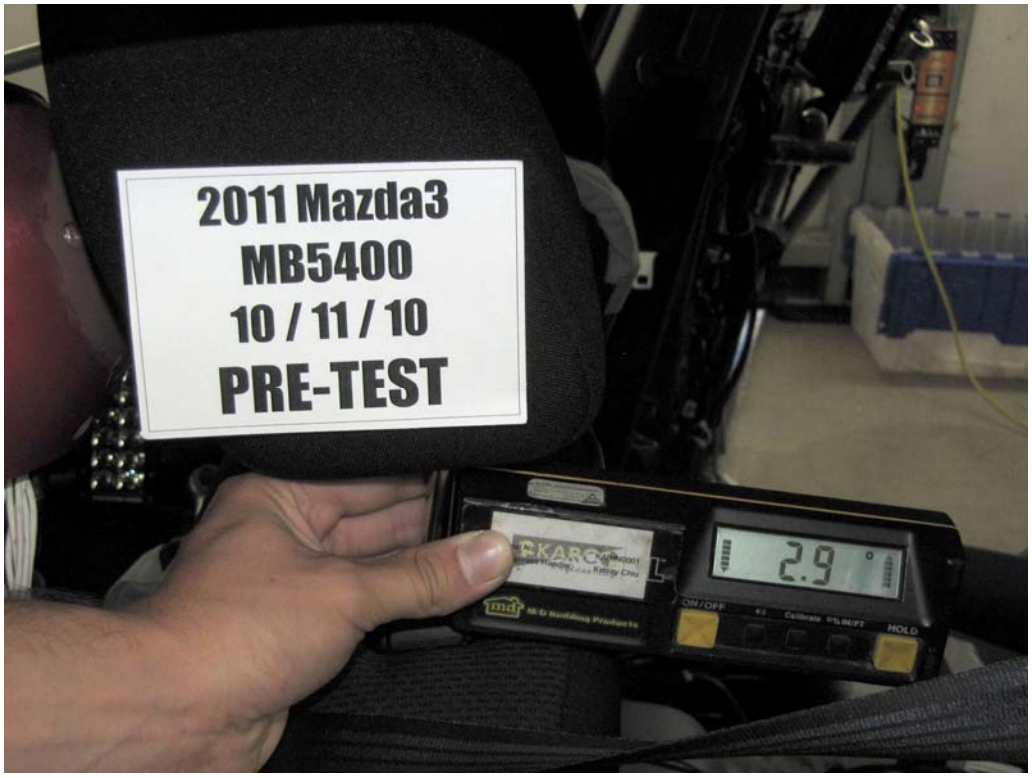


FIGURE 38. Pre-Test Close-Up View of Driver Seat Back or Head Restraint

FIGURE 39. Pre-Test Driver Dummy and Door Clearance

FIGURE 40. Post-Test Driver Dummy and Door Clearance

FIGURE 41. Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment

FIGURE 42. Post-Test Right Side View of Dummy and Front Seat Occupant Compartment

FIGURE 43. Pre-Test Inner Driver Door Panel View

FIGURE 44. Post-Test Inner Driver Door Panel View
Showing Dummy Contact Locations

Photograph Not Applicable
No Dummy Head Contact
with Vehicle Interior

FIGURE 45. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

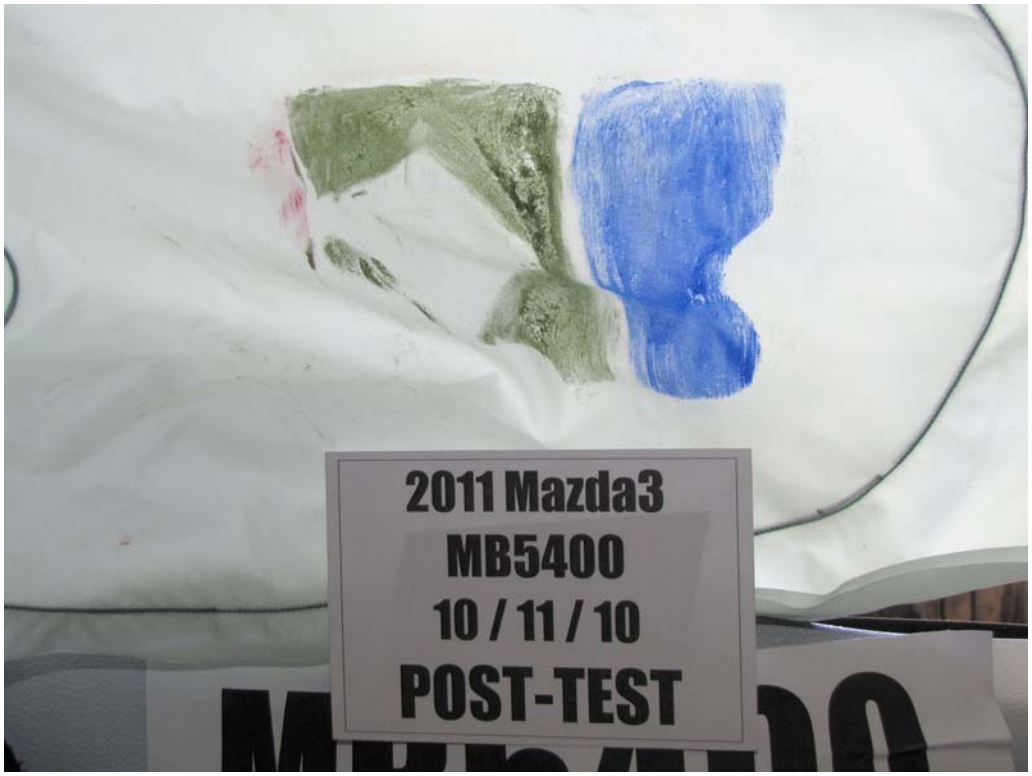


FIGURE 46. Post-Test Dummy Close-Up Head Contact with Side Airbag View

FIGURE 47. Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

FIGURE 48. Post-Test Dummy Close-Up Torso Contact with Side Airbag View

Photograph Not Applicable
No Dummy Pelvis Contact
with Vehicle Interior

FIGURE 49. Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View

FIGURE 50. Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View

FIGURE 51. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 52. Post-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 53. Close-Up View of Vehicle's Certification Label

FIGURE 54. Close-Up View of Vehicle's Tire Information Placard

FIGURE 55. Pre-Test Pole Barrier Front View

FIGURE 56. Post-Test Pole Barrier Front View

FIGURE 57. Pre-Test Pole Barrier Side View

FIGURE 58. Post-Test Pole Barrier Side View

FIGURE 59. Pre-Test Ballast View

FIGURE 60. Post-Test Primary and Redundant Speed Trap Read-Out

FIGURE 61. FMVSS No. 301-305 Rollover 0 Degrees

FIGURE 62. FMVSS No. 301-305 Rollover 90 Degrees

FIGURE 63. FMVSS No. 301-305 Rollover 180 Degrees

FIGURE 64. FMVSS No. 301-305 Rollover 270 Degrees

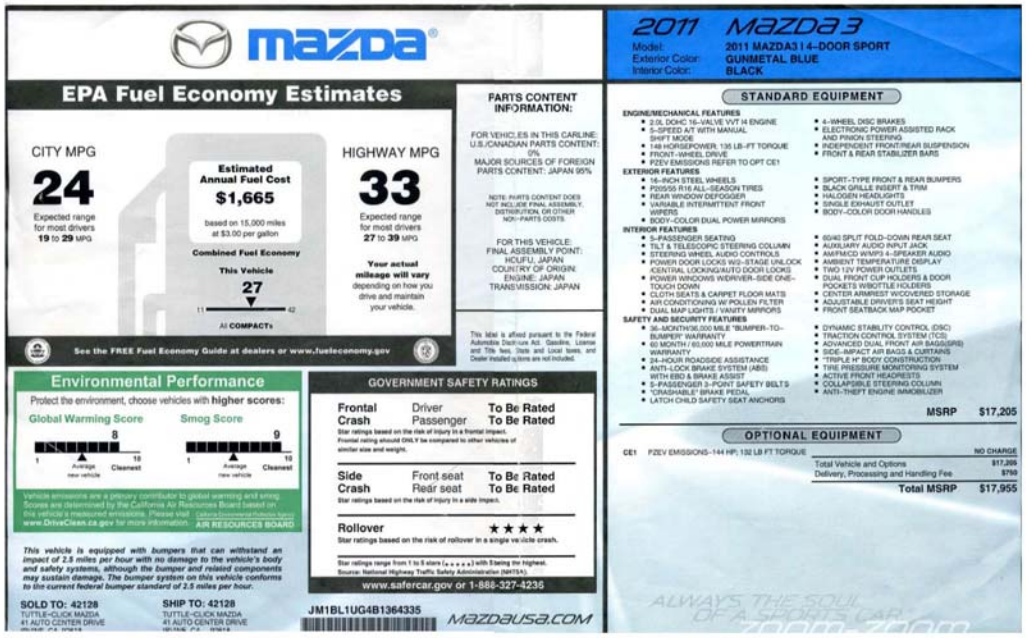


FIGURE 67. Monroney Label

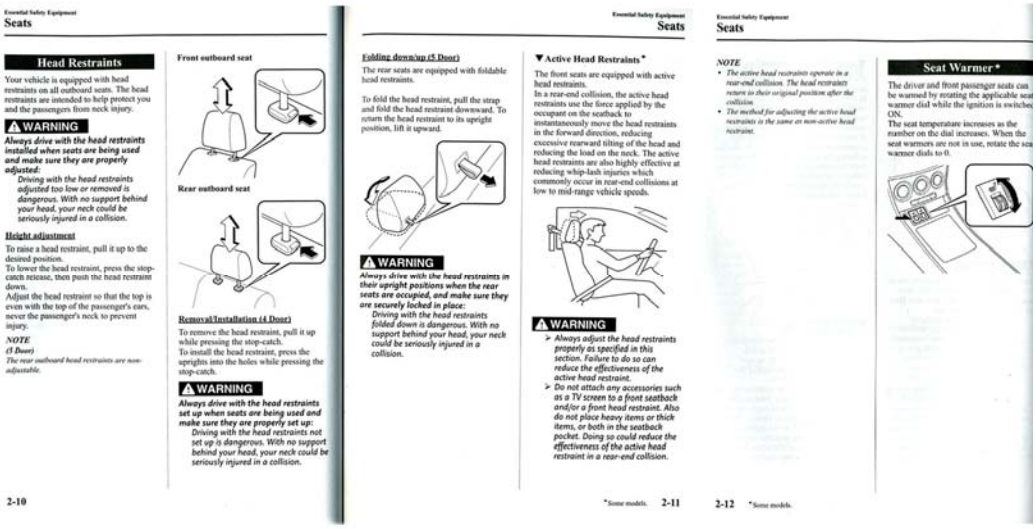


FIGURE 68. Head Restraint Use and Adjustment Information from Vehicle Manual

FIGURE 65. FMVSS No. 301-305 Rollover 360 Degrees

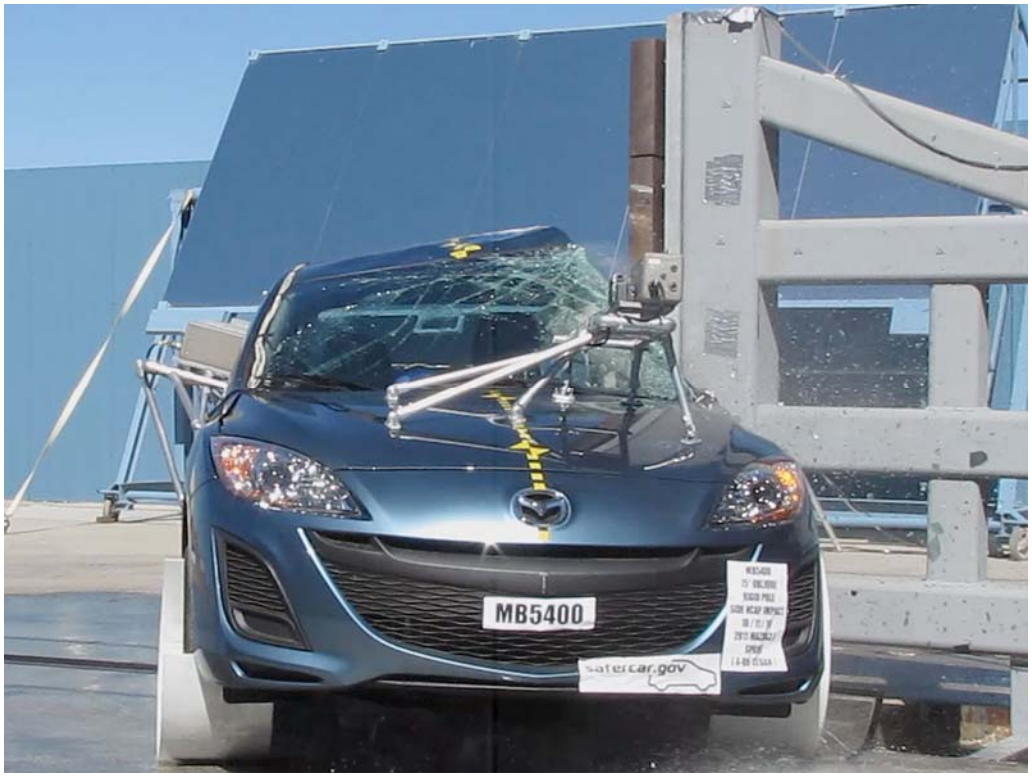


FIGURE 66. Impact Event

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Plot		Page
1	Driver Head Acceleration (X) Primary	B-1
2	Driver Head Acceleration (Y) Primary	B-1
3	Driver Head Acceleration(Z) Primary	B-1
4	Driver Head Resultant Primary	B-1
5	Driver Lower Spine T12 Acceleration (X)	B-2
6	Driver Lower Spine T12 Acceleration (Y)	B-2
7	Driver Lower Spine T12 Acceleration (Z)	B-2
8	Driver Lower Spine Y12 Resultant Acceleration	B-2
9	Driver Iliac Wing Force on Impact Side (Y)	B-3
10	Driver Acetabulum Force on Impact Side (Y)	B-3
11	Driver Total Pelvis Force on Impact Side (Y)	B-3

The following additional data 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 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
Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Vehicle Center of Gravity Angular Rate About X (Roll)
Vehicle Center of Gravity Angular Rate About Y (Pitch)
Vehicle Center of Gravity Angular Rate 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

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

Load Cell Pole Barrier #4 Force (Y)

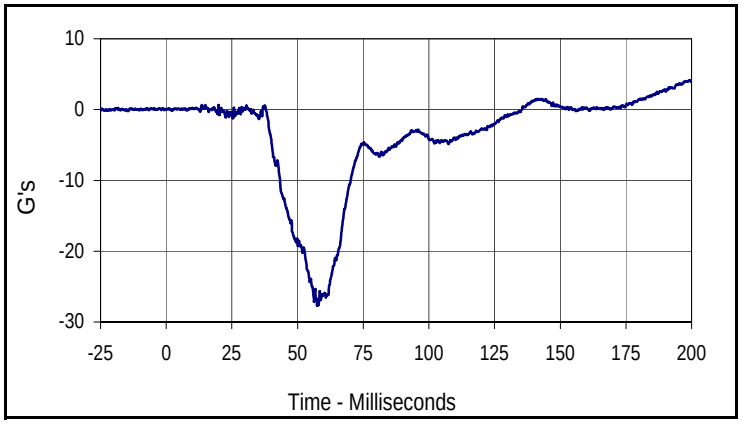
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

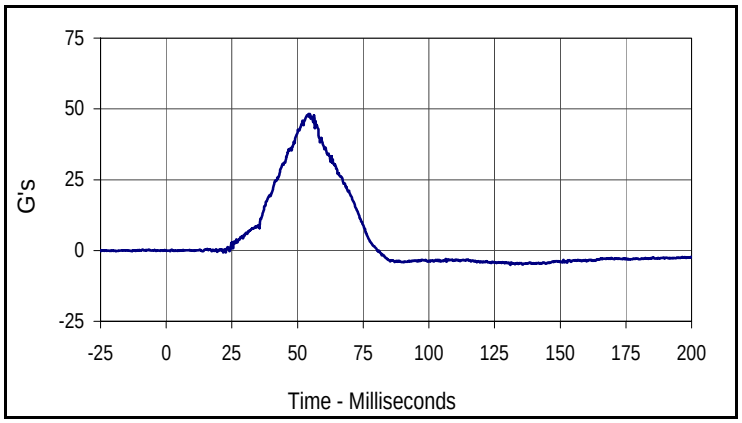
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

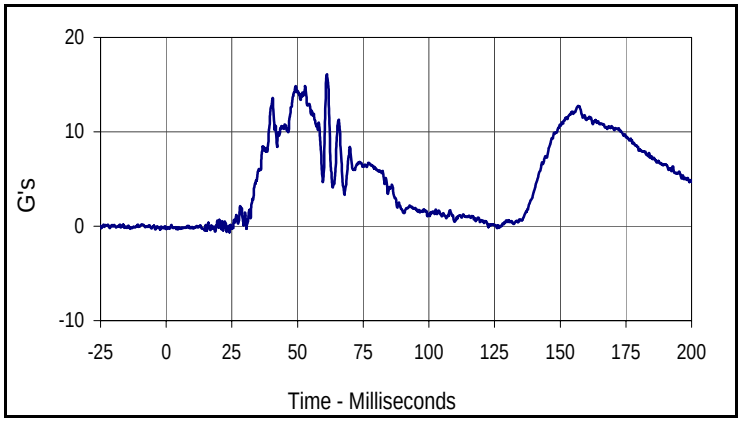
Test Vehicle:	2011 Mazda3 I Sport 4-Door Sedan	Test Date:	10/11/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB5400



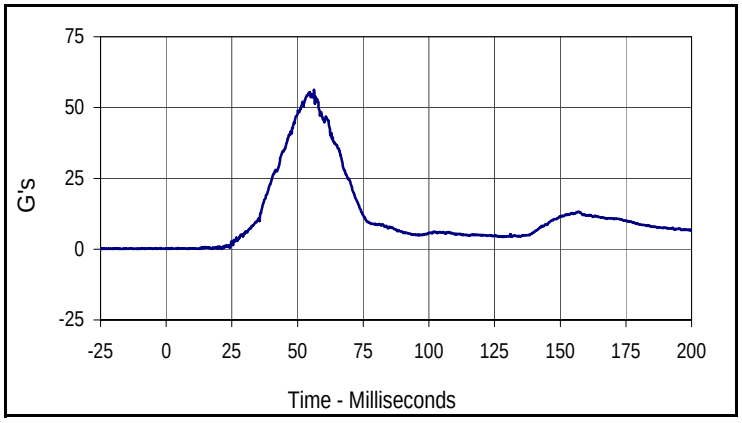
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
4.2	199.2	-27.7	57.5



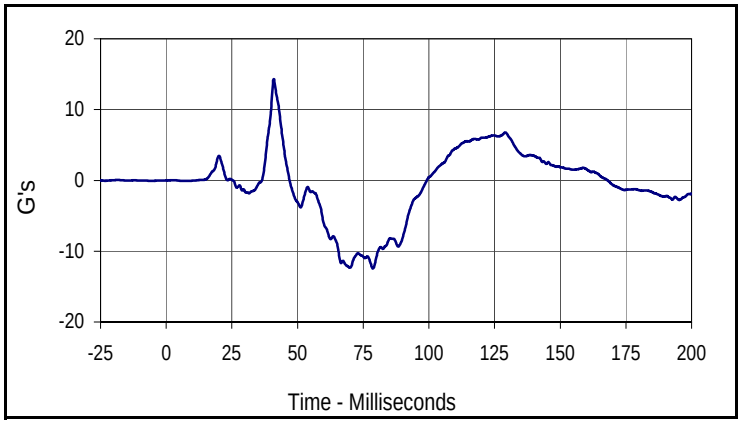
Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
48.2	54.3	-5.2	131.0



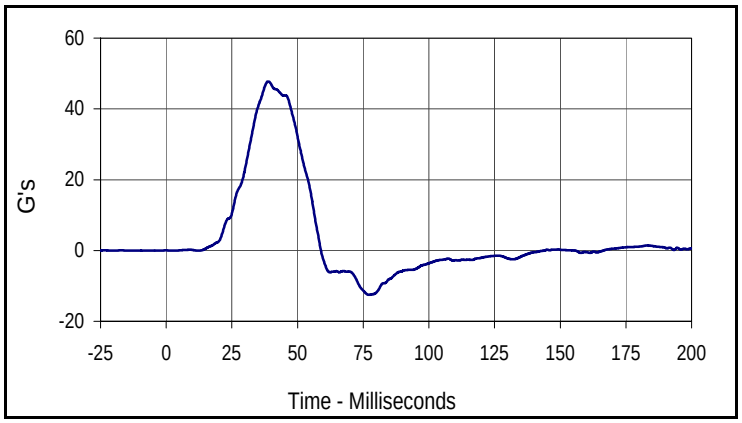
Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
16.1	61.2	-0.7	24.1



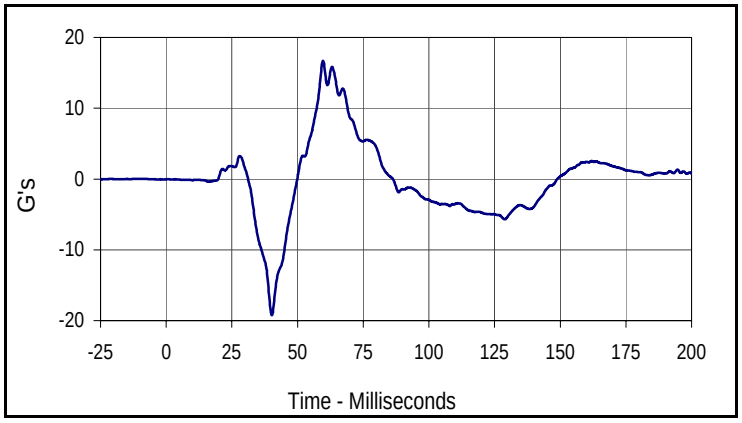
Curve Description			
Driver Head Acceleration Primary Res.			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
56.2	56.3	0.1	1.8



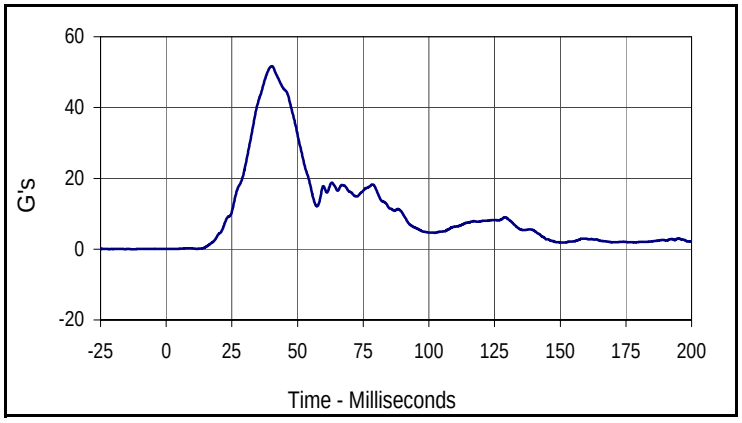
Curve Description			
Driver Lower Spine T12 Acceleration X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
14.3	40.9	-12.4	78.7



Curve Description			
Driver Lower Spine T12 Acceleration Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
47.7	38.9	-12.5	77.1

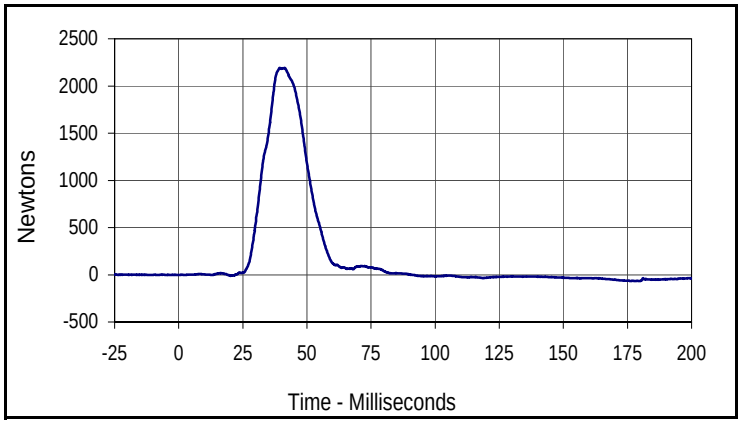


Curve Description			
Driver Lower Spine T12 Acceleration Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
16.7	59.7	-19.2	40.2

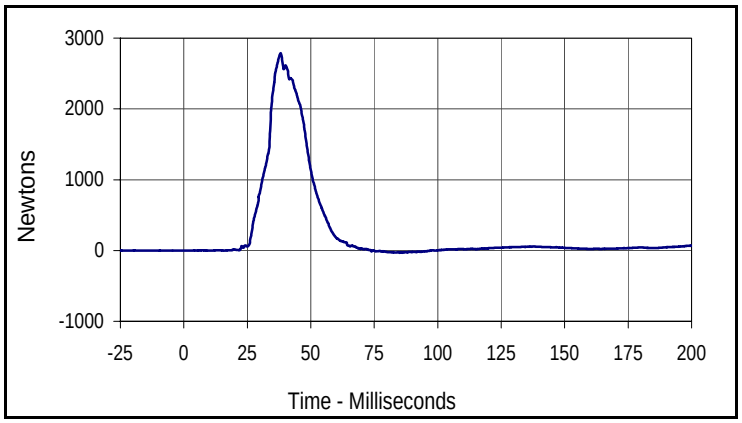


Curve Description			
Driver Lower Spine T12 Acceleration Res.			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
51.7	40.2	0.0	0.9

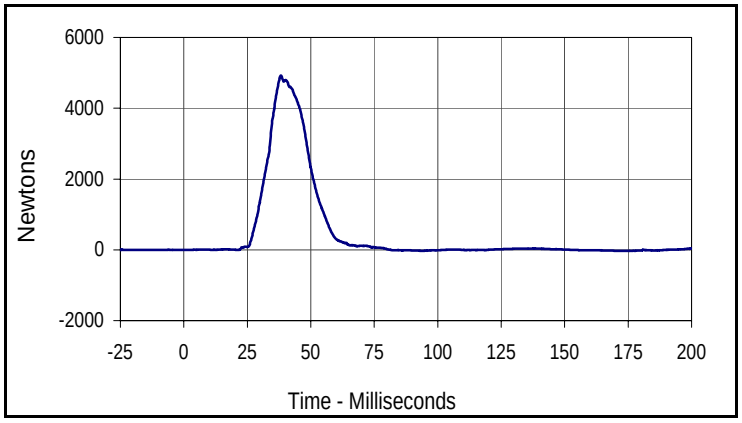
Test Vehicle:	2011 Mazda3 I Sport 4-Door Sedan	Test Date:	10/11/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB5400



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
2192.9	41.3	-66.4	177.7



Curve Description			
Driver Acetabulum Force on Impact Side Y			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
2786.3	38.1	-31.8	85.0



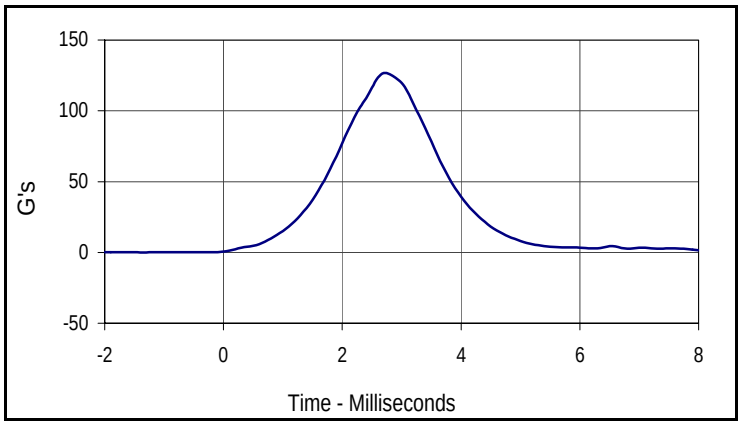
Curve Description			
Driver Total Pelvic Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	SUM	600	Newtons
Max	Time	Min	Time
4922.0	38.2	-30.8	173.8

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

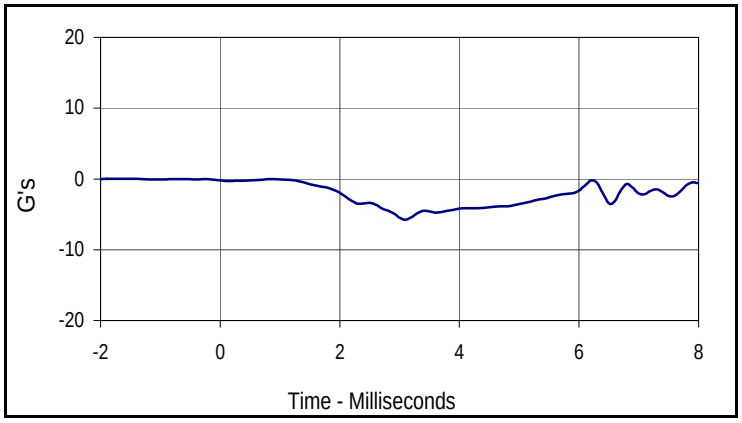
APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	HDP10A

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	126.8	Pass
Peak Longitudinal Acceleration	G's	≤15	5.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	6.3	Pass
		Overall Test Results		Pass



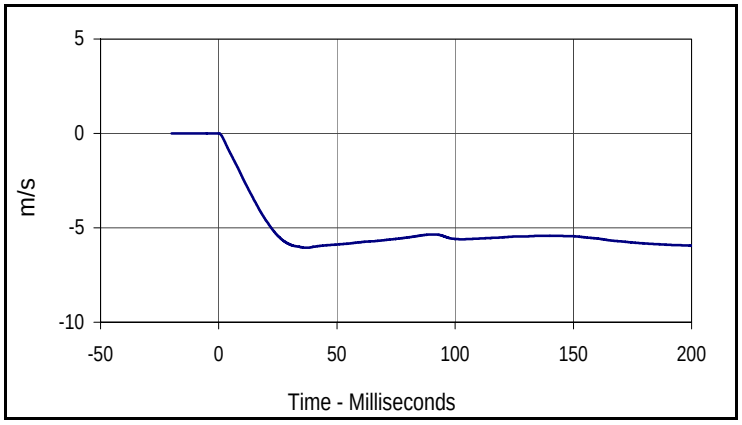
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
126.8	2.7	0.0	-1.4



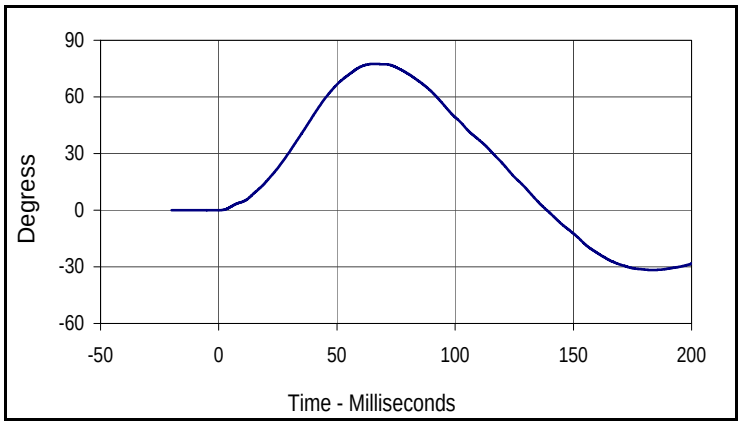
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-1.8	-5.8	3.1

Test Program:	SID IIs Neck Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	NBP10A

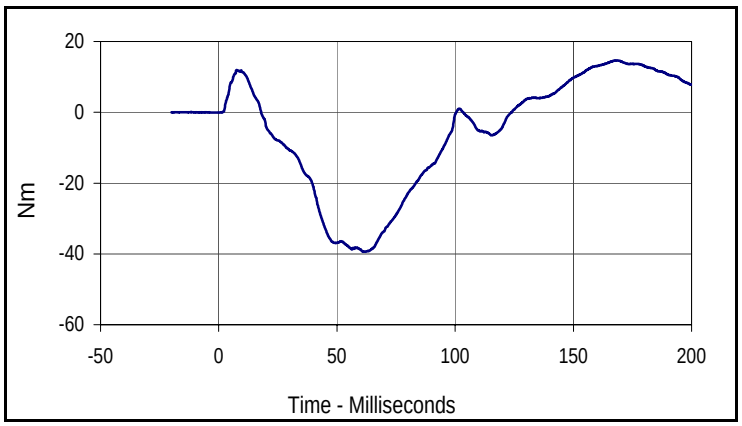
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.6	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.3	Pass
	15 msec	m/s	-3.30 to -4.10	-3.5	Pass
	20 msec	m/s	-4.40 to -5.40	-4.6	Pass
	25 msec	m/s	-5.40 to -6.10	-5.4	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.1	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	77.5	Pass
	Time	msec	50.0 to 70.0	65.6	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-39.4	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	124.0	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	-0.5	-6.1	36.7



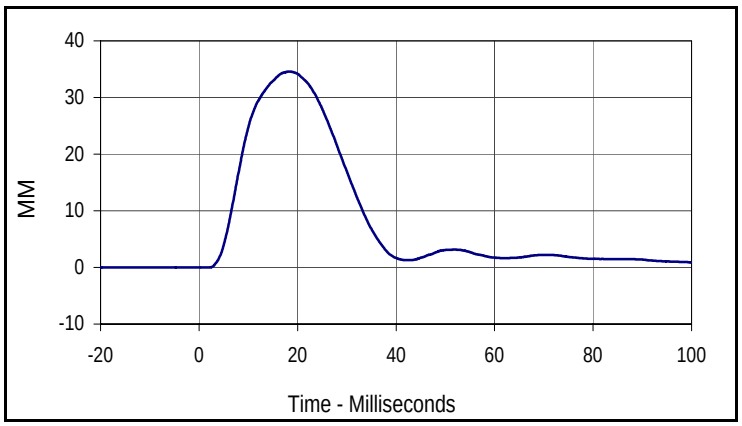
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
77.5	65.6	-31.7	183.4



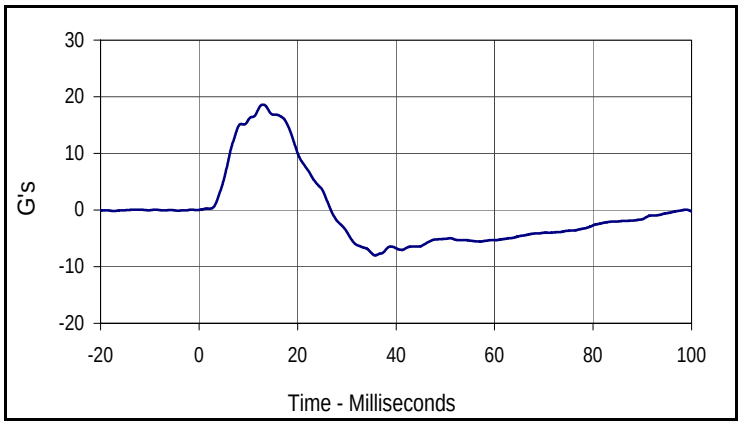
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
14.7	168.5	-39.4	62.0

Test Program:	SID IIs Shoulder Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	SHP10A

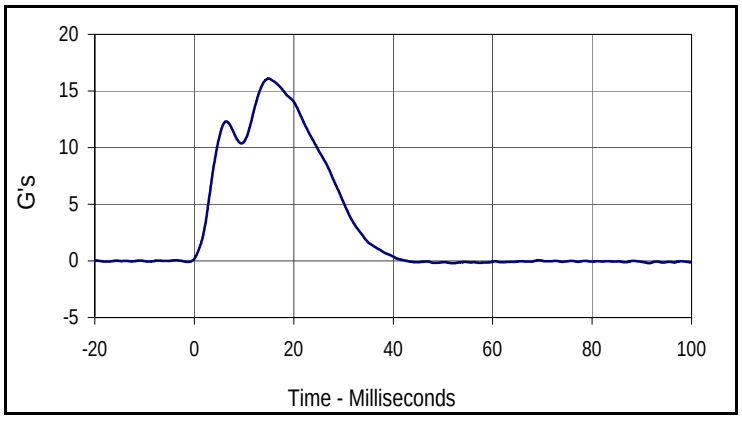
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.39	Pass
Shoulder Deflection	MM	28 to 37	34.6	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	18.6	Pass
Peak Impactor Acceleration	G's	13 to 18	16.1	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.6	18.3	0.0	-2.1



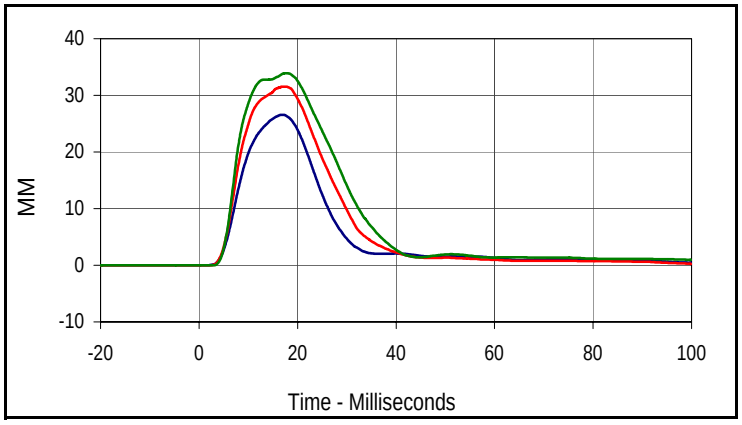
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.6	13.0	-8.0	35.7



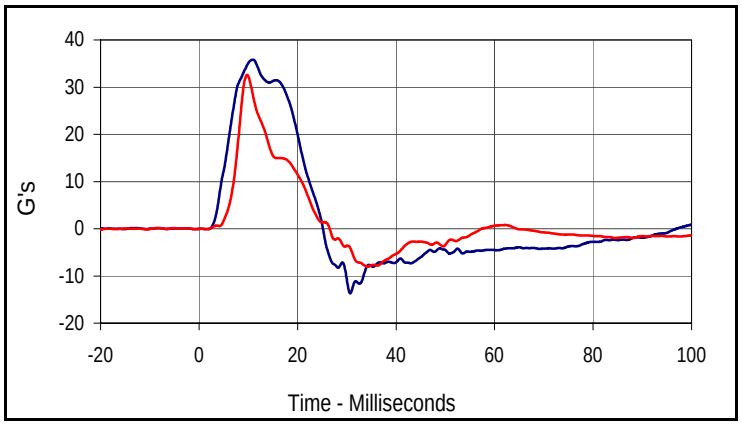
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.1	14.9	-0.2	52.0

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	TWAP09F

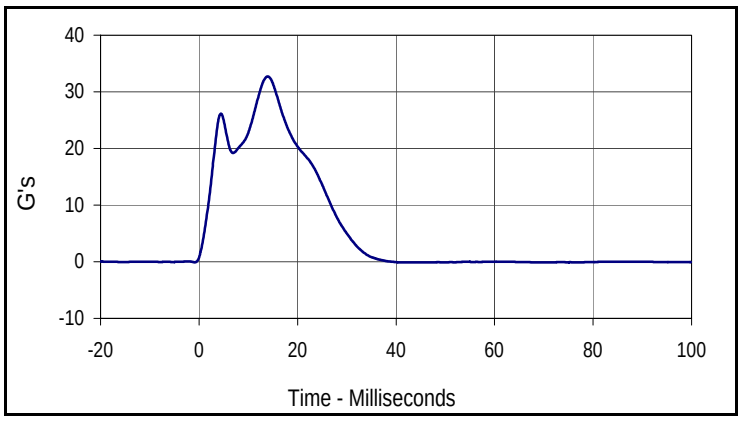
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.60	Pass
Shoulder Deflection	MM	31 to 40	35.1	Pass
Upper Thorax Rib Deflection	MM	25 to 32	26.6	Pass
Middle Thorax Rib Deflection	MM	30 to 36	31.5	Pass
Lower Thorax Rib Deflection	MM	32 to 38	33.9	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	35.8	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	32.6	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	32.7	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
26.6	16.8	0.0	-5.9
Middle Thorax Deflection			
Max	Time	Min	Time
31.5	17.1	0.0	-7.0
Lower Thorax Deflection			
Max	Time	Min	Time
33.9	17.7	0.0	-3.3



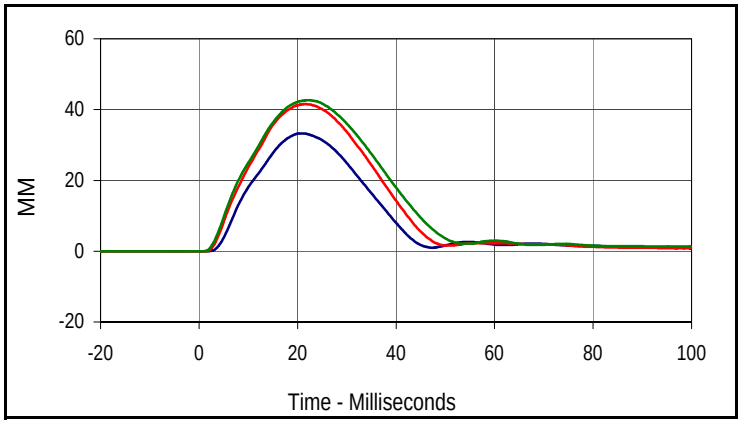
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
35.8	10.9	-13.7	30.7
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.6	9.7	-8.1	34.2



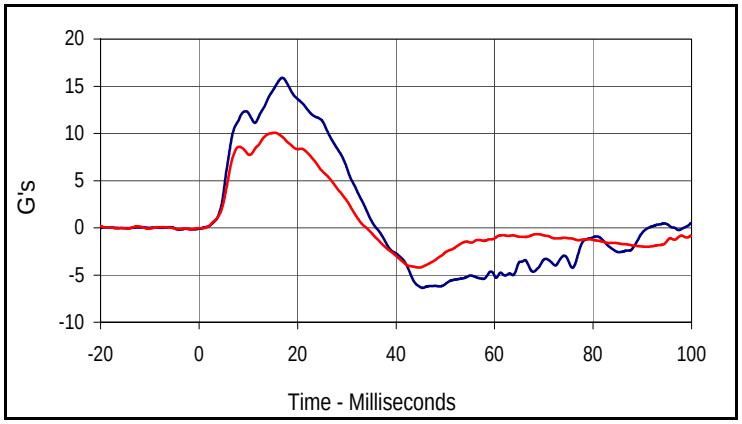
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
32.7	13.9	-0.1	42.5

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	TOAP10A

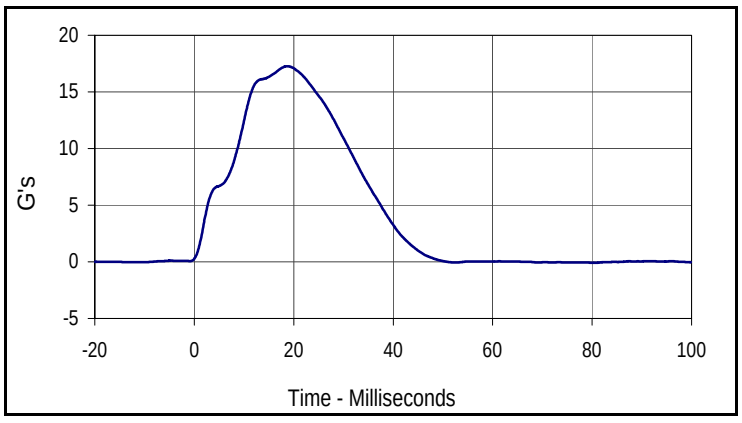
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Thorax Rib Deflection	MM	32 to 40	33.3	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.5	Pass
Lower Thorax Rib Deflection	MM	35 to 43	42.7	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.9	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	10.1	Pass
Peak Impactor Acceleration	G's	14 to 18	17.3	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.3	20.8	0.0	-18.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.5	21.5	0.0	-11.3
Lower Thorax Deflection			
Max	Time	Min	Time
42.7	22.2	0.0	-12.5



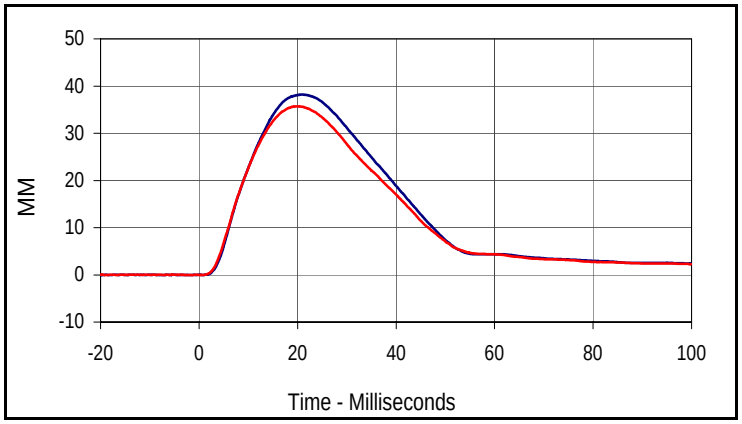
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.9	16.9	-6.4	45.4
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.1	15.4	-4.2	44.7



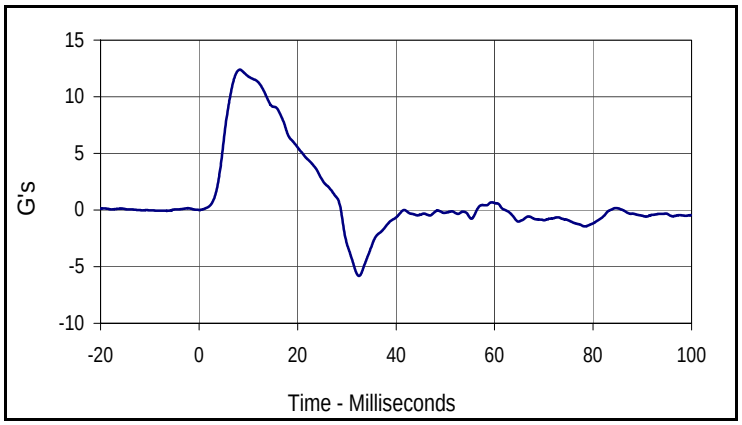
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
17.3	18.7	-0.1	0.0

Test Program:	SID IIs Abdomen Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	ABDP10A

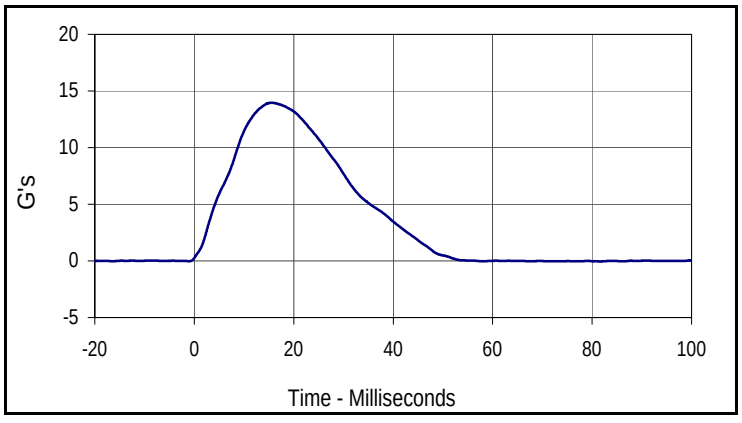
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.26	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	38.2	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	35.7	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.4	Pass
Peak Impactor Acceleration	G's	12 to 16	14.0	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
38.2	21.0	0.0	-3.0
Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.7	20.1	0.0	-2.6



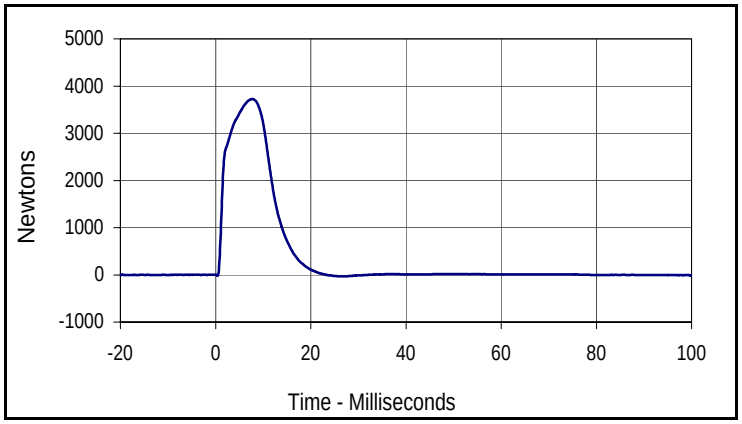
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.4	8.3	-5.8	32.5



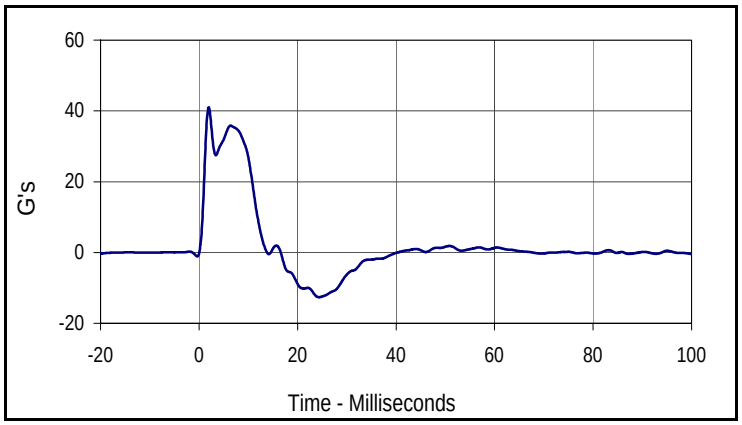
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.0	15.6	0.0	81.7

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	PAP10A

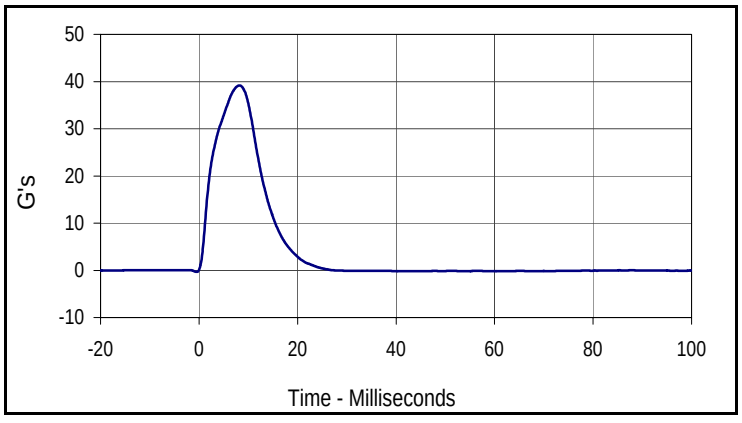
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.61	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3724.9	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	35.8	Pass
Peak Impactor Acceleration	G's	38 to 47	39.2	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3724.9	7.7	-33.1	27.0



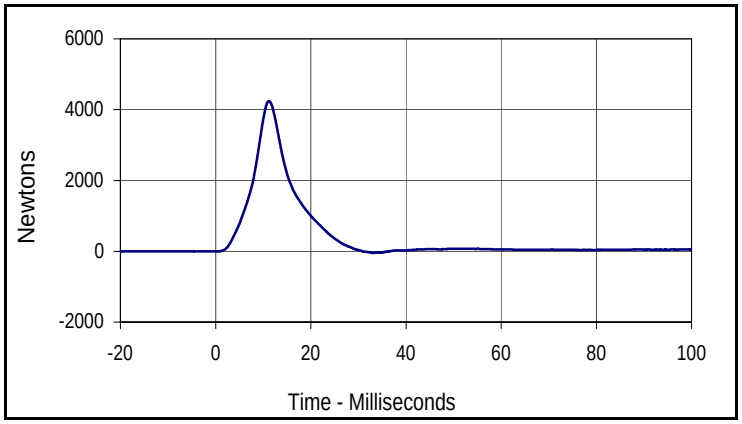
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.0	2.0	-12.6	24.3



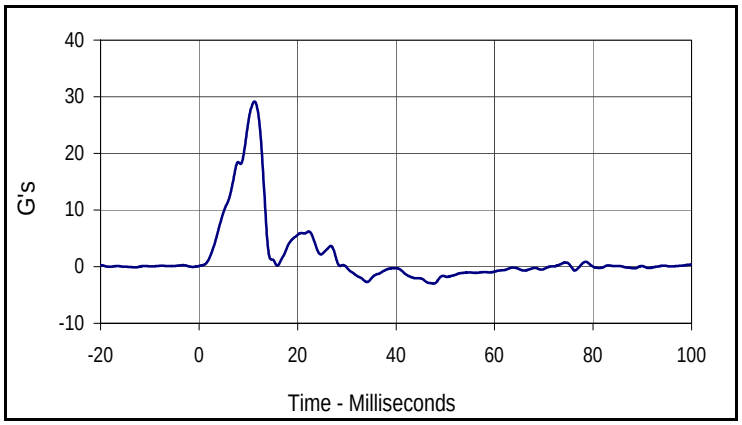
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.2	8.2	-0.3	-0.5

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	10/9/10
ATD Serial No.:	299	Test I.D.:	PLP10A

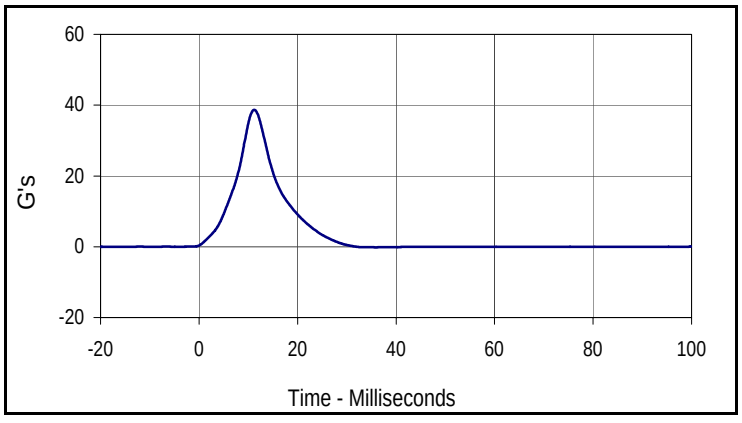
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.27	Pass
Peak Iliac Force	Newtons	4100 to 5100	4239.1	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	29.2	Pass
Peak Impactor Acceleration	G's	36 to 45	38.7	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4239.1	11.2	-48.6	33.2



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.2	11.3	-3.0	47.6

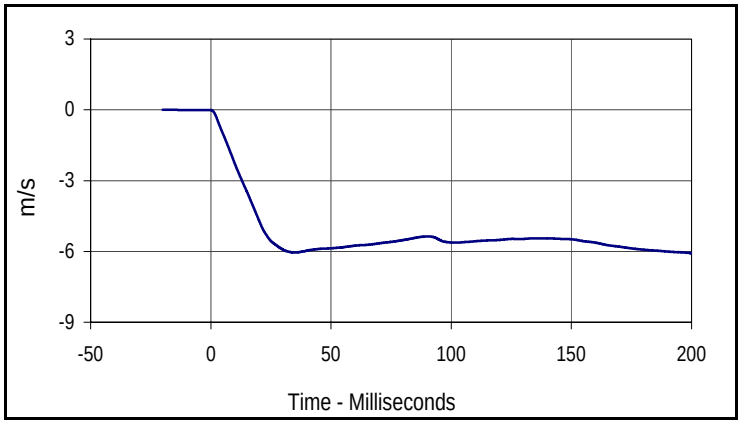


Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.7	11.2	-0.2	35.9

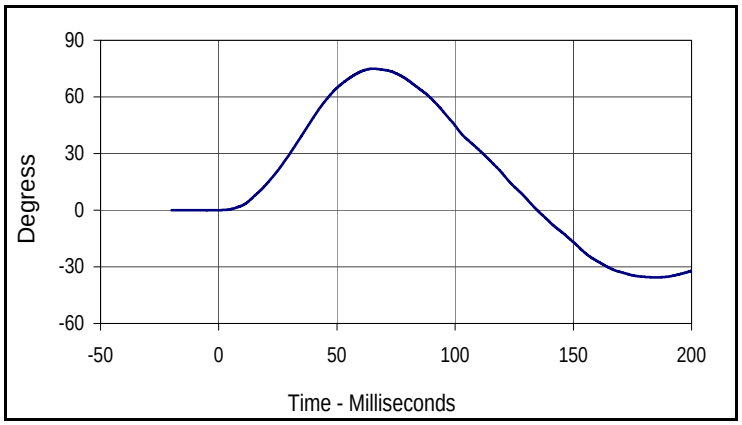
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID IIs Neck Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	NBP10B

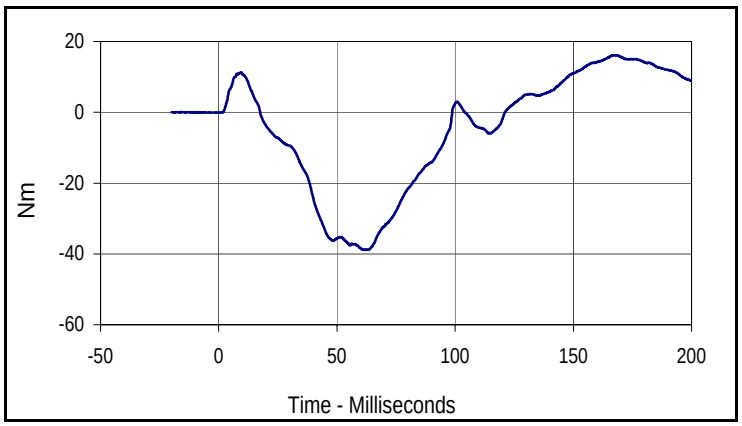
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.5	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.3	Pass
	15 msec	m/s	-3.30 to -4.10	-3.5	Pass
	20 msec	m/s	-4.40 to -5.40	-4.7	Pass
	25 msec	m/s	-5.40 to -6.10	-5.6	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.0	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	74.9	Pass
	Time	msec	50.0 to 70.0	65.4	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-38.9	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	121.1	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	-20.0	-6.1	200.0



Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
74.9	65.4	-35.6	184.9

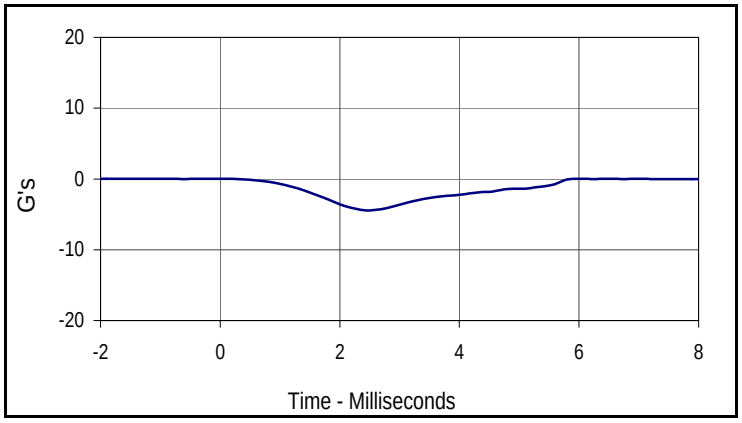


Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.1	167.2	-38.9	62.5

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	HDP10B

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	132.2	Pass
Peak Longitudinal Acceleration	G's	≤15	4.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	8.0	Pass
		Overall Test Results		Pass

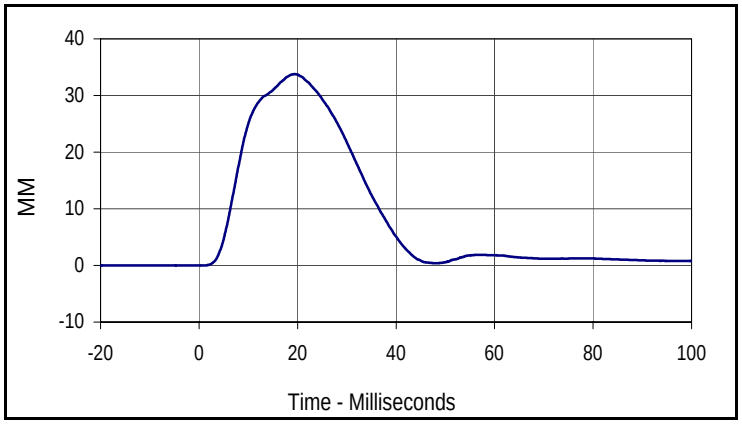
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
132.2	2.3	0.0	-2.0



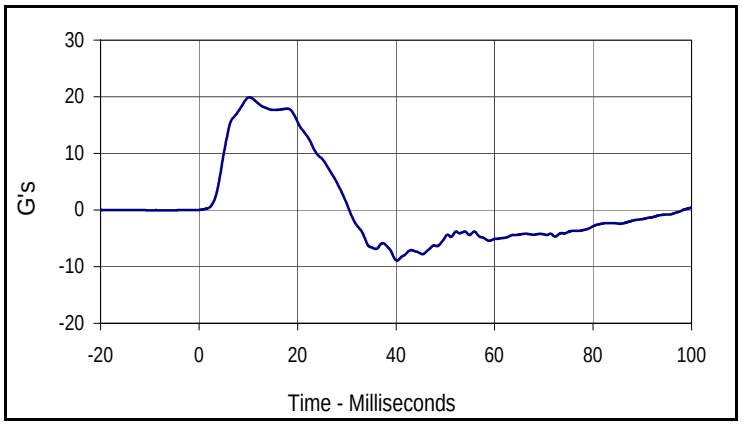
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-0.2	-4.4	2.5

Test Program:	SID IIs Shoulder Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	SHP10B

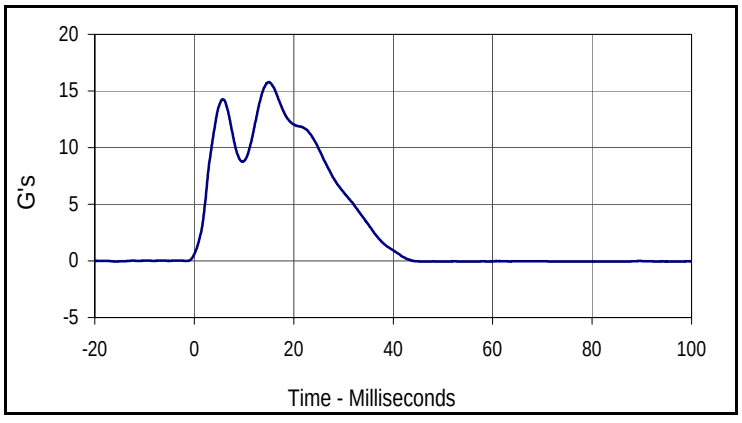
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.38	Pass
Shoulder Deflection	MM	28 to 37	33.8	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.9	Pass
Peak Impactor Acceleration	G's	13 to 18	15.8	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.8	19.4	0.0	-19.6



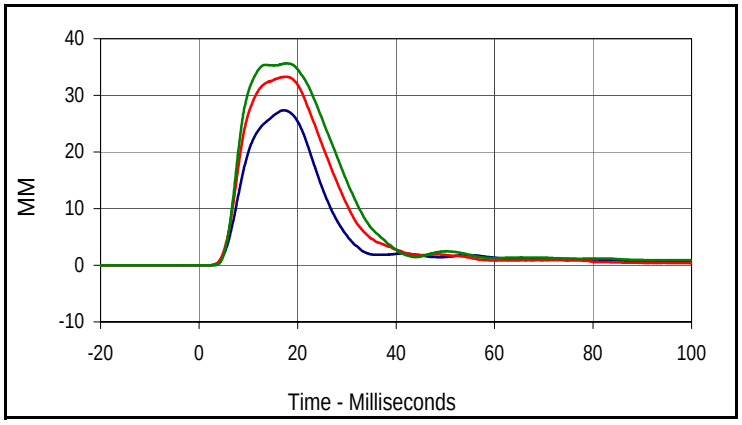
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.9	10.2	-8.9	40.2



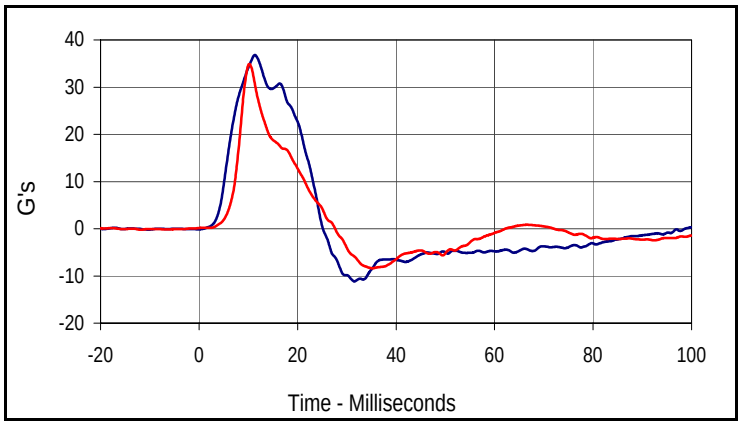
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.8	15.0	-0.1	50.8

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	TWAP10B

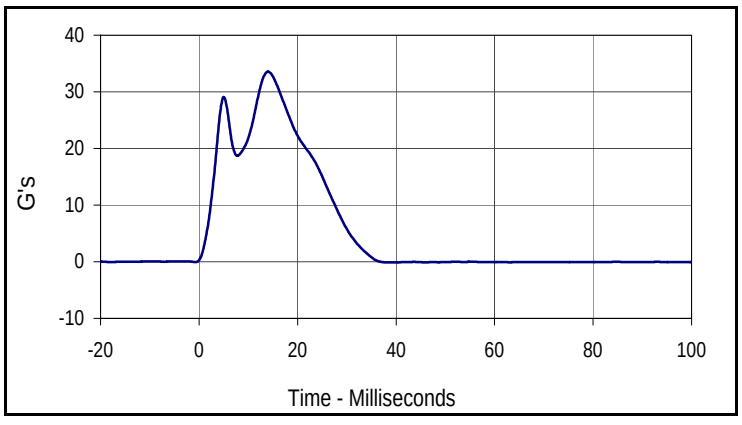
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.62	Pass
Shoulder Deflection	MM	31 to 40	36.5	Pass
Upper Thorax Rib Deflection	MM	25 to 32	27.4	Pass
Middle Thorax Rib Deflection	MM	30 to 36	33.3	Pass
Lower Thorax Rib Deflection	MM	32 to 38	35.7	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	36.8	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	34.9	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	33.5	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
27.4	17.2	0.0	-16.6
Middle Thorax Deflection			
Max	Time	Min	Time
33.3	17.7	0.0	-18.9
Lower Thorax Deflection			
Max	Time	Min	Time
35.7	17.7	0.0	-18.0



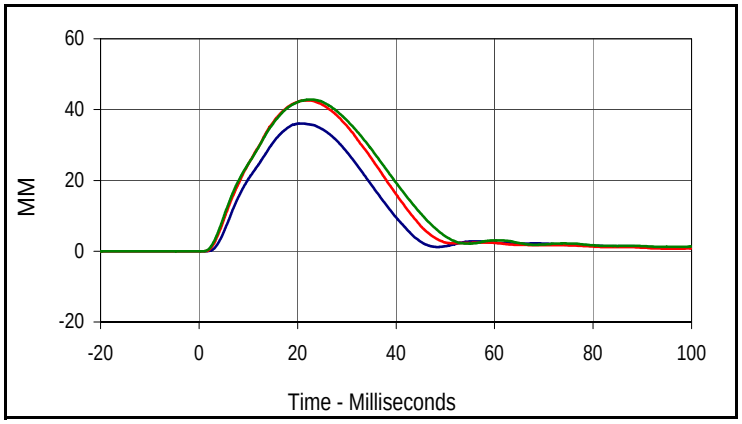
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
36.8	11.3	-11.2	31.5
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
34.9	10.2	-8.4	35.2



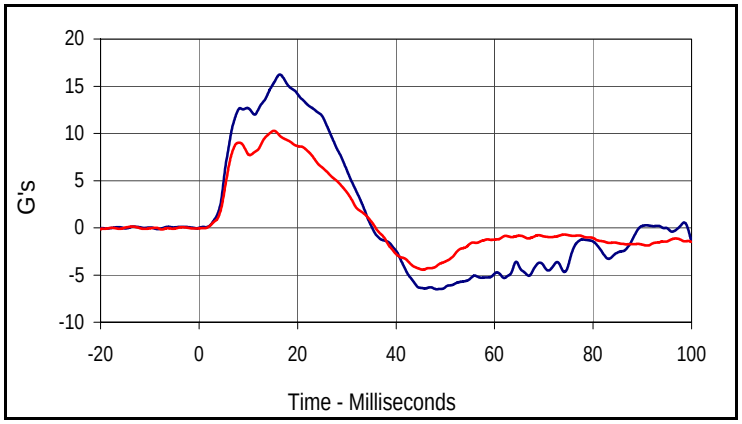
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.5	14.0	-0.1	40.2

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	TOAP10B

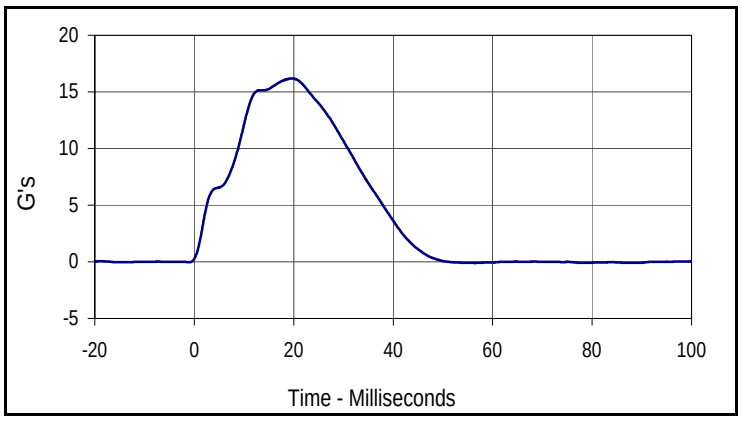
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.30	Pass
Upper Thorax Rib Deflection	MM	32 to 40	36.1	Pass
Middle Thorax Rib Deflection	MM	39 to 45	42.6	Pass
Lower Thorax Rib Deflection	MM	35 to 43	42.8	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	16.2	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	10.3	Pass
Peak Impactor Acceleration	G's	14 to 18	16.2	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.1	20.7	0.0	-4.1
Middle Thorax Deflection			
Max	Time	Min	Time
42.6	22.0	0.0	-13.4
Lower Thorax Deflection			
Max	Time	Min	Time
42.8	22.5	0.0	-3.3



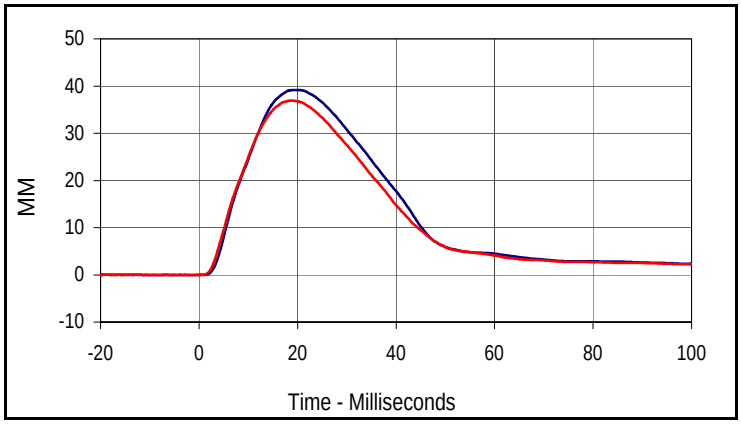
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
16.2	16.4	-6.5	48.2
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.3	15.2	-4.4	45.4



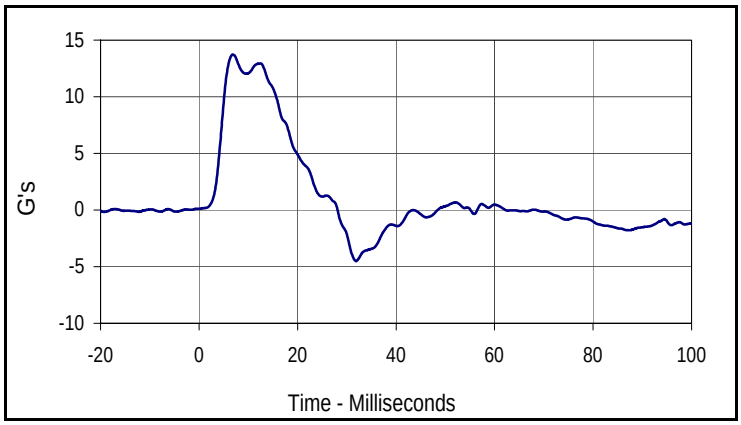
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.2	19.7	-0.1	0.0

Test Program:	SID IIs Abdomen Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	ABDP10B

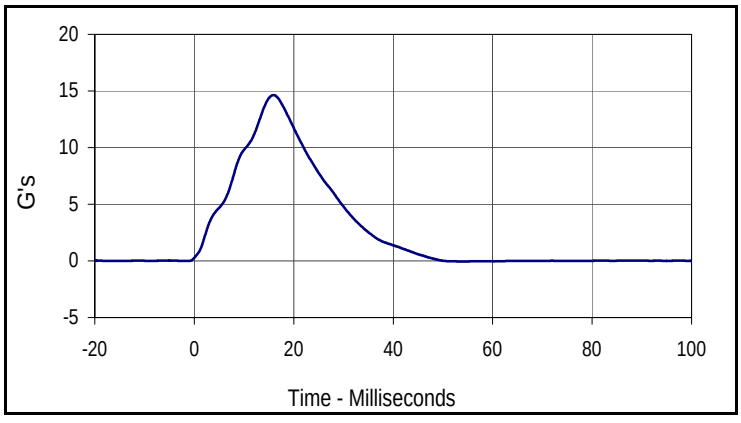
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	39.2	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	36.9	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	13.7	Pass
Peak Impactor Acceleration	G's	12 to 16	14.6	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.2	19.3	0.0	-5.8
Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
36.9	18.8	0.0	-3.0



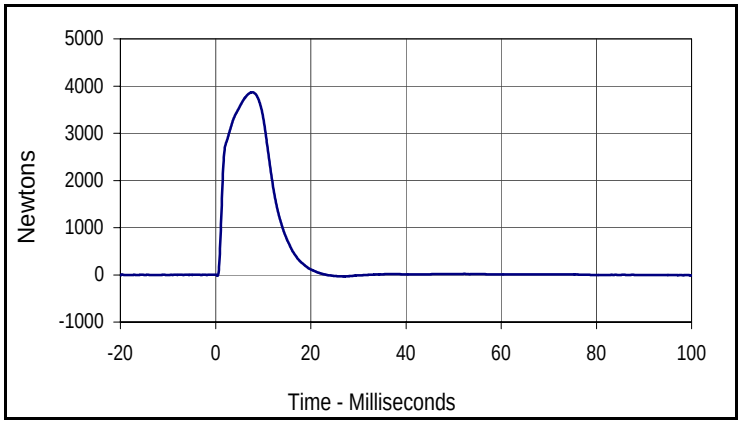
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
13.7	6.9	-4.5	31.9



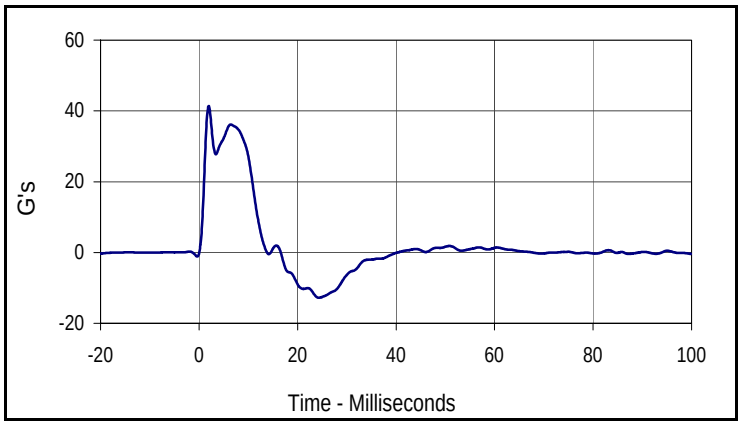
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.6	15.9	-0.1	54.3

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	PAP10B

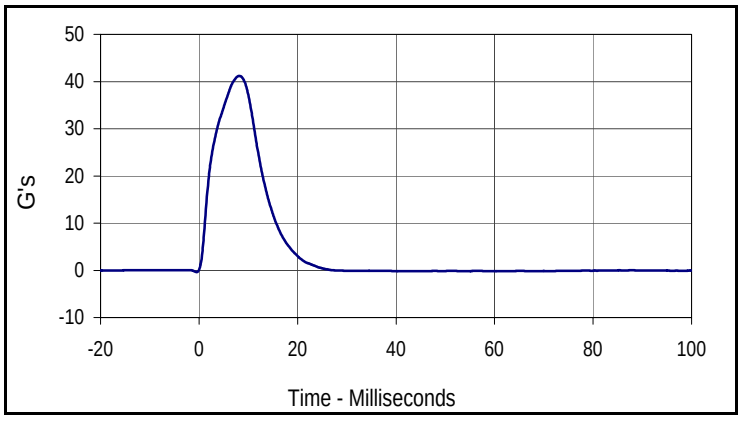
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.62	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3868.9	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	36.2	Pass
Peak Impactor Acceleration	G's	38 to 47	41.2	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3868.9	7.7	-34.5	27.0



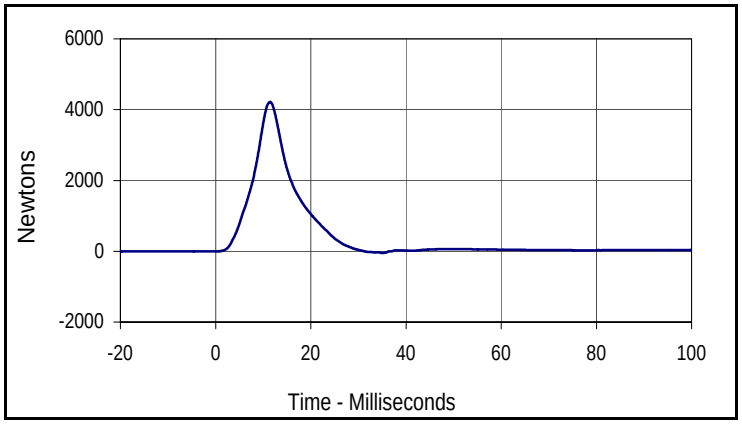
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
41.4	2.0	-12.8	24.3



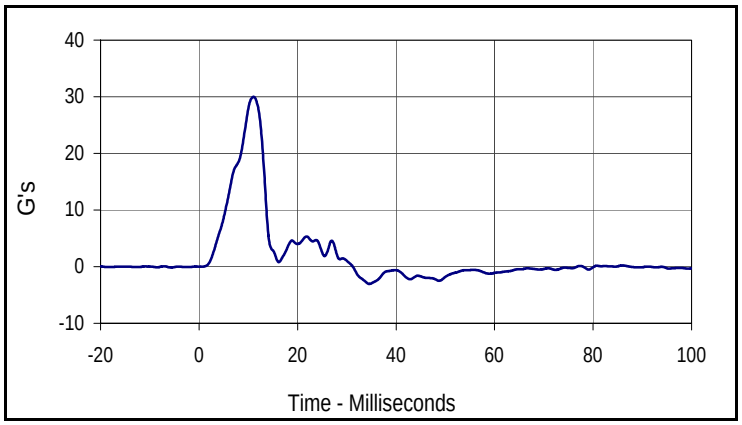
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
41.2	8.2	-0.4	-0.5

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	10/12/10
ATD Serial No.:	299	Test I.D.:	PLP10B

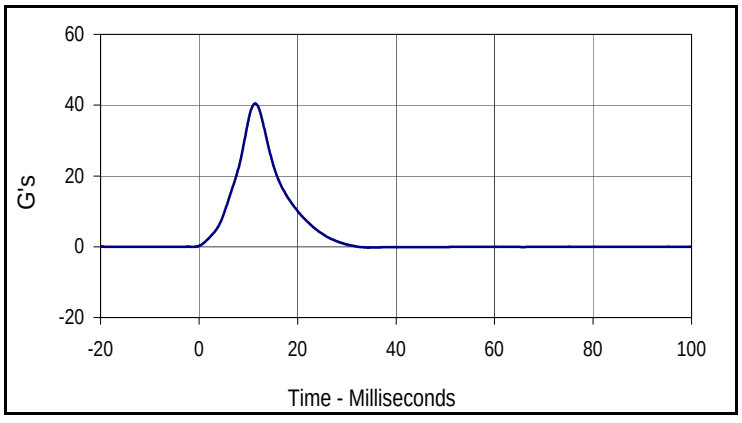
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.28	Pass
Peak Iliac Force	Newtons	4100 to 5100	4217.3	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	30.0	Pass
Peak Impactor Acceleration	G's	36 to 45	40.5	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4217.3	11.4	-46.1	34.9



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
30.0	11.0	-3.1	34.6



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.5	11.4	-0.2	35.5