

REPORT NUMBER TR-P28003-06-NC

**NEW CAR ASSESMENT PROGRAM
SIDE IMPACT TEST**

**SUZUKI MOTOR CORPORATION JAPAN
2008 SUZUKI SX4
4-DOOR**

NHTSA NUMBER: M80513

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OCTOBER 15, 2007

FINAL REPORT

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16. Abstract A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2008 Suzuki SX4 4-Door in accordance with the specifications of the Office of Crashworthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering on October 15, 2007. The impact velocity of the Moving Deformable Barrier was 61.96 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 26.7 deg. C. The target vehicle's maximum post-test static crush was 214, located at level 3. The test vehicle's occupant performance data is as follows:			
Measurement Description	Driver SID/HIII	Pass. SID/HIII	
Left Upper Rib (LUR) G's	40.4	47.5	
Left Lower Rib (LLR) G's	35.0	57.6	
Lower Spine (T ₁₂) G's	34.3	66.4	
Thoracic Trauma Index (TTI) G's	37.0	62.0	
Pelvis (PEV) G's	57.4	82.1	
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2008 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact data on a 2008 Suzuki SX4 4-Door manufactured by Suzuki Motor Corporation Japan.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Crashworthiness Standards (OCS), laboratory test procedure NCAP Side Impact Testing, dated November 2002. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2008 Suzuki SX4 4-Door was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.96 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1549 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on October 15, 2007.

Two (2) real-time cameras and ten (10) high-speed video cameras were used to document the impact event. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and SID/HIIIs can be found in Appendix A. Two 50th percentile adult male Side Impact Dummies, Hybrid III (SID/HIIIs) were placed in the driver's and left rear passenger designated seating positions according to the test procedure. Each SID/HIII is instrumented with contact switches on the pelvis, thorax and six-axis neck load cells, and fourteen accelerometers in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axes primary and redundant)

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes

SECTION 2...(CONTINUED)

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) accelerometers and one (1) contact switch on the right bumper to compare left side to right side bumper impact timing. All data channels were recorded with the fully self contained on-board Data Acquisition System (DAS). The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The driver and passenger doors remained closed during impact. The test vehicle sustained a maximum static crush of 214 mm at level 3, 1500 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 274, and the passenger SID/Hybrid III, Serial No. 275, were calibrated prior to this test. The SID/Hybrid III injury criteria are summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	Gs	37.0	62.0
Peak Pelvis Gs	Gs	57.4	82.1

Tests summaries and post-test observations are presented in Section 3. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID/HIIIs, vehicle, and MDB response data traces. Appendix C contains the SID Configuration and performance verification data. Appendix contains the Child Restraint System data.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
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

* Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M80513
Make	Suzuki
Model	SX4
Body Style	4-Door
VIN No.	JS2YB413085100861
Color	Red
Delivery Date	10/1/2007
Odometer (Miles)	21
Dealer	Victorville Hyundai Suzuki
Transmission	4-Speed Automatic
Final Drive	Front
Type/No. of Cylinders	Inline 4
Engine Displ. (L)	2
Engine Placement	Transverse
Roof Rack	Yes
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	Yes
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Torso Airbag	Yes
Driver Side Head Airbag	No
Driver Curtain Airbag	Yes
Rear Pass. Airbag	No
Rear Pass. Side Airbag	No
Rear Pass. Head Airbag	No
Rear Pass. Curtain Airbag	Yes
Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air Conditioning	Yes
AM/FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	No
Power Windows	Yes
Power Seats	No
Other	n/a

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

n/a

DATA FROM CERTIFICATION TABLE

Manufactured By	Suzuki Motor Corporation Japan
Date of Manufacture	Jun-07

GVWR (kg)	1725
GAWR Front (kg)	940
GAWR Rear (kg)	842

VEHICLE SEATING CAPACITY AND WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				370
Cargo Weight (RCLW) (kg)				29

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

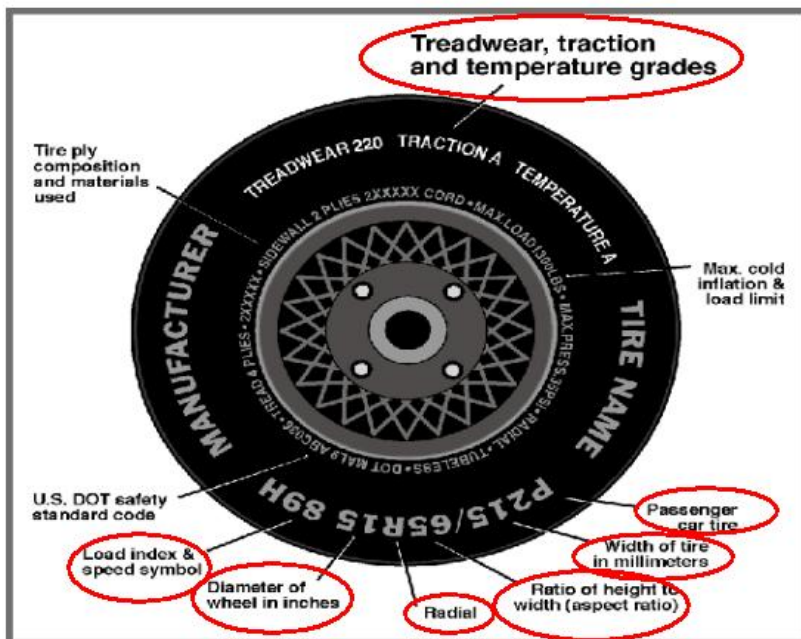
Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	308	308
Cold Tire Pressure (kPa)	230	230
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Bridgestone	Bridgestone
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies - Sidewall	1 Polyester	1 Polyester
Tire Plies - Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	91H	91H
DOT Safety Code Left	EL20 JFL 2207	EL20 JFL 2207
DOT Safety Code Right	EL20 JFL 2207	EL20 JFL 2207

DATA SHEET NO. 1...(CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	418	277	695	473	342	815
Right	kg	407	260	667	425	309	734
Ratio	%	60.6	39.4	100.0	58.0	42.0	100.0
Total	kg	825	537	1362	898	651	1549

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1363
Weight of 2 P572 ATDs	kg	162
Rated Cargo/Luggage Wt (RCLW)	kg	29
Calculated Vehicle Target Wt (TVTW)	kg	1554

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	762	764	785	787	985
As Tested	mm	747	753	757	764	1051
Fully Loaded	mm	747	751	755	753	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2500
Total Vehicle Length at Left Side	mm	2971
Total Vehicle Length at Centerline	mm	4160
Total Vehicle Length at Right Side	mm	2971
Weight of Ballast in Cargo Area	kg	0
Amount of Stoddard Solvent Added	L	41.9

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2500
Target Impact Point Aft of Front Axle	mm	310
Actual Impact Point Aft of Front Axle	mm	303

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

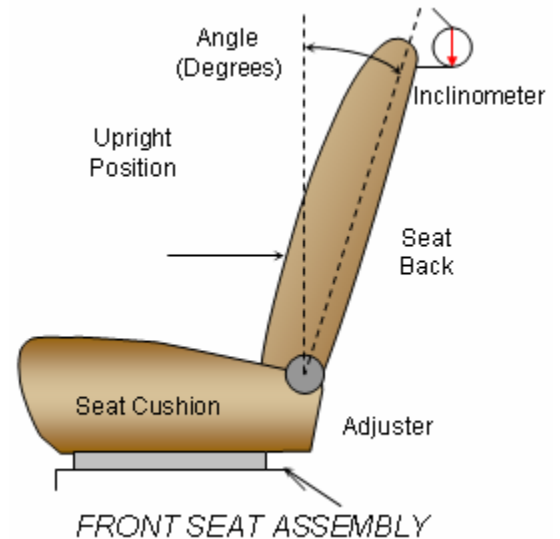
NHTSA No.: M80513
 Test Date: 10/15/2007

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: Seat back angle was measured at the headrest using a digital inclinometer.

SEAT BACK ANGLES

Position	Degrees
Driver w/Seated Dummy	4th Detent
Passenger w/Seated Dummy	Fixed

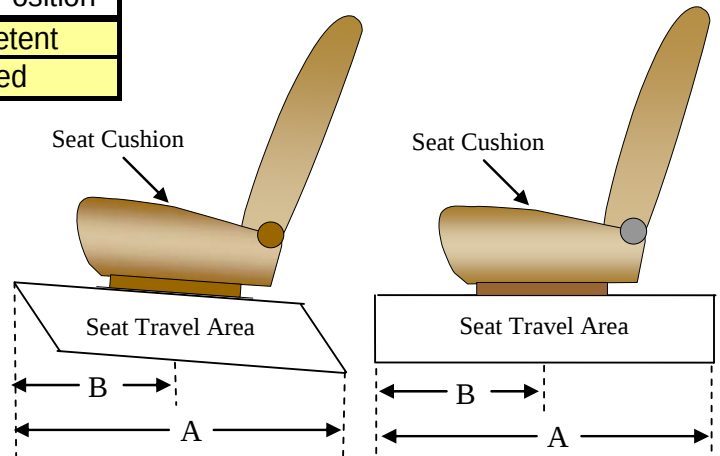


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position. The seat was set at the longitudinal mid position. There were vertical adjustments on the driver seat that was equipped with the vehicle. There were no adjustments on the passenger seat. The driver seat was placed in the lowermost position.

SEAT FORE/AFT POSITIONING

Position	Total Fore/Aft Travel	Placed in Position
Driver Seat	15 Detents	7th Detent
Passenger Seat	Fixed	Fixed



SEAT BELT ANCHORAGE

Position number one (1) is the uppermost position.

SEAT BELT ANCHORAGE POSITIONING

	Total Number of Positions	Placed in Position
Driver Seat	4	2
Passenger Seat	Fixed	Fixed

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

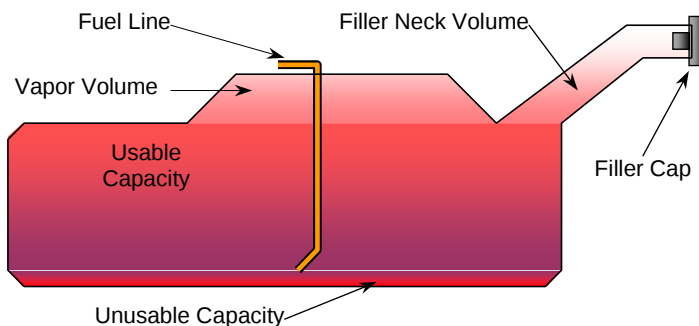
Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

FUEL TANK CAPACITY

	Liters
Usable Capacity of Standard Tank	42.77
Usable Capacity of Optional Tank	45.04
Usable Capacity Used for FMVSS 301	41.45 to 42.35
Actual Amount of Solvent Used	41.9

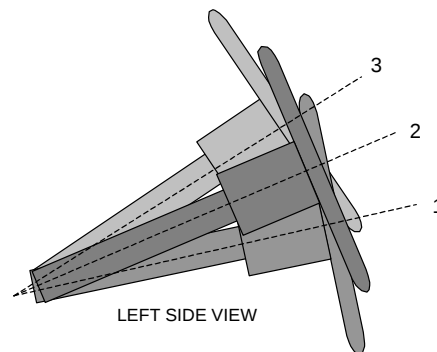
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately two (2) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

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. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



LEFT SIDE VIEW

STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position
Lowermost - Position No. 1	21.5	
Geometric Center - Position No. 2	24.2	
Uppermost - Position No. 3	28.5	

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**MAXIMUM EXTERIOR CRUSH**

Level	Measured Parameter	Units	Maximum Crush	Above Ground
1	Sill Top	mm	45	268
2	Occupant H-Point	mm	200	592
3	Mid Door	mm	214	666
4	Window Sill	mm	178	856
5	Window Top	mm	25	1458
n/a	Maximum Penetration	mm	214	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total Number of Contact Switches	5
Total	71

CAMERA COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	4
High Speed, MDB On-Board	3
Real Time, Panning	2
Total	12

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**MDB SPECIFICATIONS**

Measurement Description	Length
Overall Width of Frame Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheelbase of Frame Carriage	2590
CG Location Aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	384	308	
Right	kg	385	284	
Ratio	%	56.5	43.5	100.0
Total	kg	769	592	1361

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.96
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.95
MDB to Target CL	deg	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location		Height	From Centerline		Max Crush
Row	Description		Distance	Direction	
A	Center of Bumper	432	800	Right	228
B	Top of Bumper	533	800	Right	238
C	Mid Level	686	800	Right	246
D	Top of Stack	813	800	Right	312

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4**POST-TEST OBSERVATIONS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**TEST DUMMY INFORMATION AND CONTACT POINTS**

Description	Front Seat SID/Hybrid III	Rear Seat SID/Hybrid III
Dummy Type/Serial No.	P572F, SID/No. 274	P572F, SID/No. 275
Head Contact	Curtain	Curtain, Headliner
Upper Torso Contact	Side Airbag, Door Panel	Door Panel
Lower Torso Contact	Side Airbag	Door Panel
Left Knee Contact	Door Panel	Door Panel, Right Knee
Right Knee Contact	None	Left Knee

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Door remained closed and latched, jammed	Door remained closed and latched, jammed
Right Side Door Opening	Door remained closed and latched, opened without tools	Door remained closed and latched, opened without tools
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	No
Window Damage	Driver window broken
Other Notable Effects	n/a

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

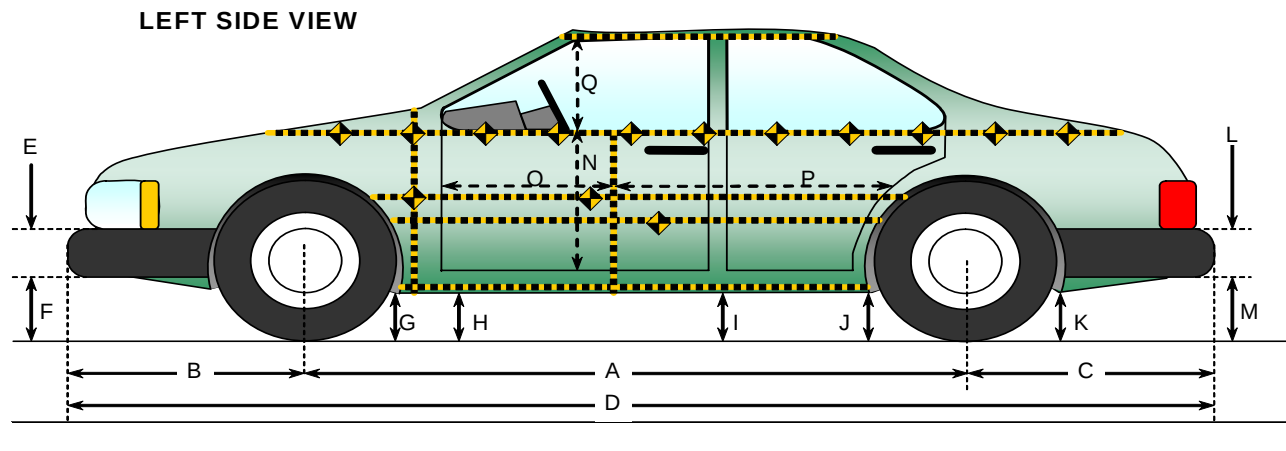
Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 2	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes
Pre-Tensioners	Yes		No	
Load Limiters	Yes		No	

MDB LEFT EDGE IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-7 (Left)
Vertical Offset	mm	+/-20	+2 (Above)

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: M80513
 Test Date: 10/15/2007



Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheel base	2500	2492	-8
B	Front Surface of Vehicle To Front Axle	920	894	-26
C	Rear Surface of Vehicle to Rear Axle	740	739	-1
D	Length of Vehicle at Centerline	4160	4154	-6
E	Front Bumper Vertical Dimension	395	370	-25
F	Ground Surface to Front Bumper Bottom	182	201	19
G	Ground Surface to Sill aft of Front Wheel	169	241	72
H	Ground Surface to Sill at Front Door Leading Edge	177	231	54
I	Ground Surface to Sill at Front Door Trailing Edge	198	243	45
J1	Ground Surface to Pinch Weld	186	201	15
J2	Ground Surface to Sill	196	238	42
K	Ground Surface to Sill aft of Rear Wheel	258	276	18
L	Rear Bumper Vertical Dimension	385	385	0
M	Ground Surface to Below Rear Bumper	240	338	98
N	Inside Rocker to Window Bottom (Door Height)	675	650	-25
O	Front Door Leading Edge to Impact Centerline	675	668	-7
P	Rear Door Trailing Edge to Impact Centerline	1250	1206	-44
Q	Window Vertical Height	460	460	0
R	Right Side Length	2971	2980	9
S	Left Side Length	2971	2936	-35
T	Vehicle Width at "B" Post	1715	1516	-199

DATA SHEET NO. 6

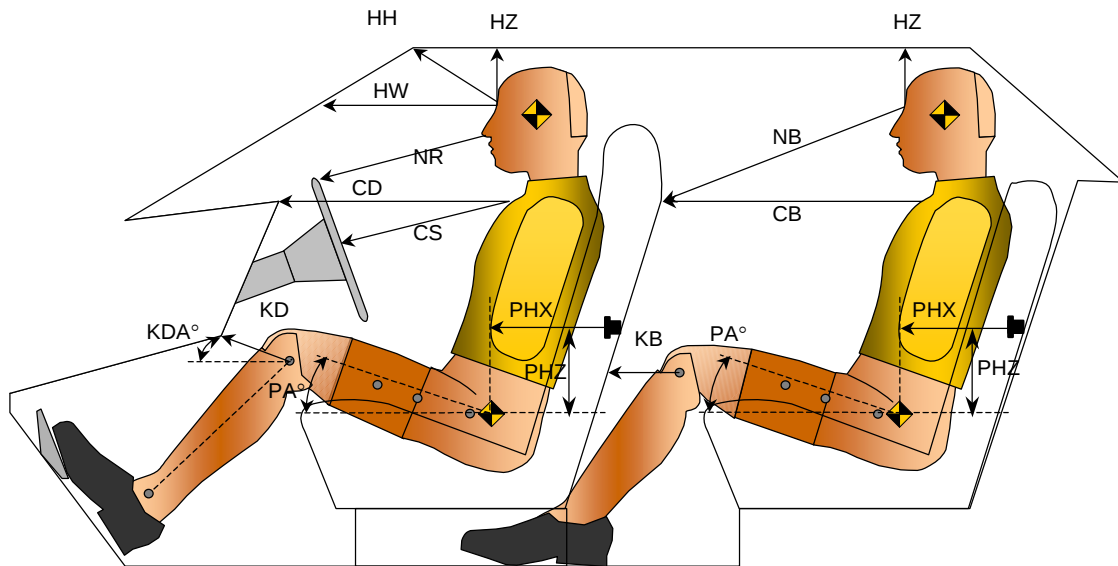
SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

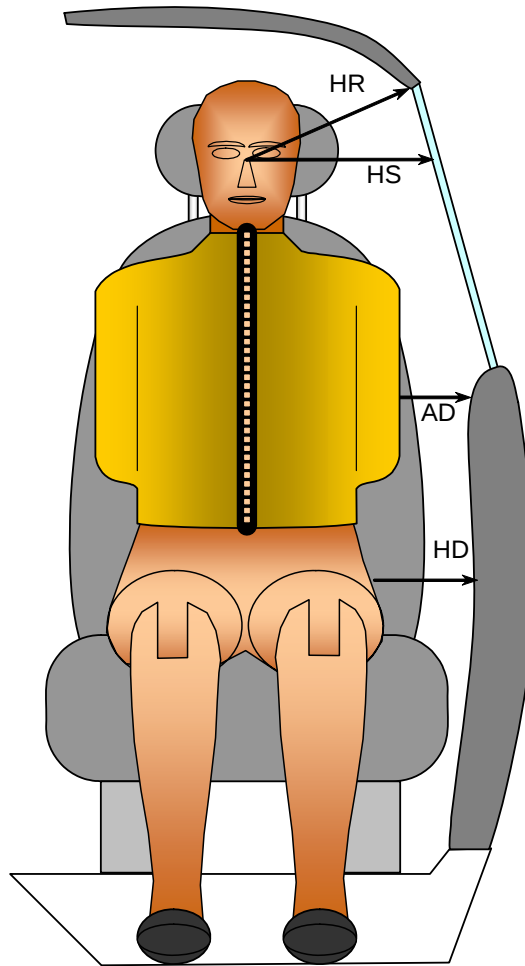
Test Date: 10/15/2007



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Passenger Code	Measurement	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	402	18.1		
HW		Head to Windshield	674	0		
HZ	HZ	Head to Roof	216	90	150	90
NR	NB	Nose to Rim (Seatback)	465	12.8	596	23.8
CD	CB	Chest to Dash (Seatback)	557	4.3	522	5.1
CS		Chest to Steering Hub	304	3		
KDL	KBL	Left Knee to Dash (Seatback)	155	17.5	178	0
KDR	KBR	Right Knee to Dash (Seatback)	155		182	
PA	PA	Pelvic Angle		24.4		23.4
PHX	PHX	Striker to H-Point (X)	170	0	208	0
PHZ	PHZ	Striker to H-Point (Z)	168	0	225	0

All dimensions shown in millimeters (mm).

DATA SHEET NO. 7**SID/HIII LATERAL CLEARANCE DIMENSIONS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007*FRONT VIEW OF DUMMY***LATERAL CLEARANCE DIMENSION INFORMATION**

Code	Measurement	Units	Driver	Passenger
HR	Head to Side Header (Y)	mm	216	258
HS	Head to Side Window	mm	290	332
AD	Arm to Door (Y)	mm	79	115
HD	H-Point to Door (Y)	mm	140	180

All dimensions shown in millimeters (mm)

DATA SHEET NO. 8

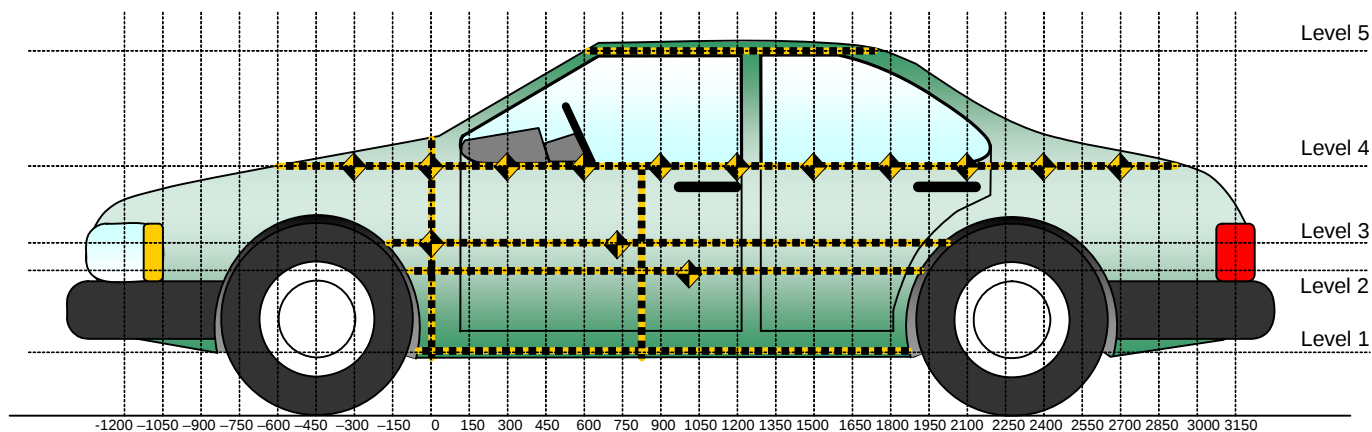
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

Measurements taken 900 mm right of impact reference.

All measurements below in mm

Level	Measurement Description	Units	Height Above Ground
1	Sill Top	mm	268
2	Occupant H-Point	mm	592
3	Mid-Door	mm	666
4	Window Sill	mm	856
5	Window Top	mm	1458

All dimensions shown in millimeters (mm).

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150				714					711					-3	
0		650	658	711			696	703	713			46	45	2	
150	682	668	666	693		727	746	766	716		45	78	100	23	
300	693	663	663	683		716	790	806	740		23	127	143	57	
450	692	661	658	676		716	801	821	770		24	140	163	94	
600	691	658	657	672	930	717	810	821	782	953	26	152	164	110	23
750	688	656	654	666	930	721	816	838	796	843	33	160	184	130	-87
900	692	656	652	663	936	721	826	846	808	871	29	170	194	145	-65
1050	688	655	652	639	936	721	842	838	771	896	33	187	186	132	-40
1200	688	656	655	662	939	718	848	860	803	921	30	192	205	141	-18
1350	688	660	659	663	935	716	853	867	841	901	28	193	208	178	-34
1500	688	663	662	666	939	716	856	876	826	877	28	193	214	160	-62
1650	688	666	667	670	939	711	866	874	815	840	23	200	207	145	-99
1800	686	665	656	674	939	700	806	860	803	956	14	141	204	129	17
1950		637	636	679	941		711	713	771	966		74	77	92	25
2100				683					711					28	
2250				691					706					15	
2400				704					711					7	
2550															
2700															
2850															
3000															

All dimensions in millimeters (mm)

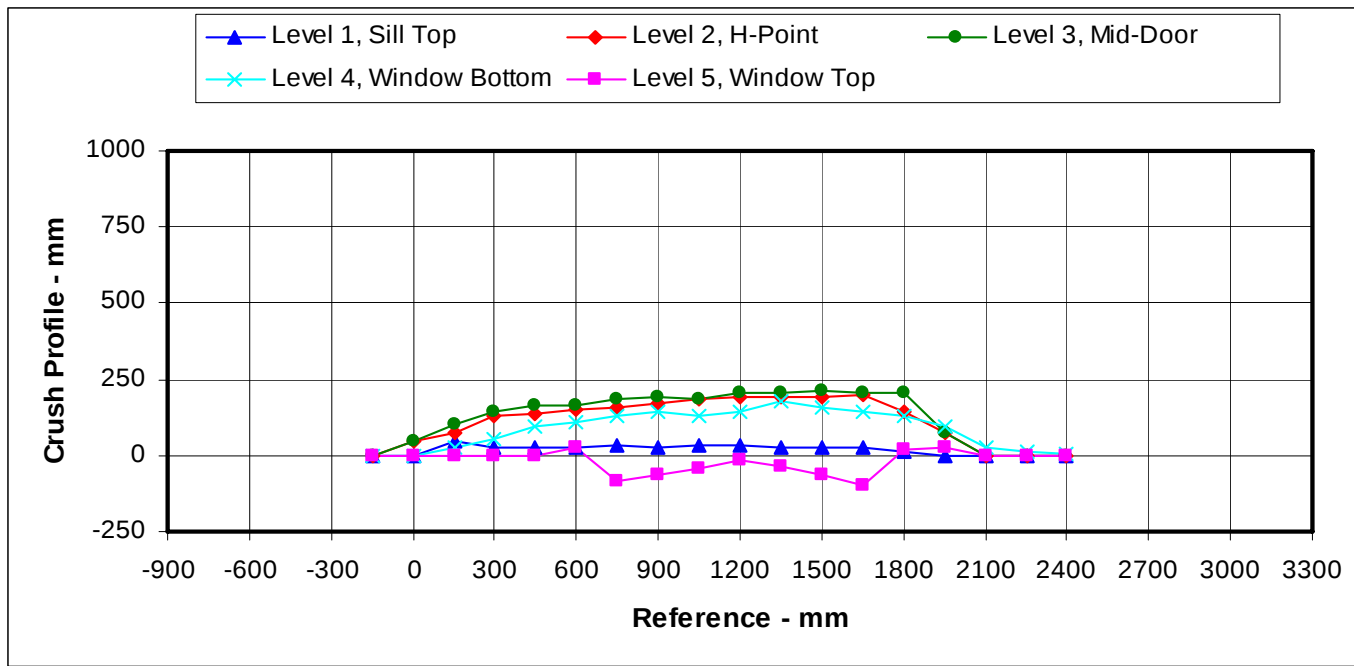
DATA SHEET NO. 9...(CONTINUED)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	45	200	214	178	25
Distance From Impact Point	mm	150	1650	1500	1350	1950

DATA SHEET NO. 10

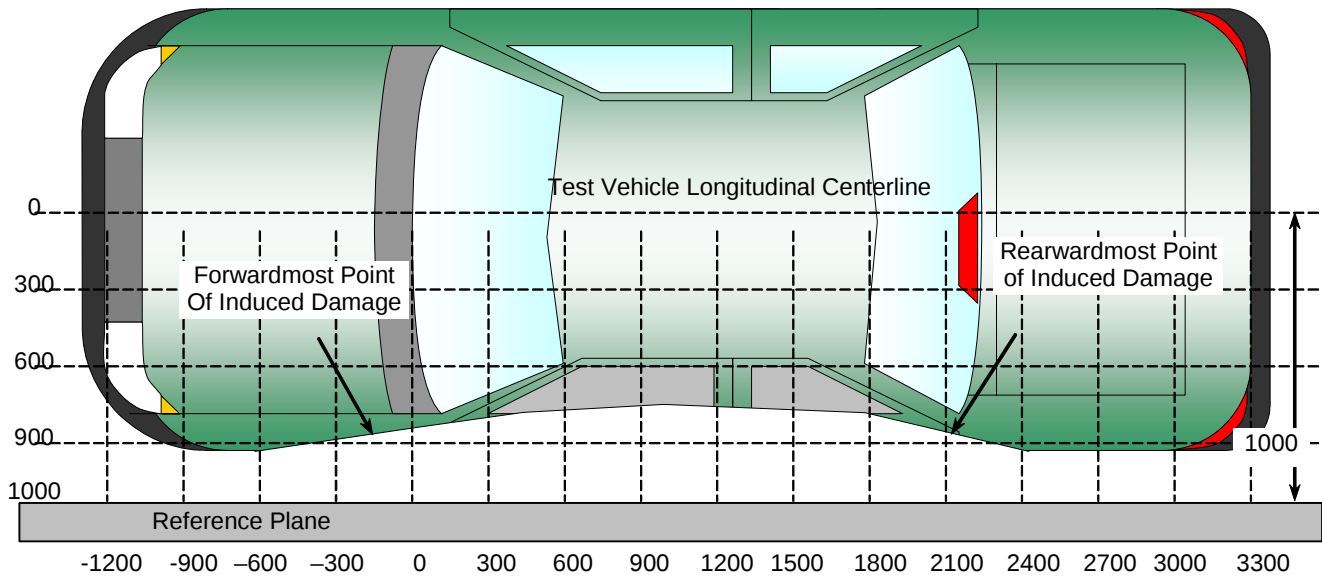
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



All Dimensions Shown in millimeters

TOP VIEW

DPD	Distance From Impact Point	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2100	4	683	711	28
2	1650	3	667	874	207
3	1200	3	655	860	205
4	750	3	654	838	184
5	300	3	663	806	143
6	-150	4	714	711	-3

DATA SHEET NO. 11

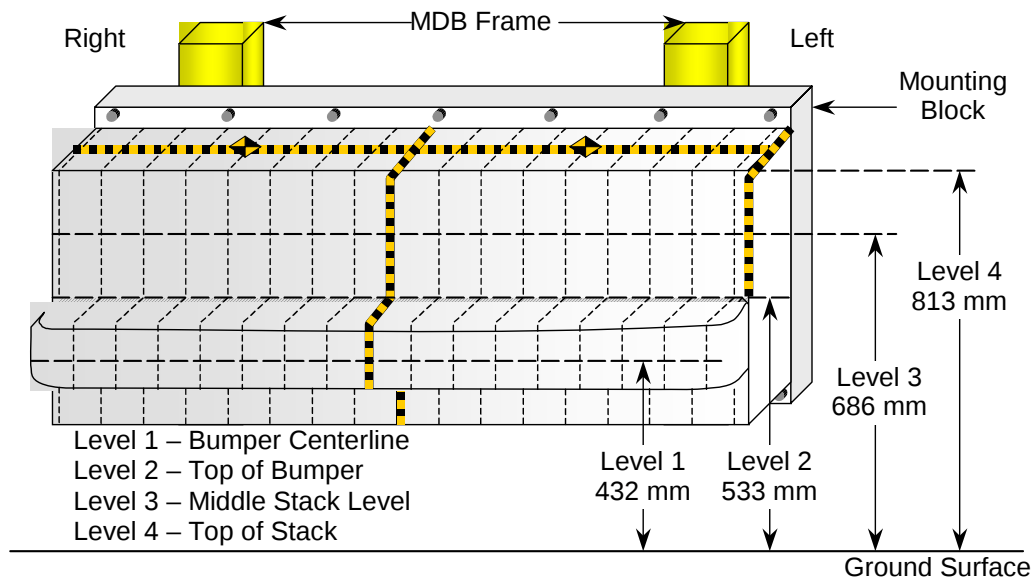
DEFORMABLE BARRIER HONEYCOMBE FACE STATIC CRUSH

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



Stack Level	Right of Center								CL	Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	746	721	691	676	676	673	671	671	677	673	673	676	676	681	691	706	726
2	756	746	736	718	708	708	706	696	687	682	678	681	691	711	732	743	751
3	764	737	696	676	661	653	643	643	642	653	656	641	638	636	640	648	658
4	830	800	743	707	686	671	666	661	660	667	686	681	656	640	648	664	671

All dimensions in millimeters (mm)

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

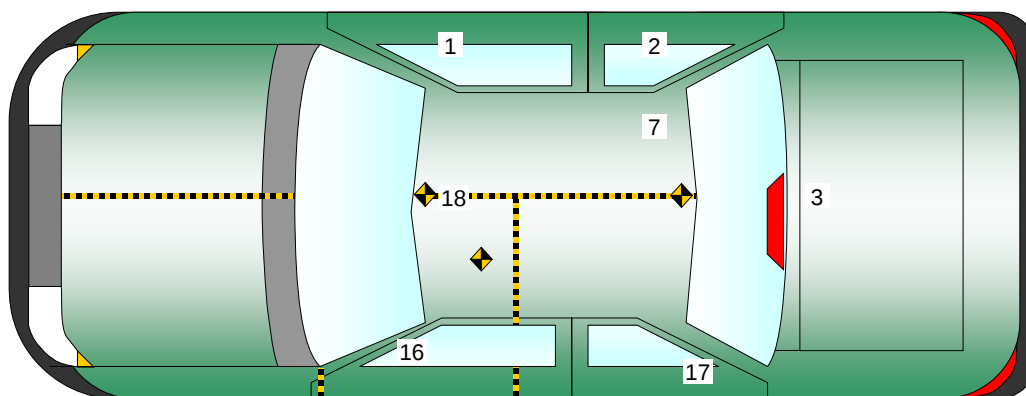
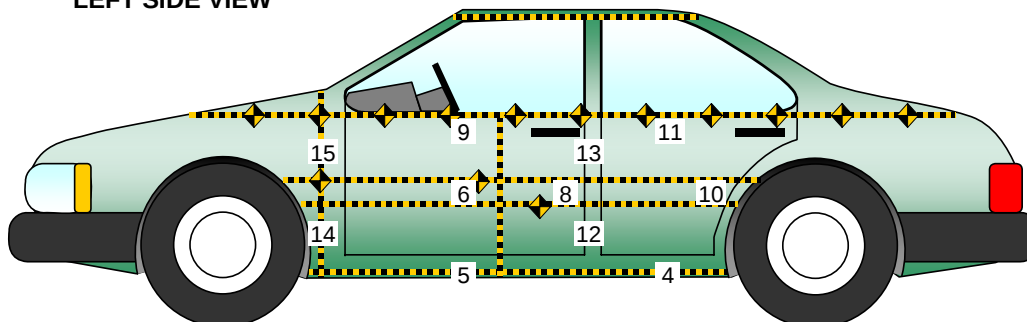
Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

LEFT SIDE VIEW



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

DATA SHEET NO. 12...(CONTINUED)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2100	650	360
2	Right Sill at Rear Seat	1460	680	380
3	Rear Floorpan Above Axle	780	0	340
4	Left Sill at Rear Door	1440	-625	185
5	Left Sill at Front Door			
6	Front Door Centerline			
7	Rt. Rear Occ. Compartment	1655	460	240
8	Front Door Mid-Rear			
9	Front Door Upper Centerline			
10	Rear Door Mid-Rear			
11	Rear Door Upper Centerline			
12	B-Post Lower	1750	-685	615
13	B-Post Middle	1750	-685	740
14	A-Post Lower	2720	-760	360
15	A-Post Middle	2720	-760	510
16	Front Seat Track	2230	-545	420
17	Rear Seat Structure			
18	Vehicle CG	2505	420	240

1

1

1

1

1

1

1

Reference Planes: X = From rear surface of vehicle, Y = Vehicle Centerline, Z = Ground Plane

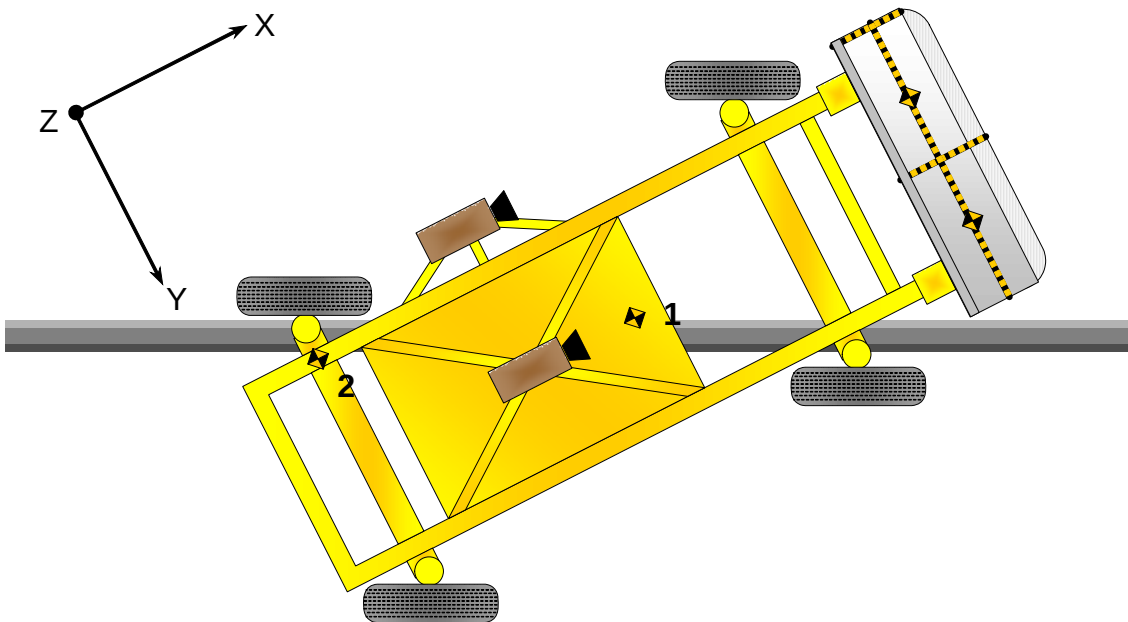
¹ – Not Installed

DATA SHEET NO. 13**MDB ACCELEROMETER LOCATIONS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**MDB ACCELEROMETER LOCATIONS**

Loc. No	Accelerometer Locations	Measurements		
		X	Y	Z
1	MDB CG	-1195	0	430
2	MDB Rear	-2642	-593	608

Reference Points:

- X – MDB Front Axle
- Y – MDB Centerline
- Z – Ground Plane



DATA SHEET NO. 14

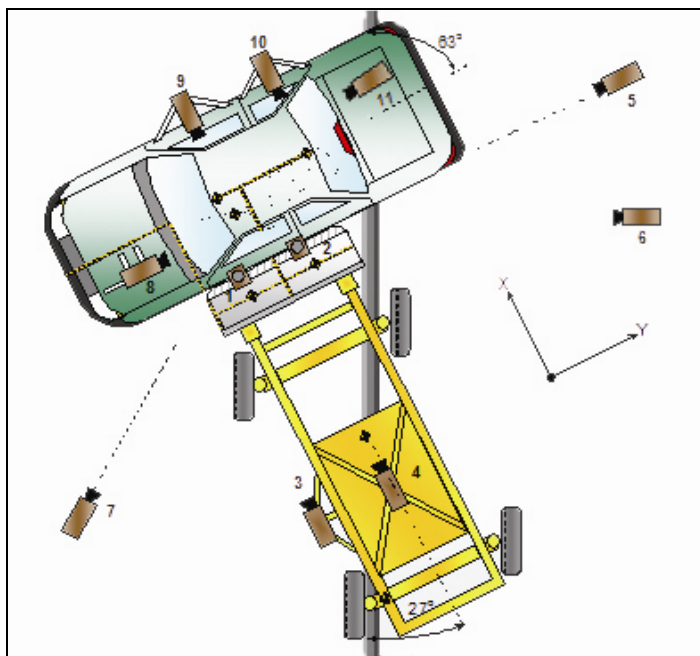
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



No.	Camera View	Location (mm)			Angle (°)	Lens (mm)	Film Speed
		X	Y	Z			
Doc	Real Time Inrun	-2484	-3958	-1506	0		30
Doc	Real Time Left Front	-2266	3549	-1475	-2		30
1	Overhead Overall	1220	2287	-5486	-90	14	1000
2	Overhead Close Up	DNR	DNR	DNR	-90	Zoom	1000
3	Left Impact Point (MDB)	-2134	0	-1143	-2	12	1000
4	Side Overall (MDB)	-3912	838	-1829	-4	12	1000
5	Rear	-64	20485	-1348	0	105	1000
6	Left Rear (MDB)	-2137	-1302	-339	-4	85	1000
7	Left Front	-2266	-3564	-1475	-2	24	1000
8	Driver Front (O.B.)	284	-621	-1373	-3	35	1000
9	Driver Side (O.B.)	1621	913	-1041	0	20	1000
10	Passenger Side (O.B.)	1629	1753	-1053	0	20	1000
11	Passenger CRS (O.B.)	692	2129	-1332	-2	10	1000

DNR = Did Not Run

All measurements are made relative to the point of impact

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

Test Time: 12:37 PM

Temperature: 26.7 deg. C

STODDARD SOLVENT SPILLAGE MEASUREMENTS

- A. From impact until vehicle motion ceases: 0
(Maximum allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0
(Maximum allowable = 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable = 1 oz/minute)
- D. Spillage Details: No leakage occurred

DATA SHEET NO. 16

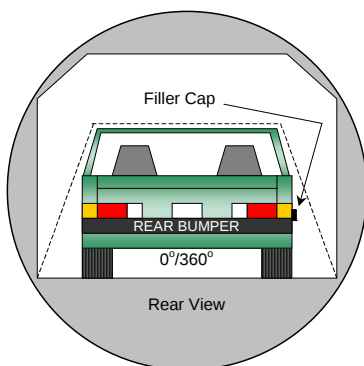
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2008 Suzuki SX4 4-Door

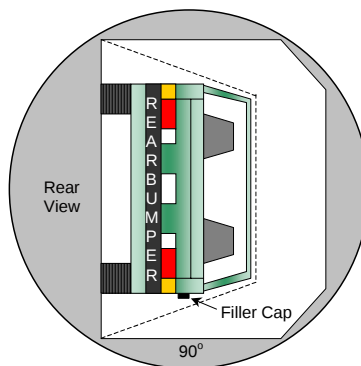
NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

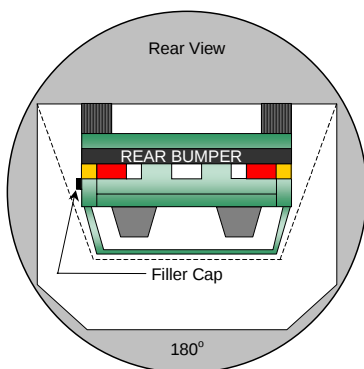
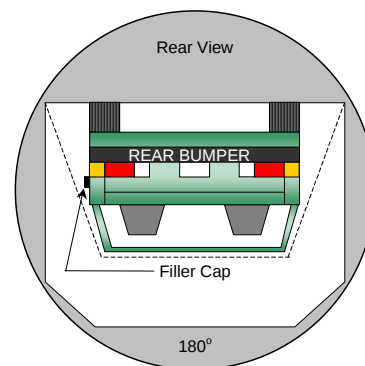
Test Date: 10/15/2007



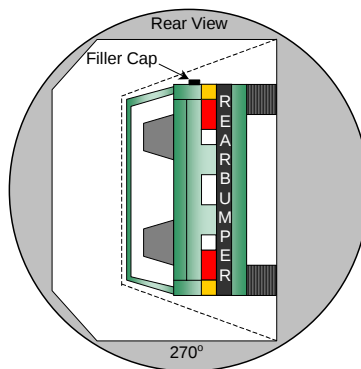
0° to 90°



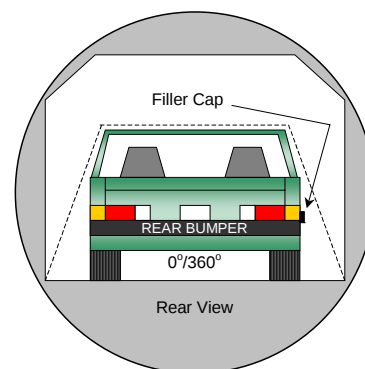
90° to 180°



180° to 270°



270° to 360°



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
 2. The position hold time at each position is 300 seconds (minimum).
 3. Details of Stoddard Solvent spillage locations.
- No solvent leakage occurred during static rollover testing.

DATA SHEET NO. 16...(CONTINUED)**FMVSS 301 STATIC ROLLOVER DATA**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**SOLVENT COLLECTION TIME TABLE (SECONDS)**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	85	313	398
90° to 180°	80	307	387
180° to 270°	80	369	449
270° to 360°	79	313	392

FMVSS 301 SPILLAGE REQUIREMENT TABLE (OZ)

First 5 Minutes	5.0
Sixth Minute	1.0
Seventh Minute	1.0
Eight Minute	1.0

FMVSS 301 SPILLAGE INFORMATION

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

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	n/a
90° to 180°	n/a
180° to 270°	n/a
270° to 360°	n/a

DATA SHEET NO. 17

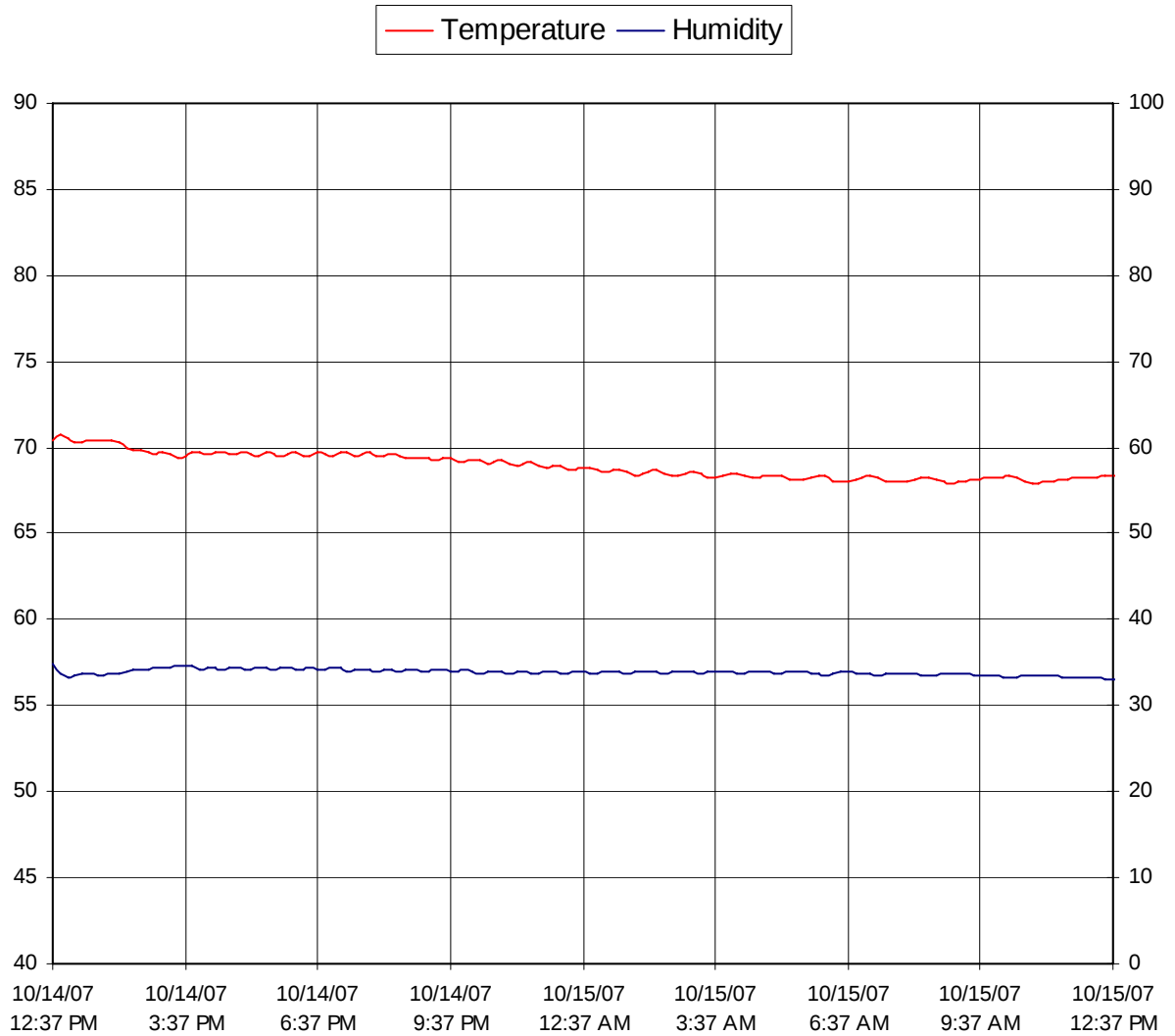
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



APPENDIX A
PHOTOGRAPHS

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A-33	Pre-Test Left Rear Door	A-33
A-34	Post-Test Left Rear Door	A-34

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Figure A-1: Right Front $\frac{3}{4}$ View, as Received



Figure A-2: Left Rear $\frac{3}{4}$ View, as Received

MFD BY SUZUKI MOTOR CORPORATION JAPAN

DATE	GVWR	GAWR FRT	GAWR RR
06 / 07	3803LB	2072LB	1852LB
	1725KG	940KG	840KG

THIS VEHICLE CONFORMS TO ALL
APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY, BUMPER AND
THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF
MANUFACTURE SHOWN ABOVE.

JS2YB413085100861

PASS CAR
2.0L 4WD US

Figure A-3: Manufacturer's Label



TIRE AND LOADING INFORMATION

(SEATING CAPACITY, TOTAL 5, FRONT 2, REAR 3)

The combined weight of occupants and cargo should never exceed 370kg or 815lbs.

TIRE	ORIGINAL TIRE SIZE	COLD TIRE PRESSURE
FRONT	P205/60R16	230 kPa, 33 PSI
REAR	P205/60R16	230 kPa, 33 PSI
SPARE	T135/90D16	420 kPa, 60 PSI

**SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION**

79161-80JU

Figure A-4: Tire Placard



Figure A-5: Pre-Test Front View



Figure A-6: Post-Test Front View



Figure A-7: Pre-Test Left Front $\frac{3}{4}$ View



Figure A-8: Post-Test Left Front $\frac{3}{4}$ View



Figure A-9: Pre-Test Left Side View



Figure A-10: Post-Test Left Side View



Figure A-11: Pre-Test Left Rear $\frac{3}{4}$ View



Figure A-12: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-13: Pre-Test Rear View



Figure A-14: Post-Test Rear View



Figure A-15: Pre-Test Right Rear $\frac{3}{4}$ View



Figure A-16: Post-Test Right Rear $\frac{3}{4}$ View



Figure A-17: Pre-Test Right Side View



Figure A-18: Post-Test Right Side View



Figure A-19: Pre-Test Right Front ¾ View



Figure A-20: Post-Test Right Front $\frac{3}{4}$ View



Figure A-21: Pre-Test Overhead View



Figure A-22: Post-Test Overhead View



Figure A-23: Pre-Test Overhead Close-up View



Figure A-24: Post-Test Overhead Close-up View



Figure A-25: Pre-Test Left Impact Point



Figure A-26: Post-Test Left Impact Point



Figure A-27: Pre-Test Front $\frac{3}{4}$ View of Left Side Door



Figure A-28: Post-Test Front $\frac{3}{4}$ View of Left Side Door



Figure A-29: Pre-Test Rear $\frac{3}{4}$ View of Left Side Door



Figure A-30: Post-Test Rear ¾ View of Left Side Door



Figure A-31: Pre-Test Left Front Door



Figure A-32: Post-Test Left Front Door



Figure A-33: Pre-Test Left Rear Door



Figure A-34: Post-Test Left Rear Door



Figure A-35: Pre-Test Driver Dummy (Door Open)

This Space Left Blank Intentionally



Figure A-36: Pre-Test Driver Dummy (Through Window)



Figure A-37: Post-Test Driver Dummy (Through Window)



Figure A-38: Pre-Test Driver Dummy Clearance From Door



Figure A-39: Post-Test Driver Dummy Clearance From Door



Figure A-40: Pre-Test Driver Dummy Right Side View



Figure A-41: Post-Test Driver Dummy Right Side View



Figure A-42: Pre-Test Front Door Panel (Interior)



Figure A-43: Post-Test Front Door Panel (Interior)



Figure A-44: Pre-Test Passenger Dummy Left Side (Door Open)

This Space Left Blank Intentionally



Figure A-45: Pre-Test Passenger Dummy Left Side (Through Window)



Figure A-46: Post-Test Passenger Dummy Left Side (Through Window)



Figure A-47: Pre-Test Passenger Dummy Clearance From Door



Figure A-48: Post-Test Passenger Dummy Clearance From Door

**Photograph Not
Available**

Figure A-49: Pre-Test Passenger Dummy Right Side View



Figure A-50: Post-Test Passenger Dummy Right Side View



Figure A-51: Pre-Test Rear Door Panel (Interior)



Figure A-52: Post-Test Rear Door Panel (Interior)



Figure A-53: Pre-Test Front View of Deformable Barrier



Figure A-54: Post-Test Front View of Deformable Barrier



Figure A-55: Pre-Test Top View of Deformable Barrier



Figure A-56: Post-Test Top View of Deformable Barrier



Figure A-57: Pre-Test Right Side View of Deformable Barrier



Figure A-58: Post-Test Right Side View of Deformable Barrier



Figure A-59: Pre-Test Left Side View of Deformable Barrier



Figure A-60: Post-Test Left Side View of Deformable Barrier



Figure A-61: Vehicle on Rollover Device (0°)



Figure A-62: Vehicle on Rollover Device (90°)



Figure A-63: Vehicle on Rollover Device (180°)

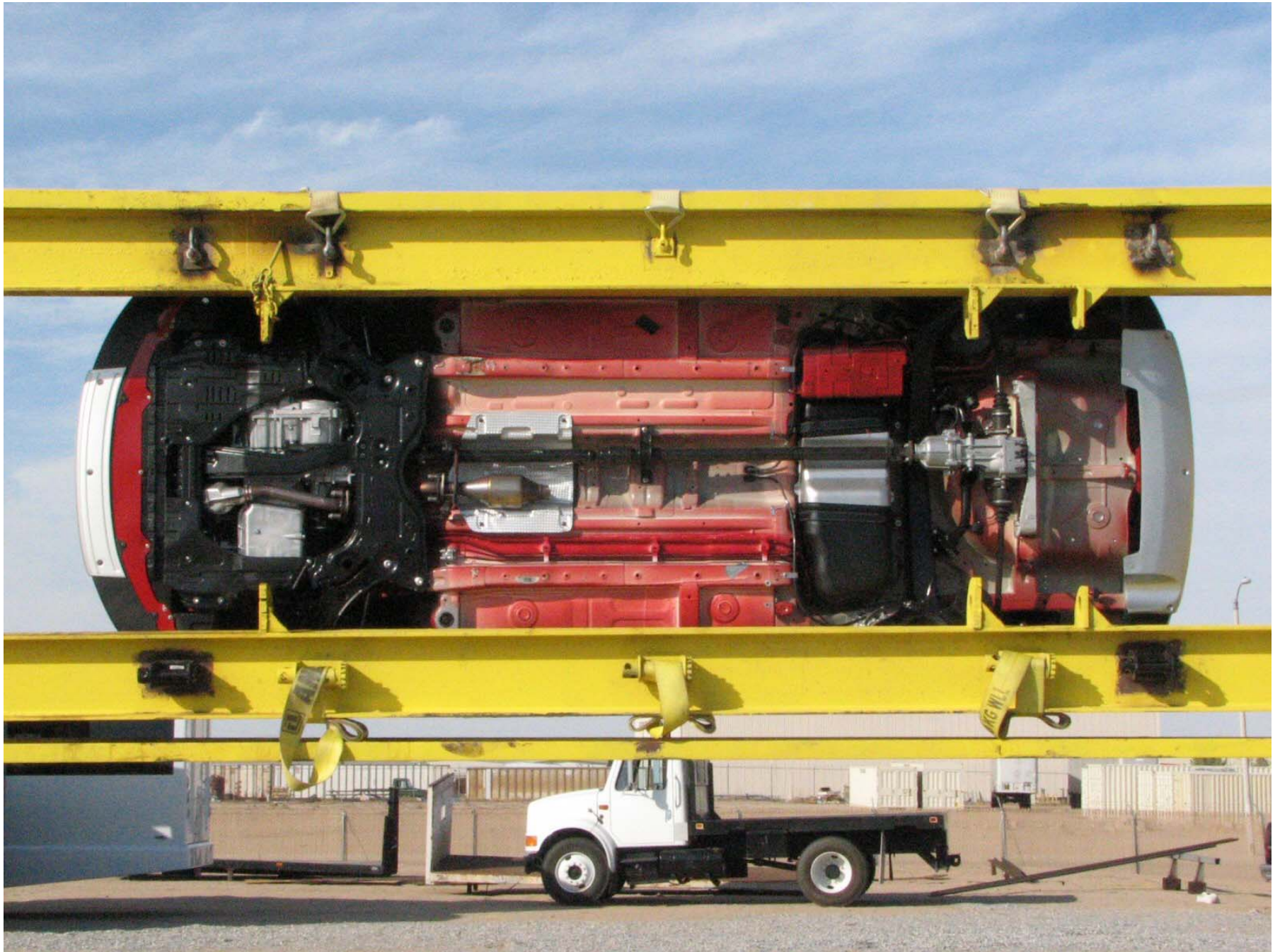


Figure A-64: Vehicle on Rollover Device (270°)



Figure A-65: Vehicle Impact

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

Data Plot	Page
B-1	Driver Upper Rib Primary Y
	Driver Lower Rib Primary Y
	Driver Lower Spine Primary Y
	Driver Pelvis Primary Y
B-2	Passenger Upper Rib Primary Y
	Passenger Lower Rib Primary Y
	Passenger Lower Spine Primary Y
	Passenger Pelvis Primary Y

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

LIST OF DATA PLOTS...(CONTINUED)

Driver Head X Primary
Driver Head Y Primary
Driver Head Z Primary
Driver Head Resultant Primary
Driver Head Primary X Velocity
Driver Head Primary Y Velocity
Driver Head Primary Z Velocity
Driver Head X Redundant
Driver Head Y Redundant
Driver Head Z Redundant
Driver Head Resultant Redundant
Driver Head Redundant X Velocity
Driver Head Redundant Y Velocity
Driver Head Redundant Z Velocity
Driver Upper Neck Force X
Driver Upper Neck Force Y
Driver Upper Neck Force Z
Driver Upper Neck Force Resultant
Driver Upper Neck Moment X
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Neck Moment Resultant
Driver Upper Rib Primary Y Velocity
Driver Lower Rib Primary Y Velocity
Driver Lower Spine Primary Y Velocity
Driver Pelvis Primary Y Velocity
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y

LIST OF DATA PLOTS...(CONTINUED)

Driver Upper Rib Redundant Y Velocity
Driver Lower Rib Redundant Y Velocity
Driver Lower Spine Redundant Y Velocity
Driver Pelvis Redundant Y Velocity
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head Resultant Primary
Passenger Head Primary X Velocity
Passenger Head Primary Y Velocity
Passenger Head Primary Z Velocity
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Head Resultant Redundant
Passenger Head Redundant X Velocity
Passenger Head Redundant Y Velocity
Passenger Head Redundant Z Velocity
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Force Resultant
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Neck Moment Resultant

LIST OF DATA PLOTS...(CONTINUED)

Passenger Upper Rib Primary Y Velocity
Passenger Lower Rib Primary Y Velocity
Passenger Lower Spine Primary Y Velocity
Passenger Pelvis Primary Y Velocity
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
Passenger Upper Rib Redundant Y Velocity
Passenger Lower Rib Redundant Y Velocity
Passenger Lower Spine Redundant Y Velocity
Passenger Pelvis Redundant Y Velocity
Passenger Thorax Contact
Passenger Pelvis Contact
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill Front Seat Resultant
Vehicle Right Sill at Front Seat X Velocity
Vehicle Right Sill at Front Seat Y Velocity
Vehicle Right Sill at Front Seat Z Velocity
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z
Vehicle Right Sill Rear Seat Resultant
Vehicle Right Sill at Rear Seat X Velocity
Vehicle Right Sill at Rear Seat Y Velocity
Vehicle Right Sill at Rear Seat Z Velocity
Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Rear Floor Above Axle Resultant
Vehicle Rear Floor Above Axle X Velocity
Vehicle Rear Floor Above Axle Y Velocity
Vehicle Rear Floor Above Axle Z Velocity

LIST OF DATA PLOTS...(CONTINUED)

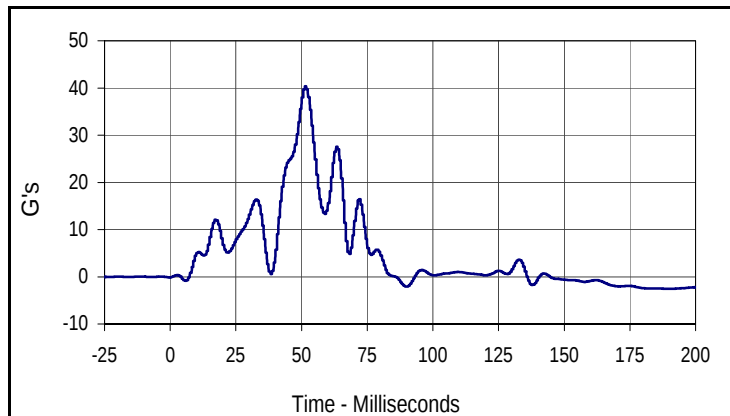
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Left Sill at Rear Door Y Velocity
Vehicle Left Sill at Front Door Y Velocity
Vehicle Left Front Door C/L Y
Vehicle Right Rear Occupant Compartment
Vehicle Left Front Door Mid Rear Y
Vehicle Left Front Door Upper CL Y
Vehicle Left Front Door CL Y Velocity
Vehicle Right Rear Occupant Compartment Y Velocity
Vehicle Left Front Door Mid Rear Y Velocity
Vehicle Left Rear Door Upper CL Y Velocity
Vehicle Left Rear Door Mid Rear Y
Vehicle Left Rear Door Upper C/L Y
Vehicle Left Rear Door Mid Rear Y Velocity
Vehicle Left Rear Door Upper CL Y Velocity
Vehicle B-Post Lower Y
Vehicle B-Post Middle Y
Vehicle B-Post Lower Y Velocity
Vehicle B-Post Middle Y Velocity
Vehicle A-Post Lower Y
Vehicle A-Post Middle Y
Vehicle A-Post Lower Y Velocity
Vehicle A-Post Middle Y Velocity
Vehicle Left Front Seat Track
Vehicle Rear Seat Structure
Vehicle Left Front Seat Track Y Velocity
Vehicle Rear Seat Structure Y Velocity
Vehicle CG X
Vehicle CG Y
Vehicle CG Z
Vehicle CG Resultant
Vehicle CG X Velocity
Vehicle CG Y Velocity
Vehicle CG Z Velocity

LIST OF DATA PLOTS...(CONTINUED)

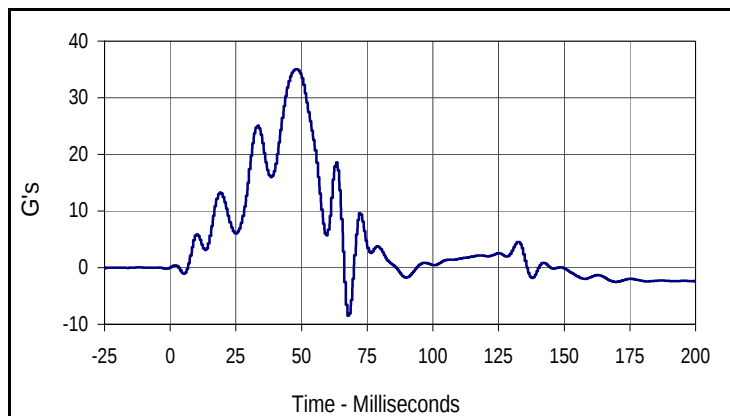
Driver Upper Rib Primary Y
Driver Lower Rib Primary Y
Driver Lower Spine Primary Y
Driver Pelvis Primary Y
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Passenger Upper Rib Primary Y
Passenger Lower Rib Primary Y
Passenger Lower Spine Primary Y
Passenger Pelvis Primary Y
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
MDB CG X
MDB CG Y
MDB CG Z
MDB CG Resultant
MDB CG X Velocity
MDB CG Y Velocity
MDB CG Z Velocity
MDB Rear X
MDB Rear Y
MDB Rear X Velocity
MDB Rear Y Velocity
MDB Right Bumper Contact

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

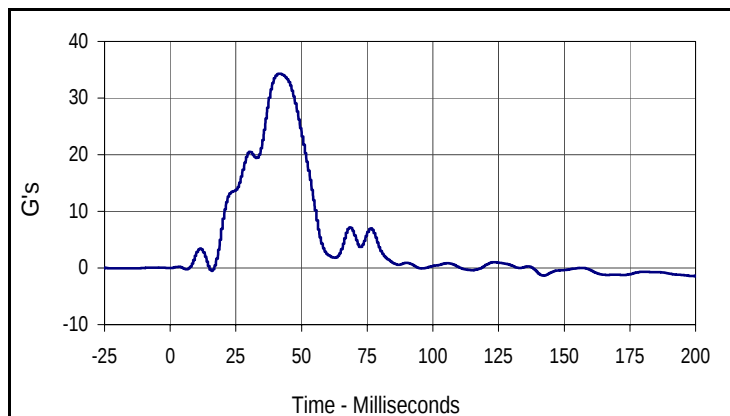
Test Date: 10/15/07
 NHTSA No.: M80513



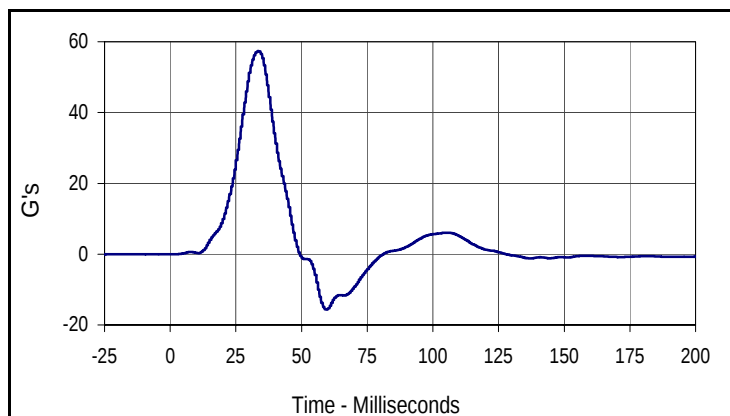
Curve Description			
Driver Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIR	FIR100	G's
Max	Time	Min	Time
40.4	51.3	-2.6	190.0



Curve Description			
Driver Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIR	FIR100	G's
Max	Time	Min	Time
35.0	48.2	-8.5	67.5



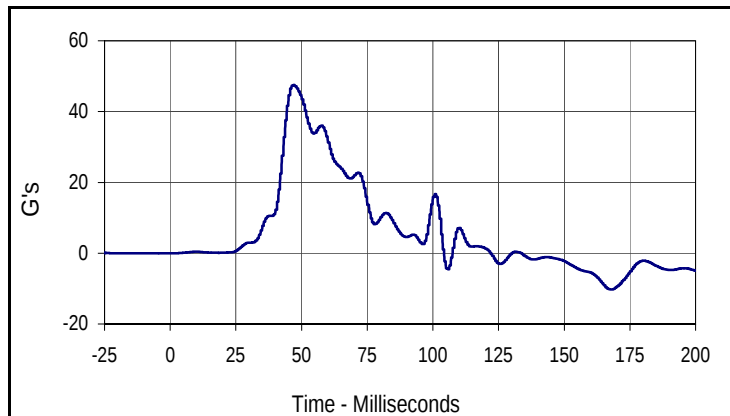
Curve Description			
Driver Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIR	FIR100	G's
Max	Time	Min	Time
34.3	41.3	-1.7	233.8



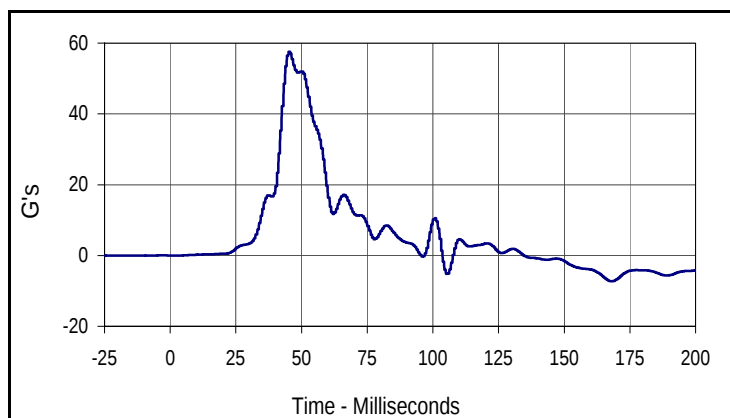
Curve Description			
Driver Pelvis Y Primary			
CURNO	Type	SAE Class	Units
004	FIR	FIR100	G's
Max	Time	Min	Time
57.4	33.2	-15.6	59.4

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

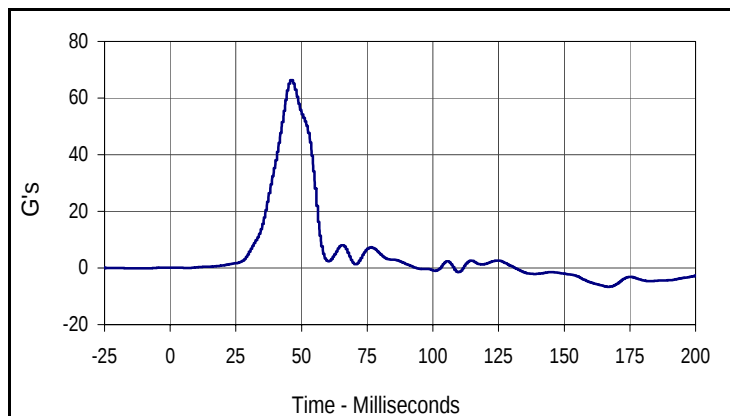
Test Date: 10/15/07
 NHTSA No.: M80513



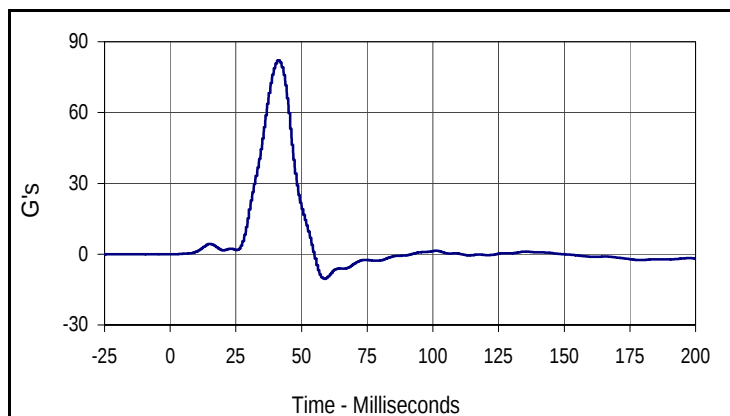
Curve Description			
Passenger Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
005	FIR	FIR100	G's
Max	Time	Min	Time
47.5	46.9	-10.3	167.5



Curve Description			
Passenger Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
006	FIR	FIR100	G's
Max	Time	Min	Time
57.6	45.0	-7.7	224.4



Curve Description			
Passenger Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
007	FIR	FIR100	G's
Max	Time	Min	Time
66.4	45.7	-6.6	166.9



Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
008	FIR	FIR100	G's
Max	Time	Min	Time
82.1	41.3	-10.4	58.8

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: SID / HIII External Measurements
ATD Serial No.: 274

Test Date: 10/11/07
Test I.D.: N/A



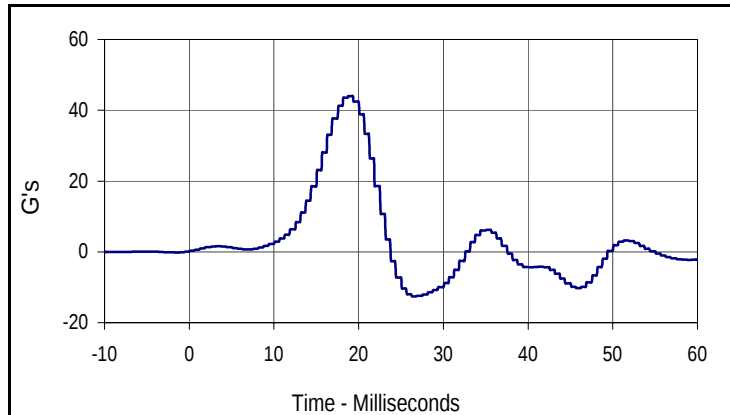
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	894	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	518	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	370	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 274

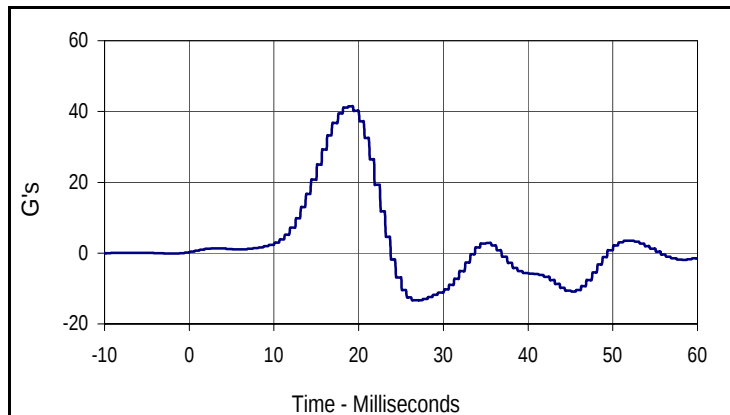
Test Date: 10/11/07
 Test I.D.: TH10M



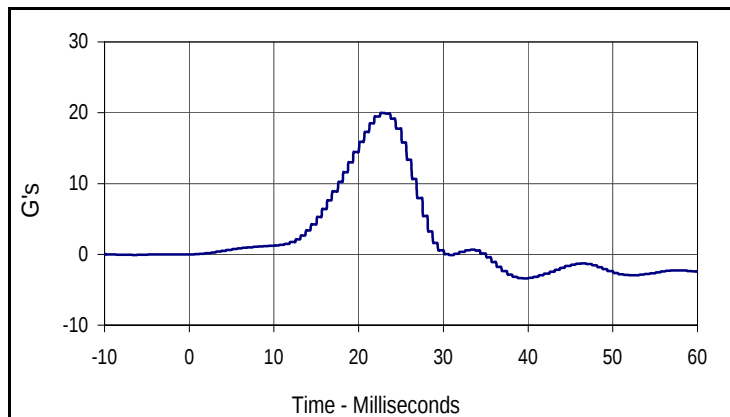
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	44.0	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.9	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
44.0	18.8	-12.5	26.3



Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.4	18.8	-13.3	26.9



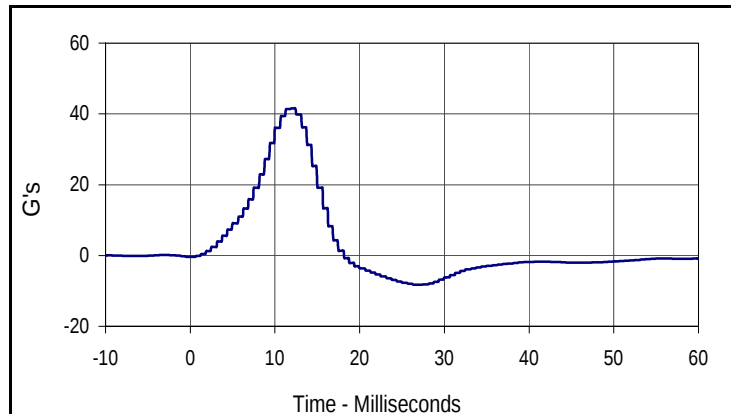
Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.9	22.6	-3.4	39.4

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 274

Test Date: 10/11/07
 Test I.D.: PL10M



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.32	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	41.5	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.70	Pass
Overall Test Results				Pass



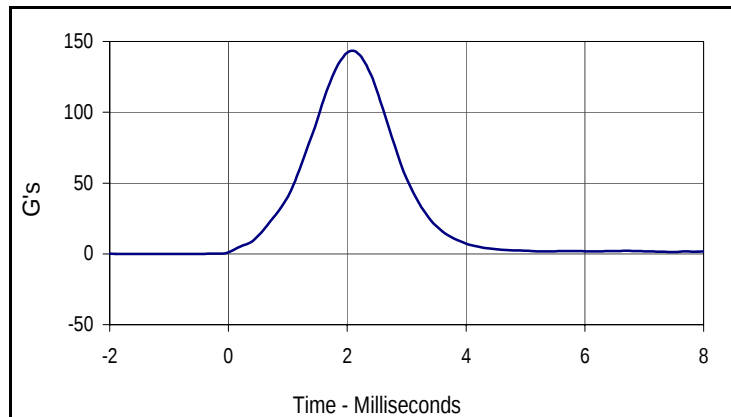
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.5	11.9	-8.3	26.9

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 274

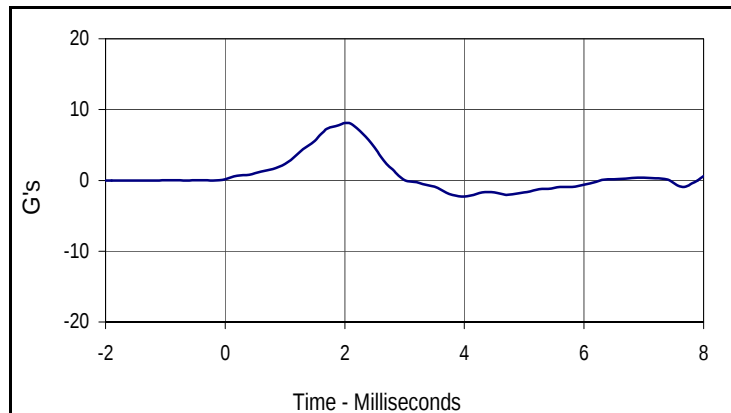
Test Date: 10/11/07
 Test I.D.: HD10M



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	143.5	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.5	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
143.5	2.1	0.0	-0.8



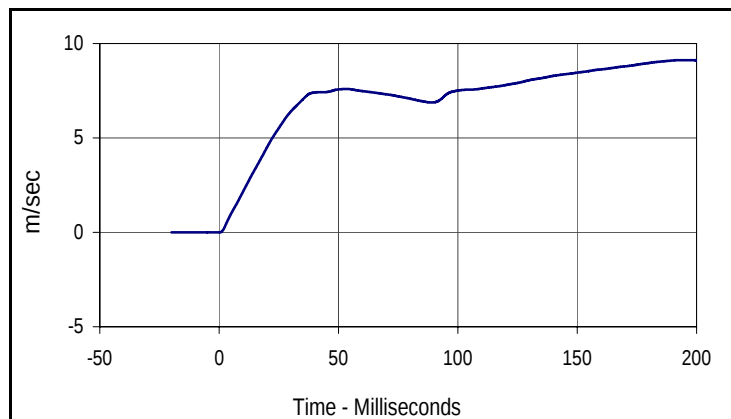
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.1	2.0	-2.3	4.0

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 274

Test Date: 10/11/07
 Test I.D.: NB10M



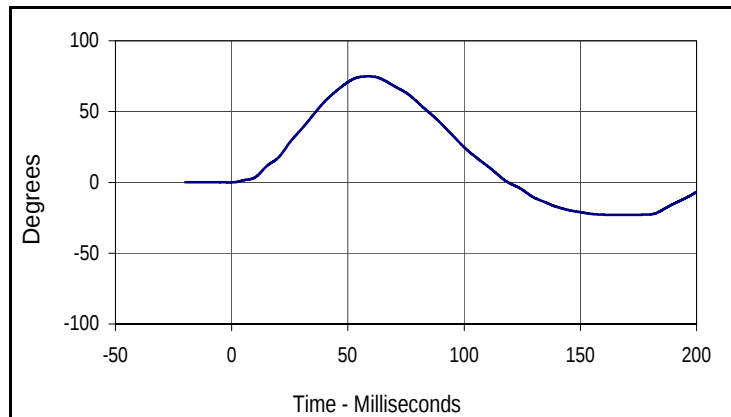
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.16	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.49	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.40	Pass
	40 to 70	m/sec	6.27 to 7.64	7.60	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	74.9	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.7	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.0	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	86.4	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	51.0	Pass
Overall Test Results				Pass	



Curve Description

Pendulum Velocity

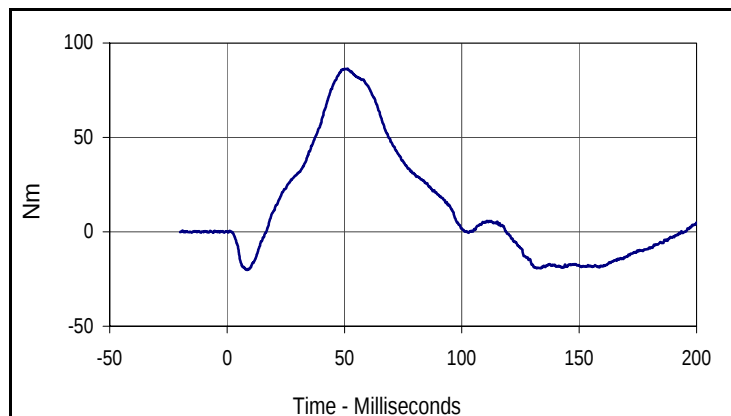
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.1	192.7	0.0	0.0



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
74.9	58.9	-23.0	165.2



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
86.4	51.2	-20.2	8.6

Test Program: SID / HIII External Measurements
 ATD Serial No.: 275

Test Date: 10/11/07
 Test I.D.: N/A



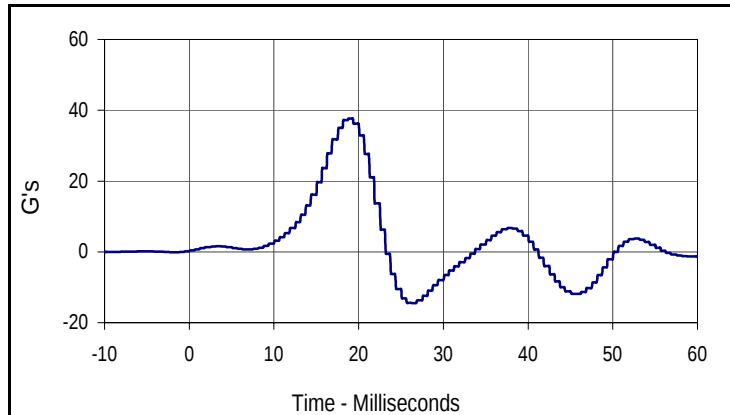
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	896	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	511	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	514	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	359	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 275

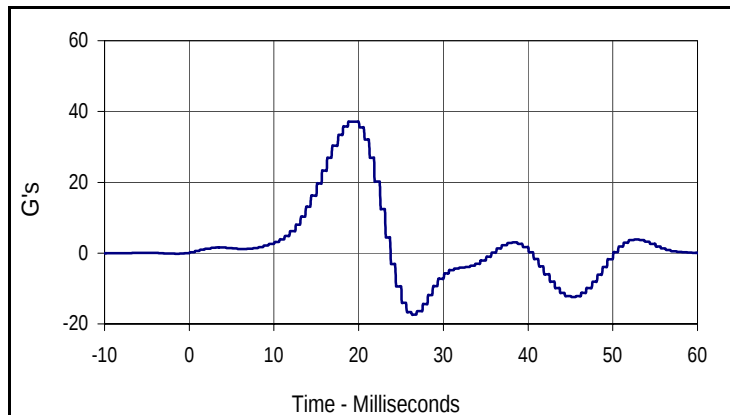
Test Date: 10/11/07
 Test I.D.: TH10L



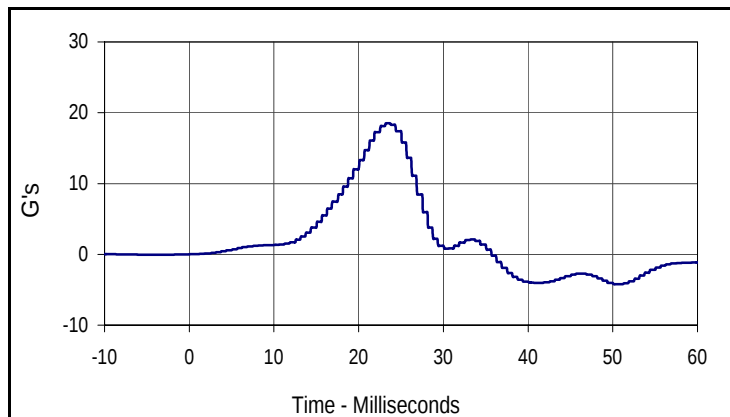
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	37.7	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.1	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	18.5	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
37.7	18.8	-14.5	26.3



Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.1	19.4	-17.4	26.3



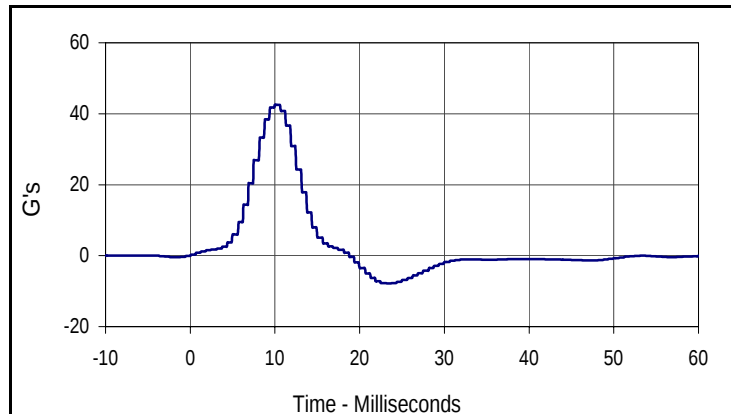
Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
18.5	23.2	-4.2	50.7

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 275

Test Date: 10/11/07
 Test I.D.: PL10L



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.5	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	4.90	Pass
Overall Test Results				Pass



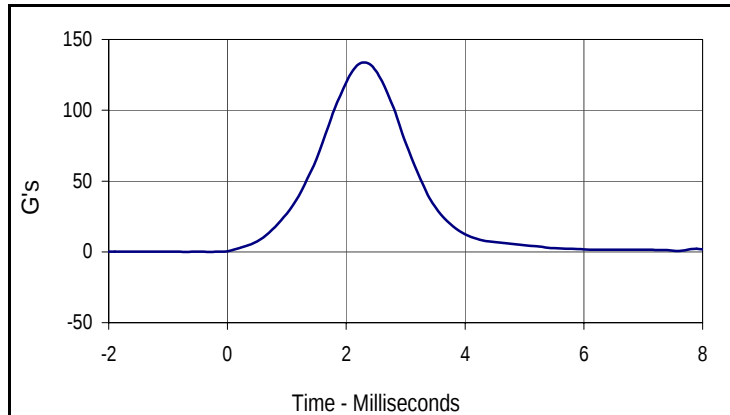
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.5	10.0	-7.9	23.2

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 275

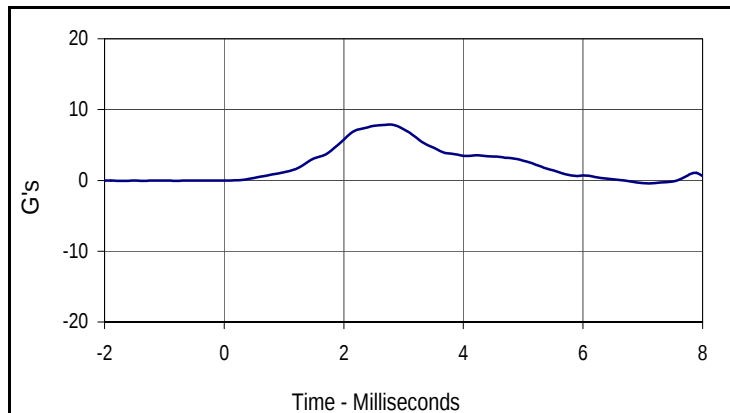
Test Date: 10/11/07
 Test I.D.: HD10L



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	133.8	Pass
Peak Longitudinal Acceleration	G's	≤15.0	7.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	3.5	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
133.8	2.3	0.0	-0.3



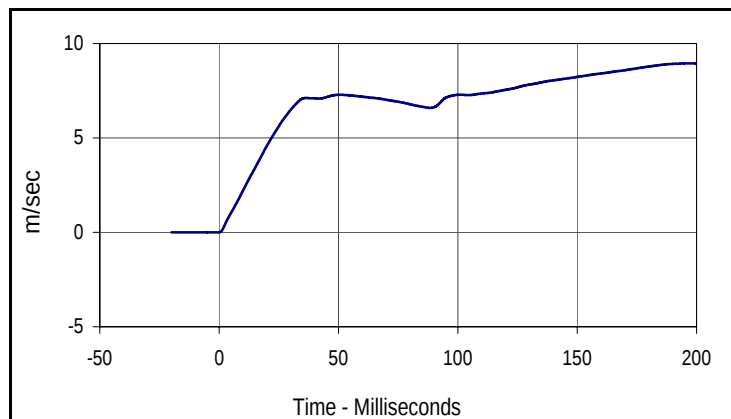
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.9	2.8	-0.1	-1.3

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 275

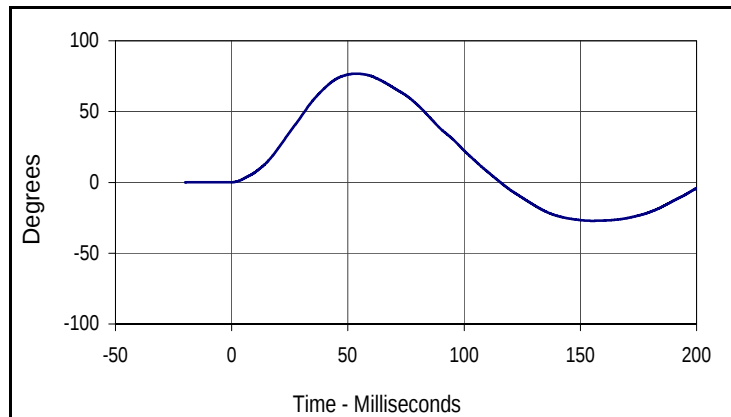
Test Date: 10/11/07
 Test I.D.: NB10L



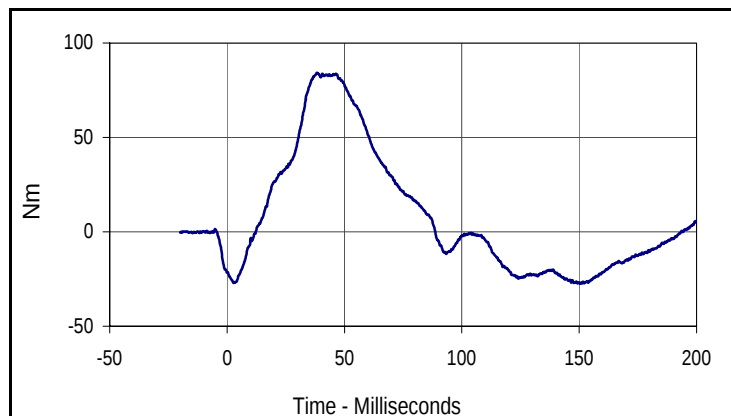
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.22	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.58	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.50	Pass
	40 to 70	m/sec	6.27 to 7.64	7.29	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	76.8	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	15.4	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	62.0	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	84.3	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.4	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.9	196.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.8	53.7	-27.1	155.3



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
84.3	38.3	-27.4	151.0

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

Test Program: SID / HIII External Measurements
ATD Serial No.: 274

Test Date: 10/6/07
Test I.D.: N/A



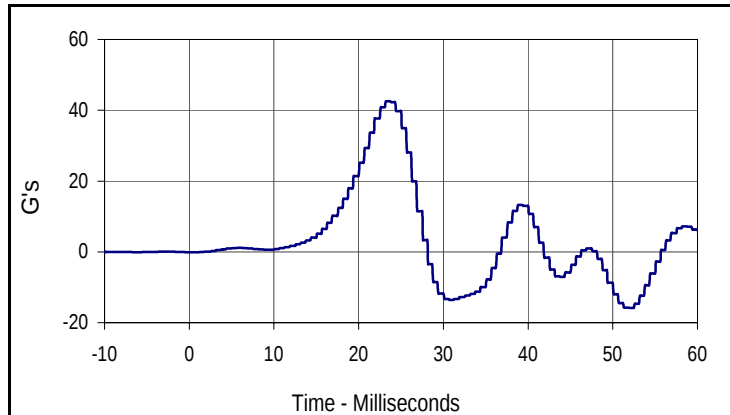
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	898	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	515	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	364	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 274

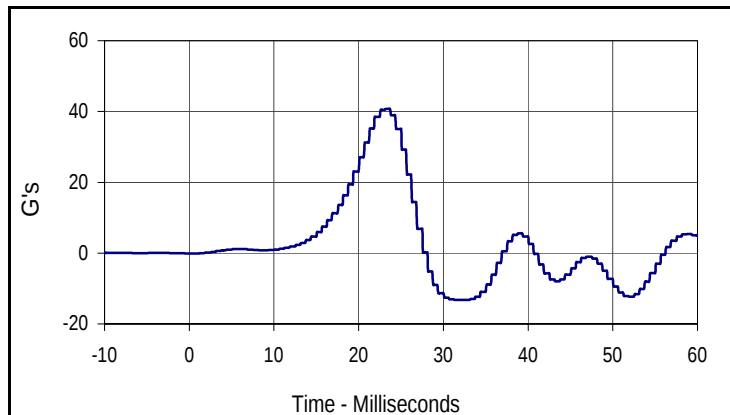
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 Test I.D.: TH10N



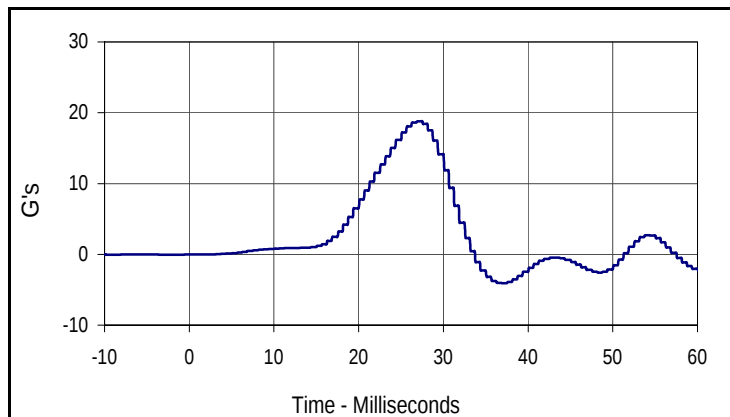
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.31	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.6	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.8	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	18.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.6	23.2	-15.8	51.9



Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.8	23.2	-13.2	31.9



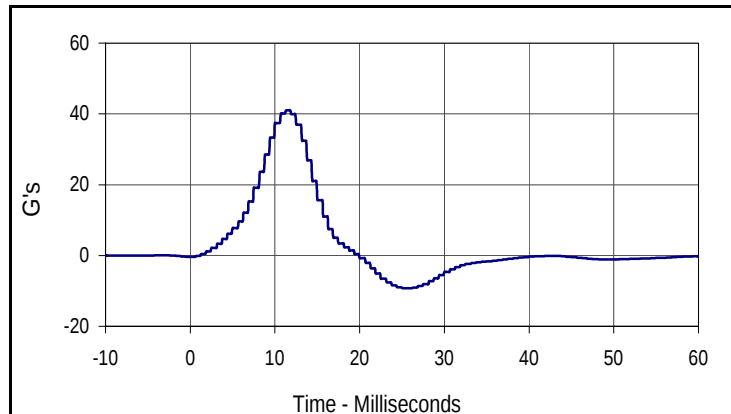
Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
18.8	26.9	-4.1	36.9

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 274

Test Date: 10/16/07
 Test I.D.: PL10N



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.32	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	41.0	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.70	Pass
Overall Test Results				Pass



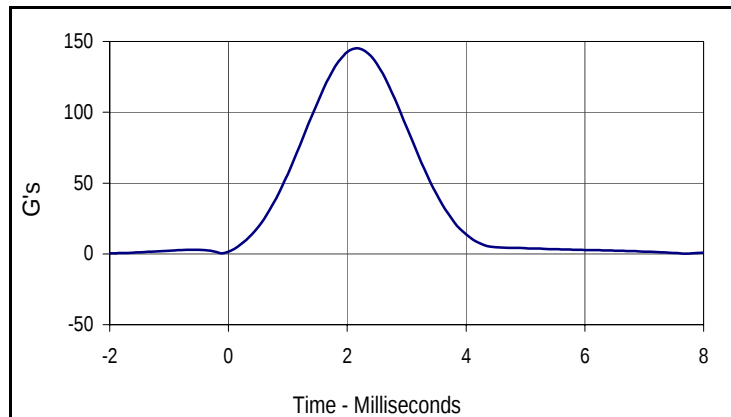
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.0	11.3	-9.3	25.7

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 274

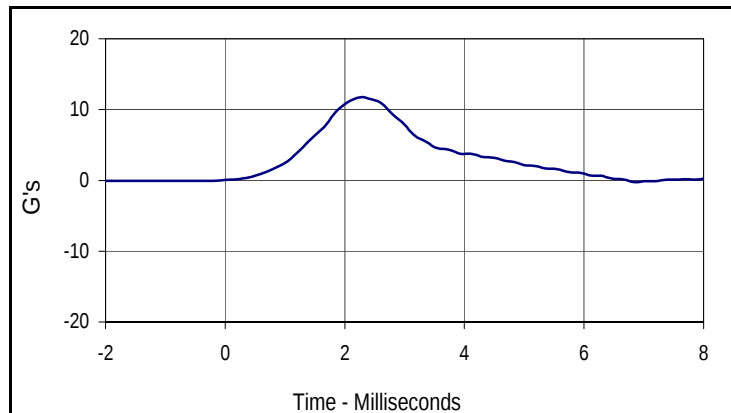
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 Test I.D.: HD10N



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	145.0	Pass
Peak Longitudinal Acceleration	G's	≤15.0	11.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.7	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
145.0	2.2	0.4	-2.0



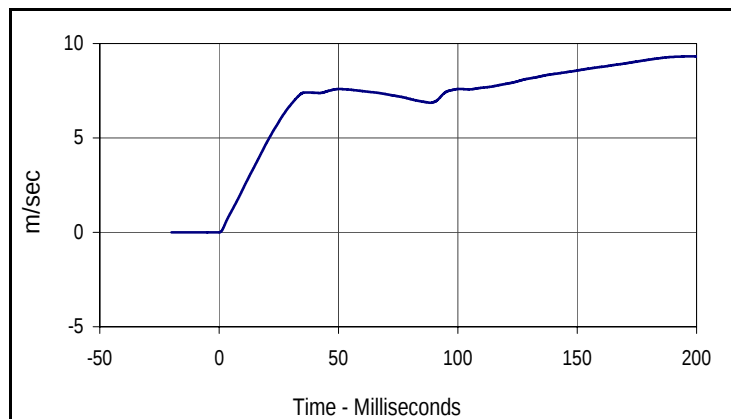
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
11.8	2.3	-0.1	-0.4

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 274

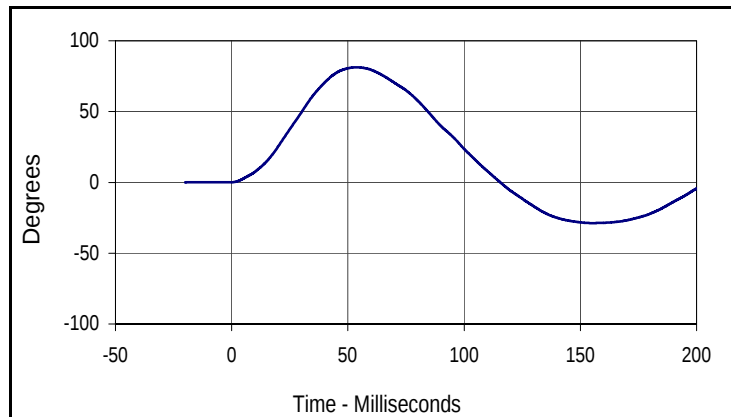
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 Test I.D.: NB10N



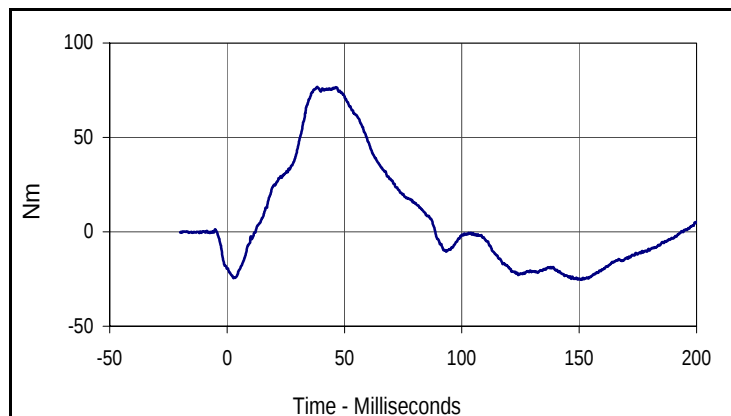
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.31	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.77	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.76	Pass
	40 to 70	m/sec	6.27 to 7.64	7.59	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	81.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	15.4	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	61.9	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	76.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.4	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.3	196.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
81.3	53.7	-28.8	155.3



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
76.8	38.3	-25.3	151.1

Test Program: SID / HIII External Measurements
 ATD Serial No.: 275

Test Date: 10/16/07
 Test I.D.: N/A



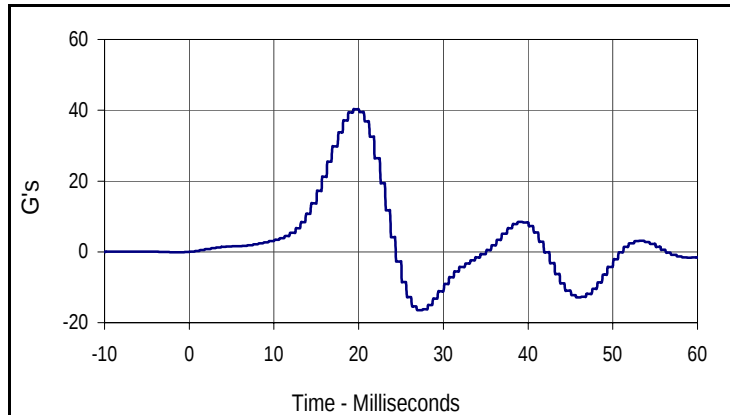
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	898	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	512	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	515	Pass
KV- Knee Pivot From Floor	mm	490 to 505	496	Pass
HW- Hip Width	mm	356 to 391	362	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 275

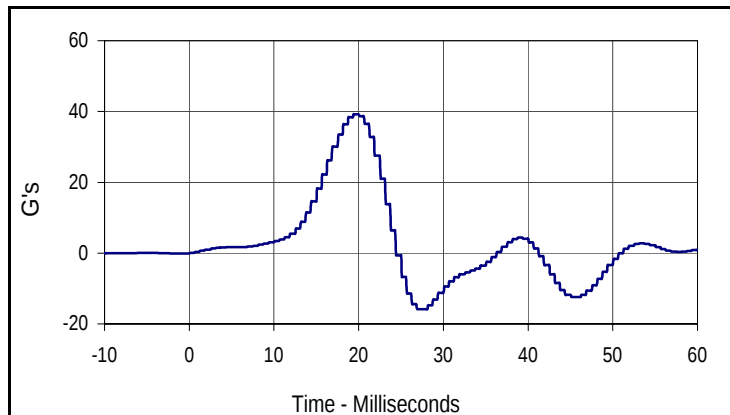
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 Test I.D.: TH100



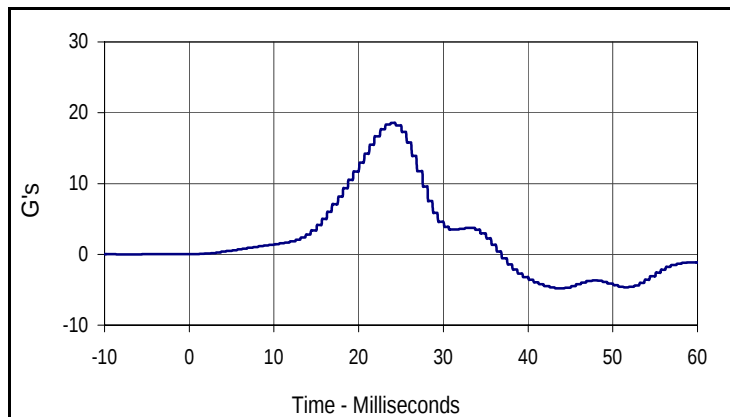
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.30	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.3	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	39.2	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	18.5	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.3	19.4	-16.4	26.9



Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
39.2	19.4	-15.8	27.6



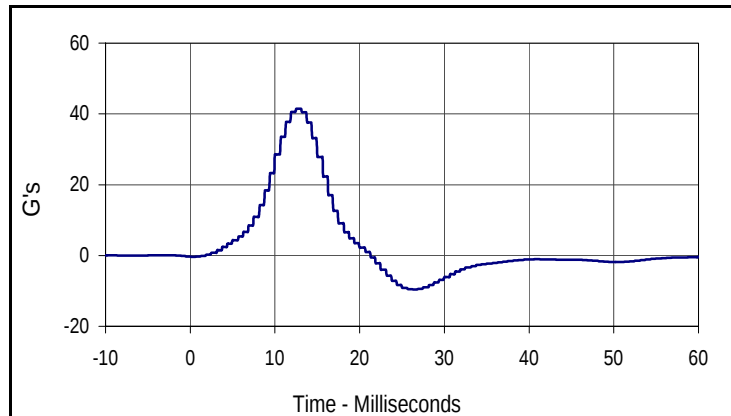
Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
18.5	23.8	-4.8	43.8

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 275

Test Date: 10/16/07
 Test I.D.: PL10N



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.32	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	41.5	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.50	Pass
Overall Test Results				Pass



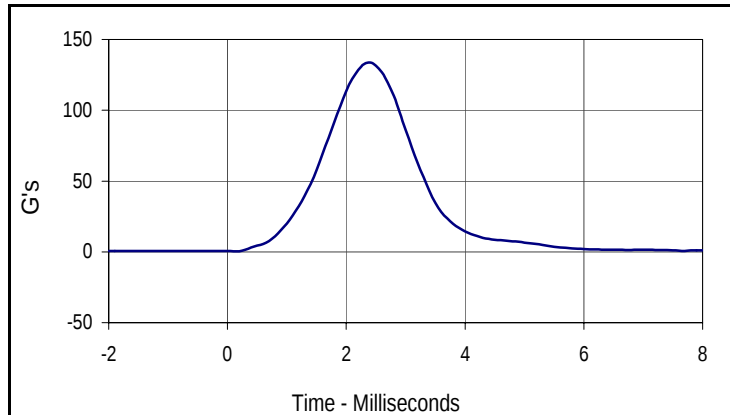
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.5	12.5	-9.6	26.3

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 275

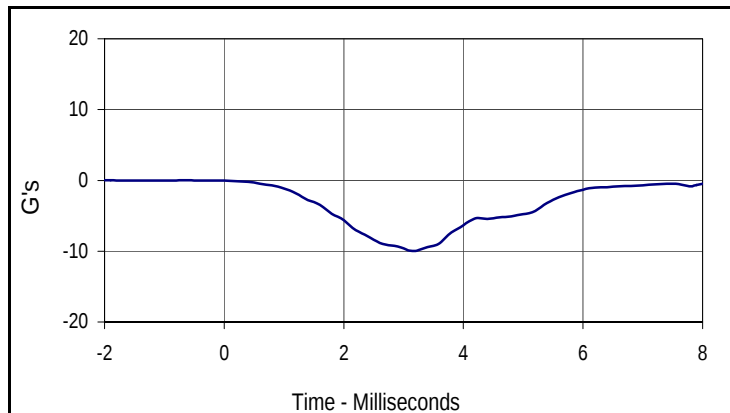
Test Date: 10/16/07
 Test I.D.: HD100



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	133.6	Pass
Peak Longitudinal Acceleration	G's	≤15.0	9.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	4.9	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
133.6	2.4	0.5	0.2



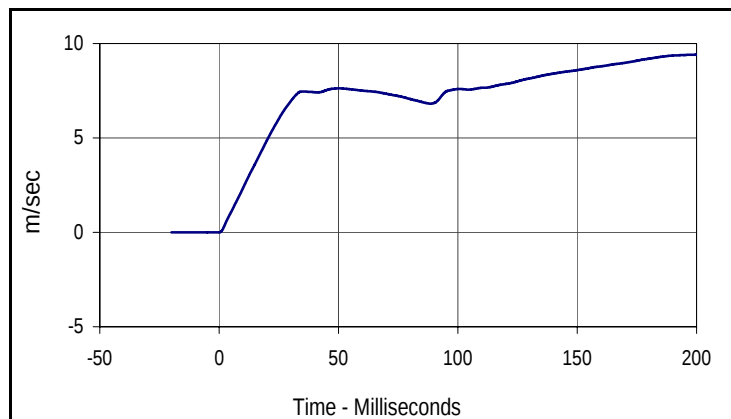
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-2.0	-9.9	3.2

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 275

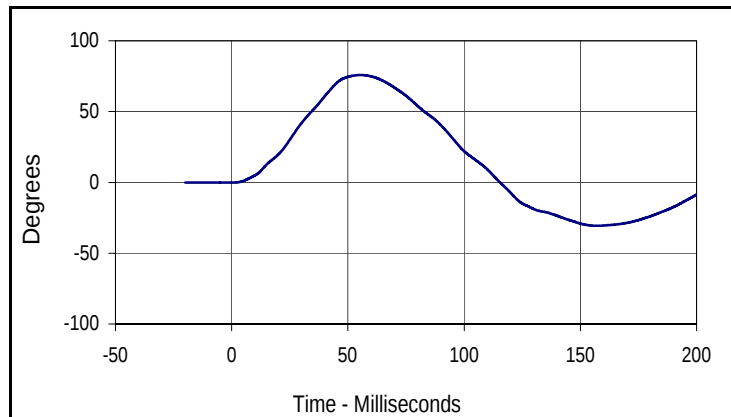
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 Test I.D.: NB100



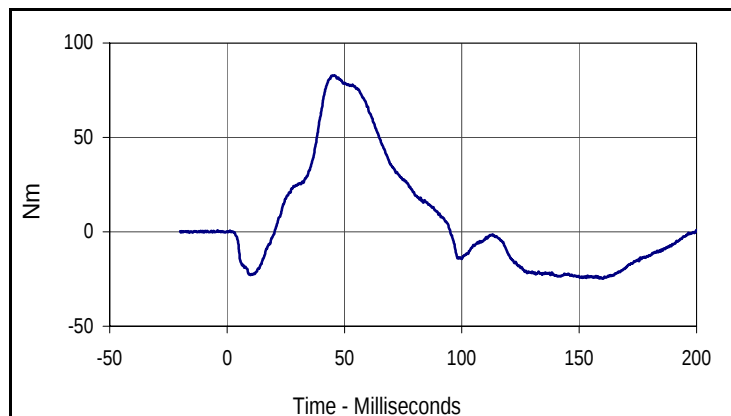
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.03	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.35	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.87	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.95	Pass
	40 to 70	m/sec	6.27 to 7.64	7.62	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	75.8	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.8	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.1	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	82.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.7	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.4	198.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
75.8	55.3	-30.7	157.1



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
82.8	45.5	-24.8	160.2

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P28003-06-NC

**NEW CAR ASSESMENT PROGRAM
SIDE IMPACT TEST**

**SUZUKI MOTOR CORPORATION JAPAN
2008 SUZUKI SX4
4-DOOR**

NHTSA NUMBER: M80513

**Prepared By:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301**



OCTOBER 15, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
RULEMAKING
MAIL CODE: NVS-111
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-32005.

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Date: October 15, 2007

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Date: October 15, 2007

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Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

Date: October 15, 2007

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P28003-05	2. Government Accession No.	3. Recipients Catalog No.	
4. Title and Subtitle Final report of a Graco Snugride CRS. NHTSA No. M80501		5. Report Date October 9, 2007	
		6. Performing Organization Code KAR	
7. Authors Mr. Kelsey A. Chiu, Project Engineer, KARCO Mr. Frank Richardson, Program Manager, KARCO		8. Performing Organization Report No. TR-P28003-05	
9. Performing Organization Name and Address Karco Engineering, LLC 9270 Holly Rd. Adelanto, CA, 92301		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-03-D-32005	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NVS-111 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C 20590		13. Type of Report and Period Covered Final Test Report	
		14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS	
15. Supplementary Notes			
16. Abstract A side impact test was conducted on the subject CRS Graco Snugride in conjunction with side impact NCAP testing on a 2008 BMW 528i 4-Door Sedan, and in accordance with the specifications of the Office of Crahsworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at KARCO Engineering, LLC, on October 9, 2007.			
Measurement Description	Units	Threshold	Right Rear (P3)
Head Injury Criteria (HIC 15)	N/A	390	51.0
3 msec. Chest Clip	G's	50	18.2
17. Key Words New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Final report of a Graco Snugride CRS		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 1200 New Jersey Ave., SE, Room W43-410 Washington, DC 20590	
19. Security Classification of this report UNCLASSIFIED	20. Security Classification of this page UNCLASSIFIED	21. No. of Pages 43	22. Price

Form DOT F1700.7 (8-72)

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SECTION D-1
PURPOSE AND SUMMARY OF TEST M80501

The purpose of this test is to obtain CRS performance data during a 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test

The Side Impact NCAP test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

One 12-month old CRABI (P3) was instrumented with head, chest, and six-axis upper neck load cells. A tri-axial accelerometer was installed on the CRS and the CRS base. Seat belt load cells were placed on the inboard and outboard lower tethers.

The right rear (Serial No. 022) CRABI was calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC 15 Value	3 msec. Chest Clip
CRABI (P3)	109.8	27.7

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007

CHILD RESTRAINT INFORMATION

Description	Position #3 CRS
Manufacturer	Graco
Model Name	Snugride
Model No.	8645HEM3
Type	Infant
Forward/Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS
Head Contact	Right side of CRS
Chest Contact	None
Abdomen Contact	None
Left Knee Contact	None
Right Knee Contact	None
Left Toe Contact	Seatback, Right foot
Right Toe Contact	None

POST-TEST DOOR OPENINGS

Description	Position #3 CRS
Right Rear Door	Remained closed and latched, opened without tools

CAMERAS

Description	Standard
High Speed	1
Real Time	0
Total	1

DATA CHANNELS

CRABI (P3) Sensors	13
Belt Sensors	2
CRS Sensors	6
Total	21

DATA SHEET NO. 2**VEHICLE PARAMETER DATA**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UWV)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	418	277	695	473	342	815
Right	kg	407	260	667	425	309	734
Ratio	%	60.6	39.4	100.0	58.0	42.0	100.0
Total	kg	825	537	1362	898	651	1549

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UWV)	kg	1363
Weight of 2 P572 ATDs	kg	162
Rated Cargo/Luggage Wt (RCLW)	kg	29
Calculated Vehicle Target Wt (TVTW)	kg	1554

DATA SHEET NO. 3

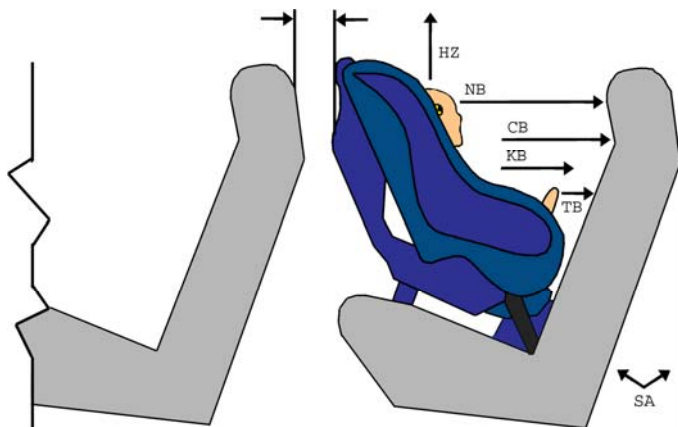
CRABI POSITIONING IN VEHICLE

Test Vehicle: 2008 Suzuki SX4 4-Door

NHTSA No.: M80513

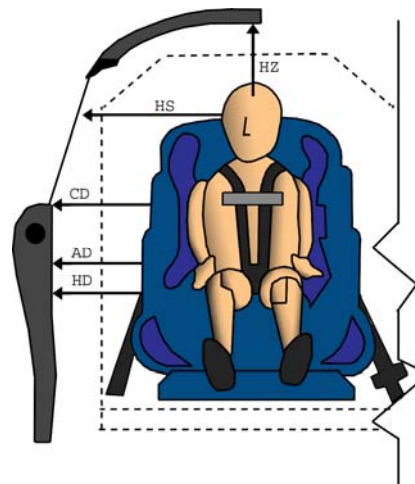
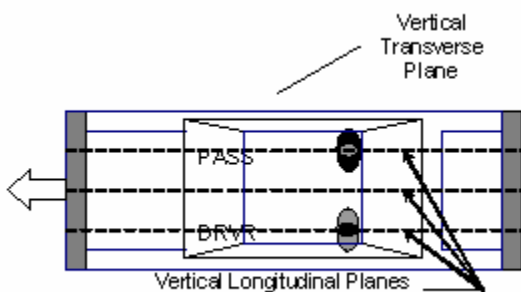
Test Program: 55/28 km/h Side Impact NCAP

Test Date: 10/15/2007



AD	Arm to Door
CD	Chest to Door
HD	H-Point to Door
HS	Head to Side Window
KK	Knee to Knee
TT	Toe to Toe

CB	Chest to Seat Back
HZ	Head to Roof
KB	Knee to Seat Back
NB	Nose to Seat Back
SA	Seat Back Angle
TB	Toe to Seat Back



DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO. 3...(CONTINUED)**CRABI POSITIONING IN VEHICLE**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**CRABI POSITION MEASUREMENTS**

Code	Measurement	P3 (Passenger's Side)	
		Length (mm)	Angle (°)
SA	Seatback Angle		26.0
HZ	Head to Roof (Z)	438	
CD	Chest to Door	360	
KK	Knee to Knee (Y)	120	
HS	Head to Side Window	310	
HD	H-Point to Door (Y)	284	
AD	Arm to Door	260	
NB	Nose to Seatback	574	
CB	Chest to Seatback	473	
FF	Foot to Foot	120	
KB-Left	Knee to Seatback	205	
KB-Right	Knee to Seatback	205	
TB-Left	Toe to Seatback	75	
TB-Right	Toe to Seatback	78	

DATA SHEET NO. 4**CRS PERFORMANCE DATA**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**CRS PERFORMANCE DATA**

Location	CRS (P3)	
	Damage	Post-Test
Upper Tether Strap		
Upper Tether Buckle		
Upper Tether Hook		
Veh. Upper Tether Anchor		
Lower Anchor Strap	No	No
Lower Anchor Buckle	No	No
Lower Anchor Hooks	No	No
Veh. Lower CRS Anchors	No	No
5-Point Harness Connections	No	No
Cracks on CRS	No	No
Fabric Tears on CRS	No	No
Vehicle Seat Structure	No	No
Vehicle Seat Fabric Tears	No	No

DATA SHEET NO. 5**CRS ACCELEROMETER LOCATIONS**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**CRS ACCELEROMETER PRE-TEST LOCATIONS**

Loc No.	Accelerometer Location	Measurements		
		X	Y	Z
1	CRS	1510	470	910
2	CRS Base	1430	510	790

Reference Planes: X = From Rear Surface of Vehicle, Y = Vehicle Centerline, Z = Ground Plane

DATA SHEET NO. 6**CRS CAMERA LOCATIONS AND DATA**Test Vehicle: 2008 Suzuki SX4 4-DoorNHTSA No.: M80513Test Program: 55/28 km/h Side Impact NCAPTest Date: 10/15/2007**CAMERA LOCATIONS**

No.	Camera View	Location (mm)			Angle (°)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Passenger CRS (O.B.)	692	2129	-1332	-2	n/a	10	1000

X = Barrier Face, Y = Monorail, Z = Ground, DNR = Did Not Run, NTM = No Time Marks

SECTION D2

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure		Page
1	Close-up, Position 3 CRS Label	D-1
2	Pre-Test Frontal View of Position 3 CRS	D-2
3	Post-Test Frontal View of Position 3 CRS	D-3
4	Pre-Test Rear View of Position 3 CRS	D-4
5	Post-Test Rear View of Position 3 CRS	D-5
6	Pre-Test Left Side View of Position 3 CRS	D-6
7	Post-Test Left Side View of Position 3 CRS	D-7
8	Pre-Test Right Side View of Position 3 CRS	D-8
9	Post-Test Right Side View of Position 3 CRS	D-9
10	Pre-Test Position 3 Front View (Head and Seat Belt Position)	D-10
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13	Post-Test Position 3 Front View (Seat Belt Position)	D-13
14	Pre-Test Position 3 Right Side View	D-14
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17	Post-Test Position 3 Left Side View	D-17
18	Post-Test Position 3 Dummy Legs	D-18

MODEL **8645HEM3**

NAME **SNUGRIDE**

Manufactured in 081607 10

GRACO CHILDREN'S PRODUCTS, INC.

EXTON, PA 19341 1-800-345-4109

Made in U.S.A.

PB-25777

Figure D2-1: Position 3 CRS Label



Figure D2-2: Pre-Test Frontal View of Position 3 CRS



Figure D2-3: Post-Test Frontal View of Position 3 CRS



Figure D2-4: Pre-Test Rear View of Position 3 CRS



Figure D2-5: Post-Test Rear View of Position 3 CRS



Figure D2-6: Pre-Test Left Side View of Position 3 CRS



Figure D2-7: Post-Test Left Side View of Position 3 CRS



Figure D2-8: Pre-Test Right Side View of Position 3 CRS



Figure D2-9: Post-Test Right Side View of Position 3 CRS



Figure D2-10: Pre-Test Position 3 Front View (Head and Seat Belt Position)



Figure D2-11: Post-Test Position 3 Front View (Head and Seat Belt Position)



Figure D2-12: Pre-Test Position 3 Front View (Seat Belt Position)



Figure D2-13: Post-Test Position 3 Front View (Seat Belt Position)



Figure D2-14: Pre-Test Position 3 Right Side View



Figure D2-15: Post-Test Position 3 Right Side View



Figure D2-16: Pre-Test Position 3 Right Side View (Through Window)



Figure D2-17: Post-Test Position 3 Right Side View (Through Window)



Figure D2-18: Post-Test Position 3 Dummy Legs

SECTION D3

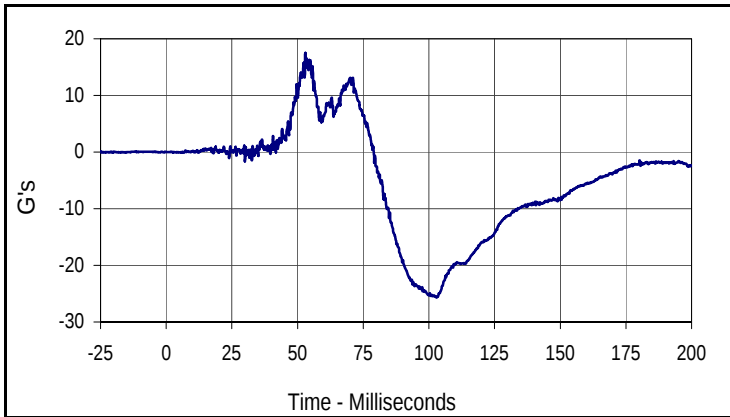
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

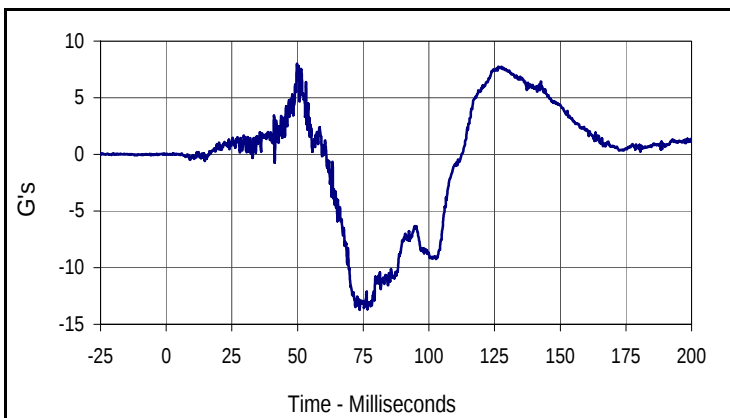
<u>Data Plot</u>	<u>Page</u>
D3-1	Right Rear CRABI Head X
	Right Rear CRABI Head Y
	Right Rear CRABI Head Z
	Right Rear CRABI Head Resultant
D3-2	Right Rear CRABI Chest X
	Right Rear CRABI Chest Y
	Right Rear CRABI Chest Z
	Right Rear CRABI Chest Resultant

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

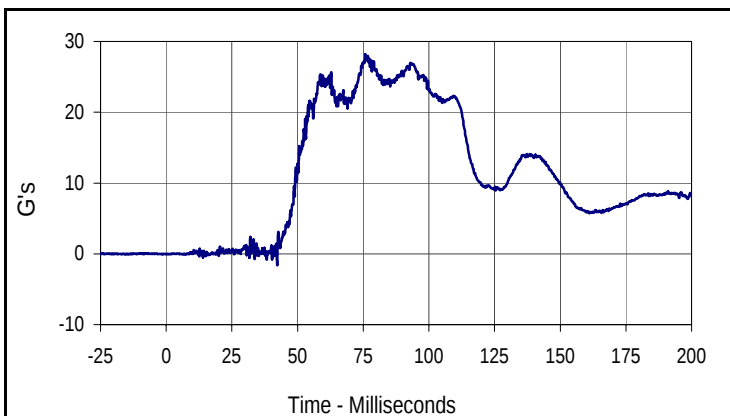
Test Date: 10/15/07
 NHTSA No.: M80513



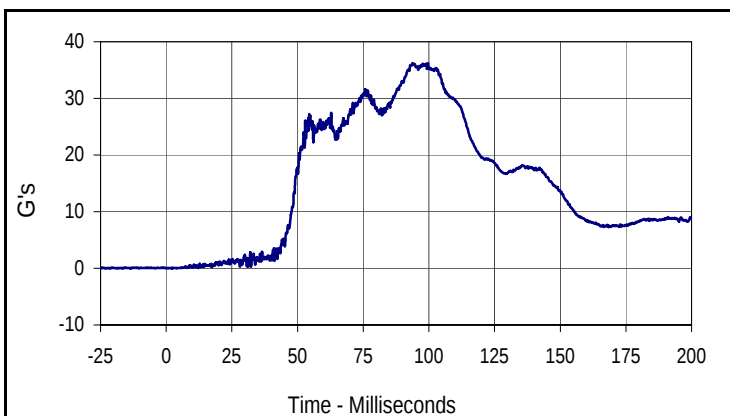
Curve Description			
CRABI Head X (P3)			
CURNO	Type	SAE Class	Units
072	FIL	1000	G's
Max	Time	Min	Time
17.5	53.0	-25.7	102.9



Curve Description			
CRABI Head Y (P3)			
CURNO	Type	SAE Class	Units
073	FIL	1000	G's
Max	Time	Min	Time
8.0	49.8	-13.7	73.7



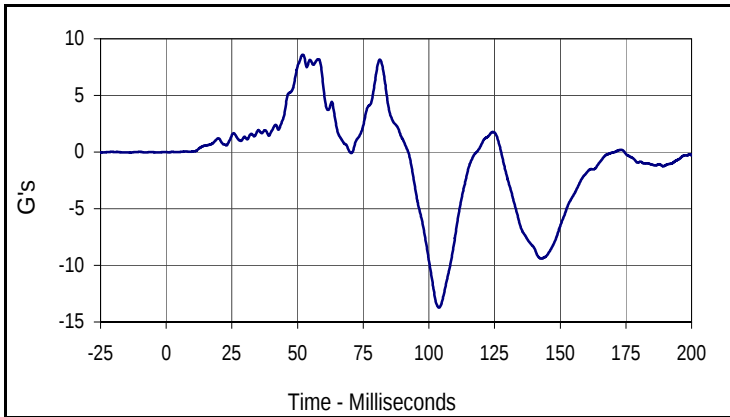
Curve Description			
CRABI Head Z (P3)			
CURNO	Type	SAE Class	Units
074	FIL	1000	G's
Max	Time	Min	Time
28.2	75.8	-1.6	42.2



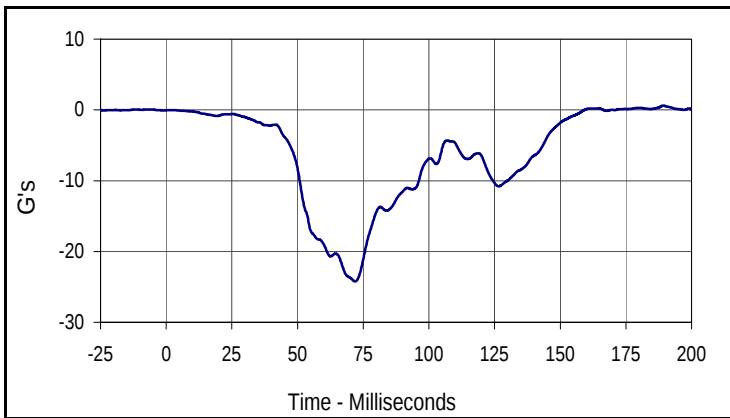
Curve Description			
CRABI Head Resultant (P3)			
CURNO	Type	SAE Class	Units
072	RES	1000	G's
Max	Time	Min	Time
36.2	93.8	0.0	2.4

Test Vehicle: 2008 Suzuki SX4 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

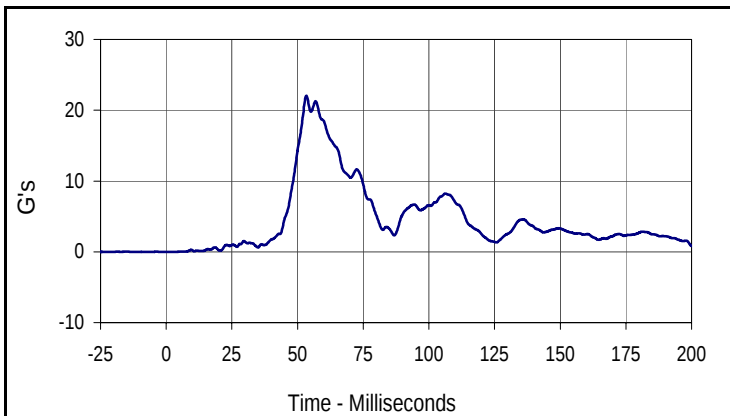
Test Date: 10/15/07
 NHTSA No.: M80513



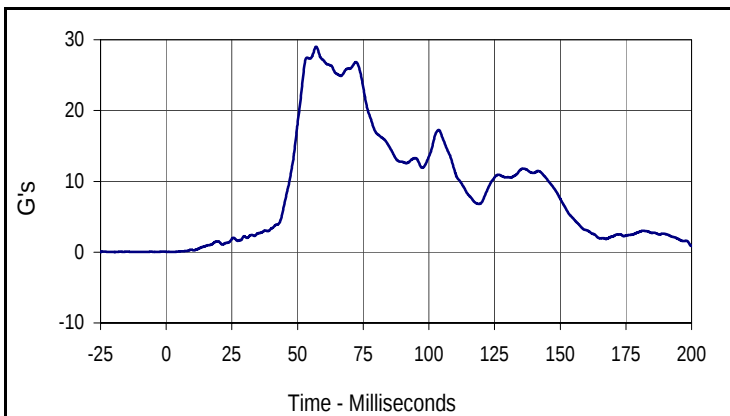
Curve Description			
CRABI Chest X (P3)			
CURNO	Type	SAE Class	Units
082	FIL	180	G's
Max	Time	Min	Time
8.6	52.0	-13.7	103.9



Curve Description			
CRABI Chest Y (P3)			
CURNO	Type	SAE Class	Units
083	FIL	180	G's
Max	Time	Min	Time
0.6	189.3	-24.2	71.9



Curve Description			
CRABI Chest Z (P3)			
CURNO	Type	SAE Class	Units
084	FIL	180	G's
Max	Time	Min	Time
22.1	53.4	0.0	0.5



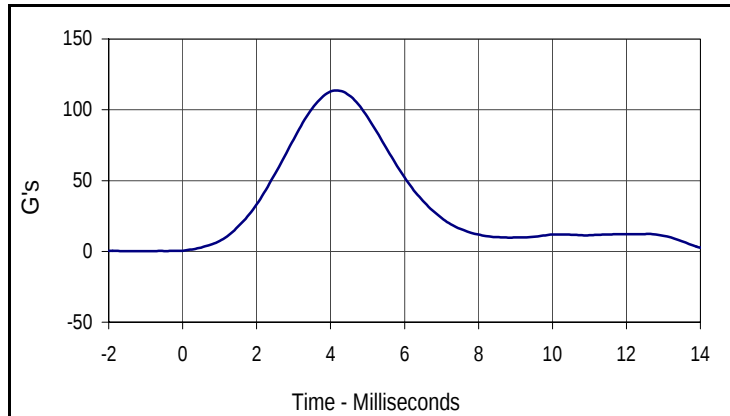
Curve Description			
CRABI Chest Resultant (P3)			
CURNO	Type	SAE Class	Units
082	RES	180	G's
Max	Time	Min	Time
29.0	57.1	0.0	3.2

SECTION D4

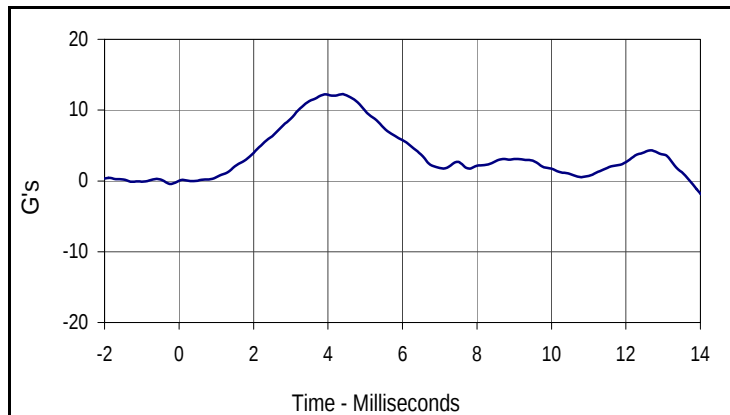
CRABI CALIBRATION INFORMATION

Test Program: CRABI 12 Month Old Frontal Head Drop TestTest Date: 10/4/07ATD Serial No.: 022Test I.D.: FHD10J

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	100.0 to 120.0	113.6	Pass
Peak Lateral Acceleration	G's	≤15.0	12.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
113.6	4.2	0.1	-1.4



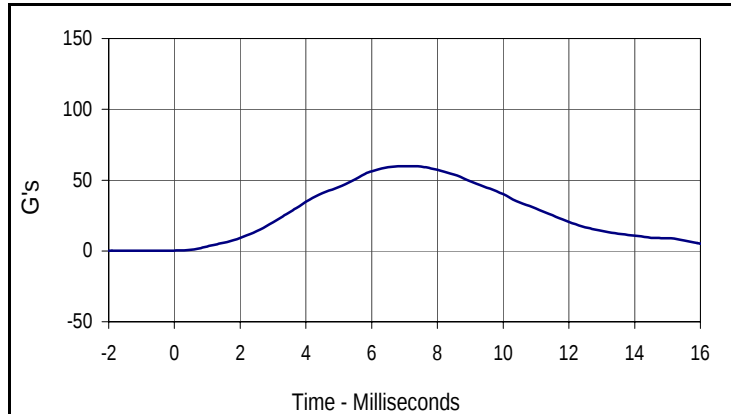
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
12.3	4.4	-0.4	-0.2

Test Program: CRABI 12 Month Old Rear Head Drop Test
 ATD Serial No.: 022

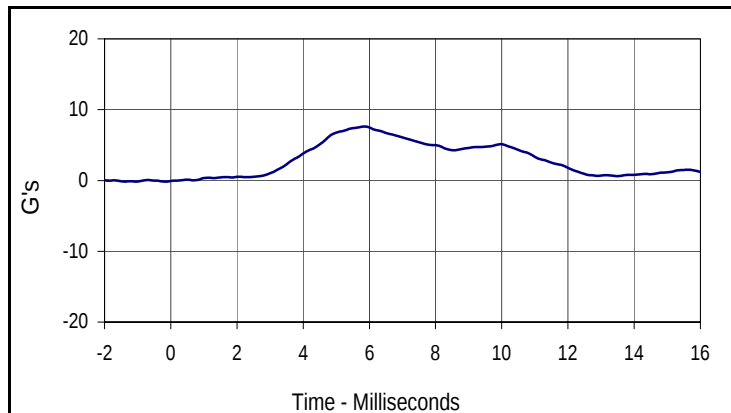
Test Date: 10/4/07
 Test I.D.: RHD10J



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	55.0 to 71.0	56.2	Pass
Peak Lateral Acceleration	G's	≤15.0	7.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
56.2	6.0	0.1	-0.9



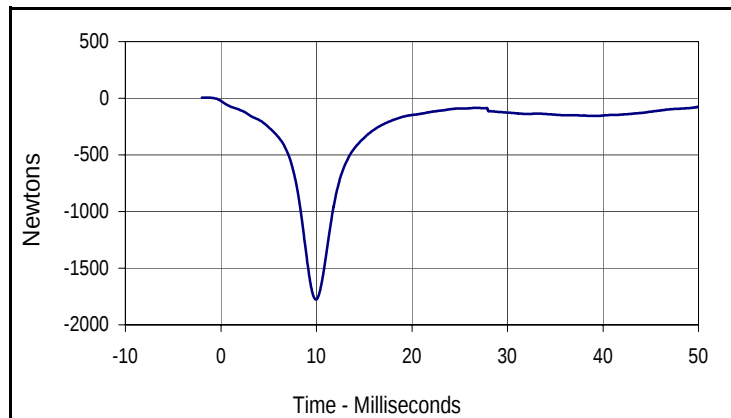
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.6	5.8	-0.2	-1.4

Test Program: CRABI 12 Month Old Thorax Impact Test
 ATD Serial No.: 022

Test Date: 10/4/07
 Test I.D.: CH10J



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 at T=0	m/sec	4.90 to 5.10	4.95	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1776	Pass
Overall Test Results				Pass



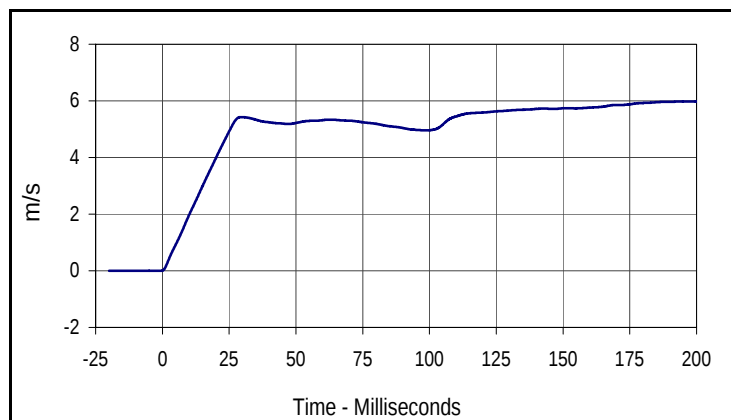
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
6.1	-1.6	-1776.2	10.0

Test Program: CRABI 12 Month Old Neck Flexion Test
 ATD Serial No.: 022

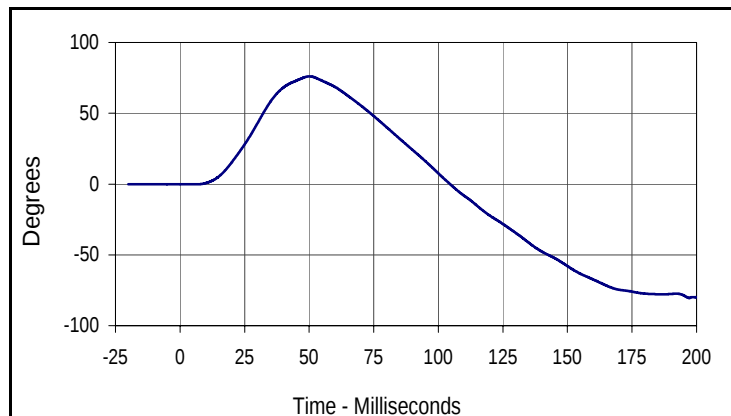
Test Date: 10/4/07
 Test I.D.: NF10J



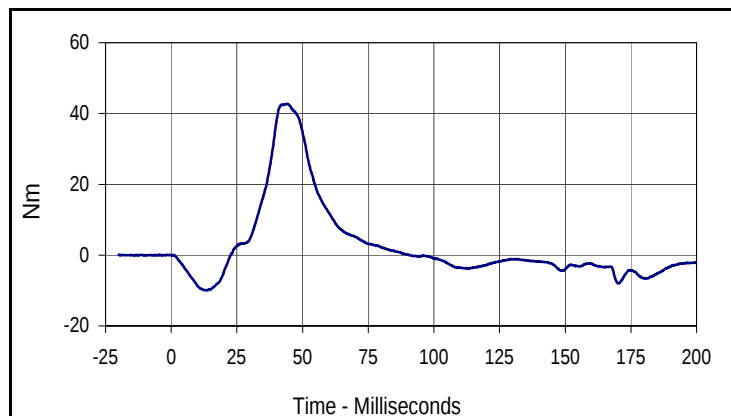
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.20	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	2.0	Pass
	20 Msec.	m/s	3.4 to 4.2	4.0	Pass
	25 Msec.	m/s	4.3 to 5.2	4.9	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	76.1	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	40.0	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	70.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.0	199.3	0.0	-0.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.1	50.1	-80.5	197.1



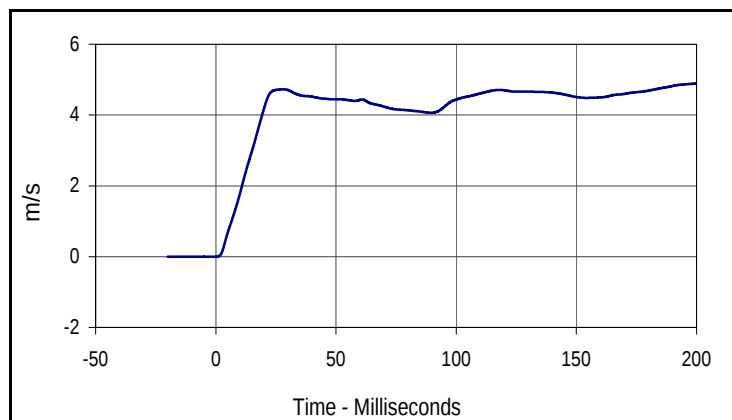
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
42.8	44.3	-9.9	13.5

Test Program: CRABI 12 Month Old Neck Extension Test
 ATD Serial No.: 022

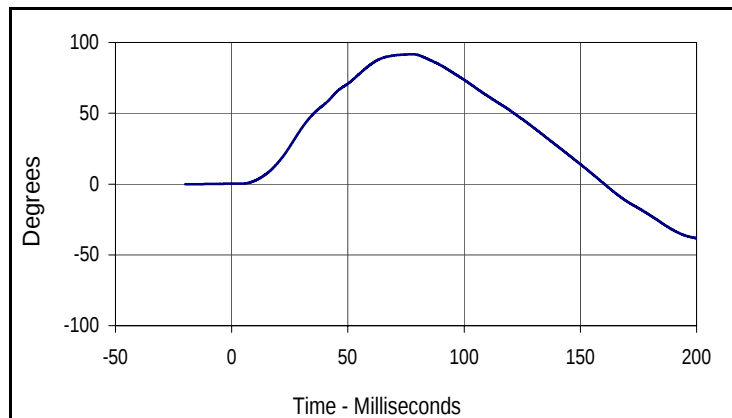
Test Date: 10/4/07
 Test I.D.: NE10J



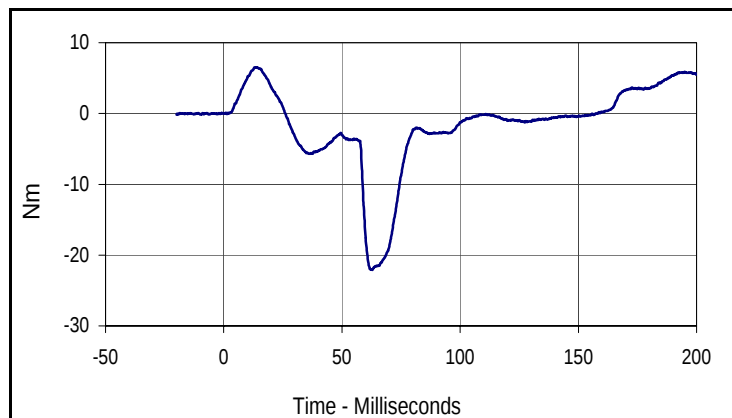
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.40	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.9	Pass
	10 Msec.	m/s	1.5 to 2.1	1.8	Pass
	14 Msec.	m/s	2.2 to 2.9	2.8	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	91.7	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-17.8	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	77.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.9	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
91.7	77.7	-38.2	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
6.5	13.2	-22.1	62.8

Test Program: CRABI 12 Month Old External Dimensions
 ATD Serial No.: 022

Test Date: 10/4/07
 Test I.D.: N/A



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
A - Total sitting height	mm	456.0 to 471.2	462	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	286	Pass
C - "H" point height	mm	27.9 to 38.1	30	Pass
D - "H" point from backline	mm	40.1 to 50.3	47	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	52	Pass
F - Thigh clearance	mm	63.0 to 73.2	69	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	188	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	106	Pass
J - Elbow rest height	mm	150.1 to 165.3	160	Pass
K - Buttock to knee length	mm	202.7 to 217.9	209	Pass
L - Popliteal length	mm	138.7 to 153.9	143	Pass
M - Knee pivot height	mm	165.1 to 180.3	170	Pass
N - Buttock popliteal length	mm	144.8 to 160.0	156	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	113	Pass
P - Foot length	mm	92.4 to 102.6	96	Pass
Q- Stature	mm	727.7 to 753.1	N/A	N/A
R - Buttock to knee pivot length	mm	178.5 to 188.7	180	Pass
S - Head Breadth	mm	124.4 to 134.6	127	Pass
T - Head Depth	mm	149.9 to 165.1	159	Pass
U - Hip breadth	mm	158.5 to 173.7	166	Pass
V - Shoulder breadth	mm	200.7 to 215.9	210	Pass
W - Foot breadth	mm	39.1 to 49.3	43	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	458	Pass
Z - Waist circumference	mm	447.0 to 472.4	460	Pass
AA - Reference location for dimension Y & O	mm	256.5 to 266.7	263	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	112	Pass
CC - Shoulder Height	mm	299.7 to 314.9	303	Pass
DD - Chin Height	mm	289.6 to 304.8	291	Pass
Overall Test Results				Pass