

REPORT NUMBER TR-P27125-01-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 PONTIAC VIBE
4-DOOR**

NHTSA NUMBER: G70113

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




MAY 17, 2007


FINAL REPORT


**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
RULEMAKING
MAIL CODE: W43-410
1200 NEW JERSEY AVE SE
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.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: 
Mr. Johnny H. Dutto Project Engineer
KARCO Engineering, LLC
Date: May 17, 2007

Reviewed by: 
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC
Date: May 17, 2007

Approved by: 
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC
Date: May 17, 2007

FINAL REPORT ACCEPTED BY:

Manager, Side Impact NCAP

Date of Acceptance

Technical Report Documentation Page

| 1. Report No. TR-P27125-01-NC | 2. Government Accession No. | 3. Recipients Catalog No. | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|------------------|-------------------------|-----------------|----------------|--|--------------------------|------|------|--|--------------------------|------|------|--|------------------------------------|------|------|--|---------------------------------|------|------|--|------------------|------|------|--|
| 4. Title and Subtitle Final Report of Side Impact New Car Assessment Program Testing of a 2007 Pontiac Vibe 4-Door NHTSA No. G70113 | | 5. Report Date May 17, 2007 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 6. Performing Organization Code KAR | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Authors Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco | | 8. Performing Organization Report No. TR-P27125-01-NC | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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: W43-410 1200 New Jersey Ave SE 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 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2007 Pontiac Vibe 4-Door in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, CA, on May 17, 2007. The impact velocity of the Moving Deformable Barrier was 61.89 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 32.8 deg. C. The target vehicle's maximum post-test static crush was 308 mm located at level 2. The test vehicle's occupant performance data is as follows: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;">Measurement Description</th> <th style="width: 15%;">Driver SID/HIII</th> <th style="width: 15%;">Pass. SID/HIII</th> <th style="width: 35%;"></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) G's</td> <td style="text-align: center;">50.6</td> <td style="text-align: center;">51.4</td> <td></td> </tr> <tr> <td>Left Lower Rib (LLR) G's</td> <td style="text-align: center;">37.7</td> <td style="text-align: center;">65.2</td> <td></td> </tr> <tr> <td>Lower Spine (T₁₂) G's</td> <td style="text-align: center;">48.1</td> <td style="text-align: center;">66.7</td> <td></td> </tr> <tr> <td>Thoracic Trauma Index (TTI) G's</td> <td style="text-align: center;">89.0</td> <td style="text-align: center;">66.0</td> <td></td> </tr> <tr> <td>Pelvis (PEV) G's</td> <td style="text-align: center;">88.6</td> <td style="text-align: center;">73.6</td> <td></td> </tr> </tbody> </table> | | | | Measurement Description | Driver SID/HIII | Pass. SID/HIII | | Left Upper Rib (LUR) G's | 50.6 | 51.4 | | Left Lower Rib (LLR) G's | 37.7 | 65.2 | | Lower Spine (T ₁₂) G's | 48.1 | 66.7 | | Thoracic Trauma Index (TTI) G's | 89.0 | 66.0 | | Pelvis (PEV) G's | 88.6 | 73.6 | |
| Measurement Description | Driver SID/HIII | Pass. SID/HIII | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Upper Rib (LUR) G's | 50.6 | 51.4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Lower Rib (LLR) G's | 37.7 | 65.2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lower Spine (T ₁₂) G's | 48.1 | 66.7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thoracic Trauma Index (TTI) G's | 89.0 | 66.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pelvis (PEV) G's | 88.6 | 73.6 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. Key Words New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Side Impact Dummy (SID/HIII) | | 18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 1200 New Jersey Ave SE Washington, DC 20590 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. Security Classification of this report UNCLASSIFIED | 20. Security Classification of this page UNCLASSIFIED | 21. No. of Pages 178 | 22. Price | | | | | | | | | | | | | | | | | | | | | | | | |

TABLE OF CONTENTS

| Section | | Page |
|---------|---|------|
| 1 | Purpose and Test Procedure | 1 |
| 2 | Summary of Side Impact Test | 2 |
| 3 | Occupant and Vehicle Information Sheets | 4 |

| Data Sheet No. | | Page |
|----------------|--|------|
| 1 | General Test and Vehicle Parameter Data | 5 |
| 2 | Test Vehicle Summary of Results | 10 |
| 3 | Moving Deformable Barrier (MDB) Summary of Results | 11 |
| 4 | Post-Test Observations | 12 |
| 5 | Vehicle Pre-Test and Post-Test Measurements | 13 |
| 6 | SID/HIII Longitudinal Clearance Dimensions | 14 |
| 7 | SID/HIII Lateral Clearance Dimensions | 15 |
| 8 | Vehicle Side Measurements | 16 |
| 9 | Vehicle Exterior Crush Profiles | 17 |
| 10 | Vehicle Damage Profile Distances | 19 |
| 11 | Deformable Barrier Honeycomb Face Static Crush | 20 |
| 12 | Vehicle Accelerometer Locations | 21 |
| 13 | MDB Accelerometer Locations | 23 |
| 14 | High Speed Camera Locations and Data | 24 |
| 15 | FMVSS 301 Fuel System Integrity Post-Impact Data | 25 |
| 16 | FMVSS 301 Static Rollover Data Sheet | 26 |

| Appendix | | Page |
|----------|--|------|
| A | Photographs | A |
| B | SID/HIII, Vehicle and MDB Response Data | B |
| C | SID/HIII Configuration and Performance Verification Data | C |
| D | Child Restraint System | D |

SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2007 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 2007 Pontiac Vibe 4-Door manufactured by General Motors Corporation.

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 2007 Pontiac Vibe 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 61.89 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 1467 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on May 17, 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 308 mm at level 2, 1350 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

| Measurement | Units | Driver | Passenger |
|-----------------------------|-------|--------|-----------|
| Thoracic Trauma Index (TTI) | G's | 49 | 66 |
| Peak Pelvic G's (PEV) | G's | 89 | 74 |

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/HIIs, vehicle, and MDB response data traces. Appendix C contains the SID Configuration and performance verification data.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

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 | $=(tf - 32)/1.8$ |
| 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: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

TEST VEHICLE INFORMATION AND OPTIONS

| | |
|------------------|--------------------|
| NHTSA No. | G70113 |
| Make | Pontiac |
| Model | Vibe |
| Body Style | 5-Door MPV |
| Vin No. | 5Y2SL67817Z419186 |
| Color | Red |
| Delivery Date | 5/7/2007 |
| Odometer (Miles) | 70.0 |
| Dealer | Rio Rancho Pontiac |
| Transmission | 4-Speed Automatic |
| Final Drive | Front |
| Type/No. Cyl. | Inline 4-Cylinder |
| Engine Disp. (L) | 1.8 |
| Engine Placement | Transverse |
| Roof Rack | No |
| Sunroof/T-Top | No |
| Tinted Glass | No |
| Traction Control | No |
| Power Brakes | Yes |
| Front Disc | Yes |
| Rear Disc | No |

| | |
|---------------------------|------|
| Anti-Lock Brakes | Yes |
| All Wheel Drive | No |
| Power Steering | Yes |
| Driver Front Airbag | Yes |
| Driver Side Torso Airbag | Yes |
| Driver Side Head Airbag | No |
| Driver Curtain/Airbag | Yes |
| 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 Cond. | Yes |
| AM/FM CD | Yes |
| Tilt Steering | Yes |
| Automatic Door Locks | No |
| Power Windows | No |
| Power Seats | No |
| Other | None |

Does Owners Manual provide instructions to turn off automatic door locks.

N/A

DATA FROM CERTIFICATION LABEL

| | |
|---------------------|--------------------------------|
| Manufactured By | New United Motor Manufacturing |
| Date of Manufacture | Dec-06 |

| | |
|-----------------|------|
| GVWR (kg) | 1744 |
| GAWR Front (kg) | 914 |
| GAWR Rear (kg) | 839 |

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

| Measured Parameter | Front | Rear | Third | Total |
|----------------------------|--------|-------|-------|-------|
| Type of Seats | Bucket | Bench | | |
| Number of Occupants | 2 | 3 | | 5 |
| Capacity Weight (VCW) (kg) | | | | 385 |
| Cargo Weight (RCLW) (kg) | | | | 45 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

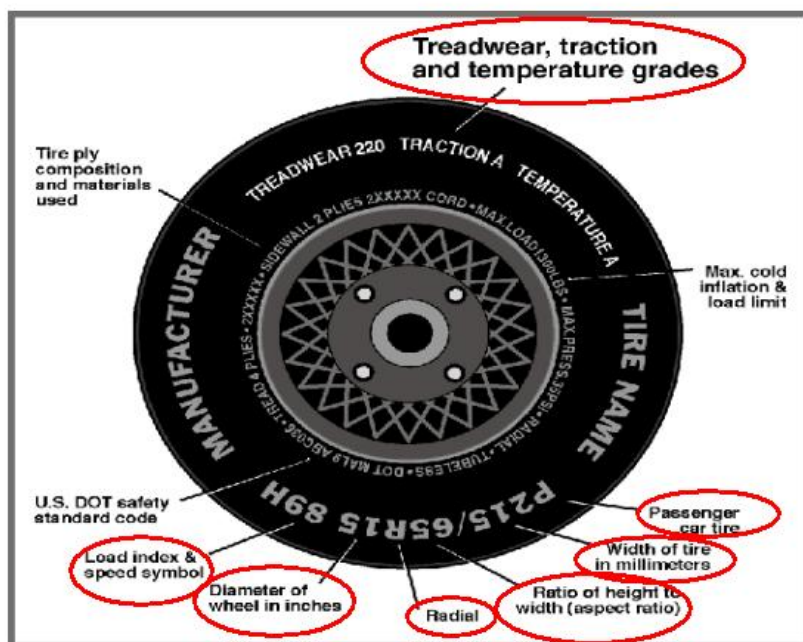
Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

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 Pressure (kpa) | 220 | 220 |
| Recommended Tire Size | 220 | 220 |
| Tire Size on Vehicle | P205/55R16 | P205/55R16 |
| Tire Manufacturer | Goodyear | Goodyear |
| Treadwear | 260 | 260 |
| Traction | A | A |
| Temperature Grades | A | A |
| Tire Plies Sidewall | 1 Polyester | 1 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 | M6TZ ENDR 4406 | M6TZ ENDR 4406 |
| DOT Safety Code Left | M6TZ ENDR 4406 | M6TZ ENDR 4406 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

TEST VEHICLE WEIGHTS

| | Units | As Delivered Weights (UVW) | | | As Tested Weights (ATW) | | |
|--------|-------|----------------------------|-----------|-------|-------------------------|-----------|-------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 380 | 261 | 641 | 436 | 330 | 766 |
| Right | kg | 371 | 254 | 625 | 399 | 302 | 701 |
| Ratio | % | 59.3 | 40.7 | 100 | 56.9 | 43.1 | 100 |
| Totals | kg | 751 | 515 | 1266 | 835 | 632 | 1467 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value |
|--------------------------------------|-------|-------|
| Total Delivered Weight (UVW) | kg | 1266 |
| Weight of 2 P572 ATD's | kg | 161 |
| Rated Cargo/Luggage Wt. (RCLW) | kg | 81 |
| Calculated Vehicle Target Wt. (TVTW) | kg | 1508 |

TEST VEHICLE ATTITUDE AND CG

| | Units | LF | RF | LR | RR | CG (aft of front axle) |
|--------------|-------|-----|-----|-----|-----|------------------------|
| As Delivered | mm | 820 | 824 | 839 | 845 | 1057 |
| As Tested | mm | 800 | 813 | 812 | 820 | 1120 |
| Fully Loaded | mm | 803 | 816 | 799 | 816 | |

GENERAL TEST VEHICLE DATA

| Measurement Description | Units | Value |
|---|--------|-------|
| Test Vehicle Wheel Base | mm | 2599 |
| Total Vehicle Length at Left Side | mm | 3010 |
| Total Vehicle Length at Centerline | mm | 4367 |
| Total Vehicle Length at Right Side | mm | 3010 |
| Weight of Ballast In Cargo Area | kg | 0 |
| Amount of Stoddard Solvent in Fuel Tank | liters | 45.45 |

TEST VEHICLE VERTICAL IMPACT LINE DATA

| Measurement Description | Units | Value |
|---------------------------------------|-------|-------|
| Test Vehicle Wheel Base | mm | 2599 |
| Target Impact Point Aft of Front Axle | mm | 360 |
| Actual Impact Point Aft of Front Axle | mm | 350 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

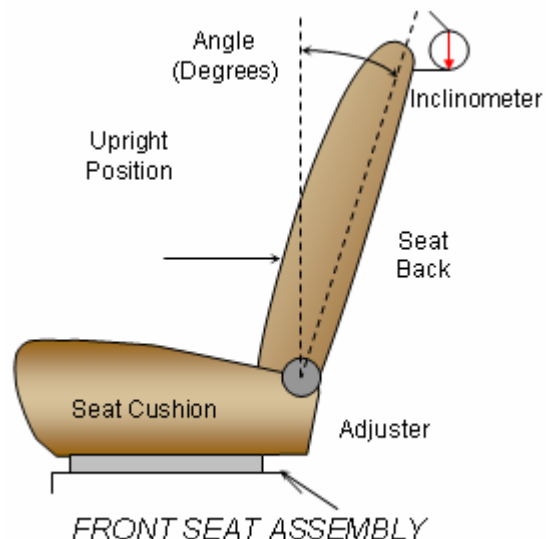
NHTSA No.: G70113

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

Test Date: 5/17/07

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 head rest using a digital inclinometer.



SEAT BACK ANGLES

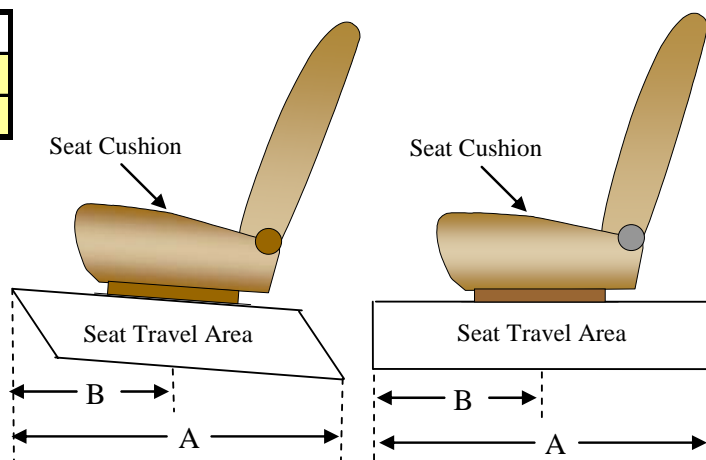
| | Deg. |
|--------------------------|-----------------|
| Driver w/seated Dummy | 1.7 @ Head rest |
| Passenger w/seated Dummy | N/A |

SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position at the highest vertical seat height to rearmost position at the lowest vertical seat height. 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 vertical adjustments on the passenger seat. The driver seat was placed at the lowermost position.

SEAT FORE/AFT POSITIONING

| | Total Fore/Aft Travel | Placed in Position # |
|-------------|-----------------------|----------------------|
| Driver Seat | 18 detents | 9th Detent |
| Rear Seat | N/A | N/A |



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position

SEAT BELT UPPER ANCHORAGE

| | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 5 | 3 |
| Rear Seat | Fixed | Fixed |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

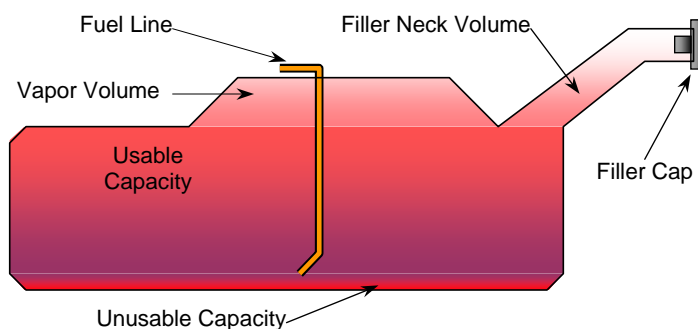
Test Program: 55/28 km/h Side Impact NCAP

Test Date: 5/17/07

FUEL TANK CAPACITY

| | Liters |
|------------------------------------|----------------|
| Usable Capacity of "Standard Tank" | 49.96 |
| Usable Capacity of "Optional" Tank | |
| Usable Capacity used for FMVSS 301 | 45.95 to 46.93 |
| Actual Amount of Solvent used | 46.45 |

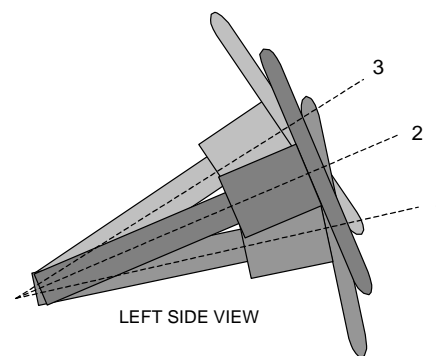
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately two (2) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

| | Degrees | Fore/Aft Position (mm) |
|---------------------------------|---------|------------------------|
| Lowermost position No. 1 | 27.0 | |
| Geometric center position No. 2 | 28.7 | |
| Uppermost position No. 3 | 30.7 | |

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

TEST VEHICLE WEIGHTS

| | Units | As Delivered Weights (UWV) | | | As Tested Weights (ATW) | | |
|--------|-------|----------------------------|-----------|-------|-------------------------|-----------|-------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 380 | 261 | | 436 | 330 | |
| Right | kg | 371 | 254 | | 399 | 302 | |
| Ratio | % | 59.3 | 40.7 | | 56.9 | 43.1 | |
| Totals | kg | 751 | 515 | 1266 | 835 | 632 | 1467 |

MAXIMUM EXTERIOR STATIC CRUSH

| Level | Measured Parameter | Units | Maximum Crush | Above Ground |
|---------|---------------------|-------|---------------|--------------|
| Level 1 | Sill Top Height | mm | 141 | 190 |
| Level 2 | Occupant H-Point | mm | 308 | 513 |
| Level 3 | Mid Door | mm | 285 | 594 |
| Level 4 | Window Sill | mm | 218 | 831 |
| Level 5 | Window top | mm | 39 | 1371 |
| N/A | Maximum Penetration | mm | 308 | |

INSTRUMENTATION

| | |
|---|----|
| Driver SID/Hybrid III Accelerometers | 20 |
| Passenger SID/Hybrid III Accelerometers | 20 |
| Vehicle Structure Accelerometers | 21 |
| MDB Accelerometers | 5 |
| Total No. 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: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

MDB SPECIFICATIONS (mm)

| Measurement Description | Length |
|---|--------|
| Overall Width of Framework Carriage | 1252 |
| Overall Length including Honeycomb Face | 4115 |
| Wheel Base of Framework Carriage | 2590 |
| C.G. 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 | |
| Totals | 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 | 61.89 |
| Trap No. 2 Velocity (Redundant) | km/h | 61.1 to 62.7 | 61.87 |
| MDB CL to Target Vehicle CL | degrees | 88.5 to 91.5 | 89.5 |

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

| Vertical Location | | | From Centerline | | Max. Crush |
|-------------------|------------------|--------|-----------------|-----------|------------|
| Row | Description | Height | Distance | Direction | |
| A | Center of Bumper | 432 | 800 | Right | 167 |
| B | Top of Bumper | 533 | 800 | Right | 91 |
| C | Mid Level | 686 | 800 | Left | 93 |
| D | Top of Stack | 813 | 800 | Left | 144 |

MDB INSTRUMENTATION AND CAMERAS

| | |
|--------------------|---|
| Accelerometers | 5 |
| Contact Switches | 1 |
| High Speed Cameras | 2 |

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

TEST DUMMY INFORMATION AND CONTACT POINTS

| Description | Front Seat SID/Hybrid III | Rear Seat SID/Hybrid III |
|-------------------------|---------------------------|--------------------------|
| Dummy Type / Serial No. | P572F, SID / No. 275 | P572F, SID / No. 274 |
| Head Contact | Curtain Airbag | Curtain Airbag |
| Upper Torso Contact | Side Torso Bag | Door Panel |
| Lower Torso Contact | Door Panel | 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 | Remained closed and latched, operational | Remained closed and latched, operational |
| Seat Movement | None | None |
| Seat Back Failure | None | None |

POST-TEST STRUCTURAL OBSERVATIONS

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|--|
| Pillar Performance | No separation |
| Sill Separation | Front & Rear passenger side sill separated |
| Windshield Damage | Cracked |
| Window Damage | Driver Side Window Broken |
| Other Notable Effects | None |

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type | Left Front (Driver) Occupant Location 01 | | Left Rear (Passenger) Occupant Location 04 | |
|------------------------|---|-----------|---|-----------|
| | Installed | Operation | Installed | Operation |
| Front Airbag | Yes | No | No | |
| Side Torso Airbag | Yes | Yes | No | |
| Head Airbag | No | | No | |
| Curtain Airbag | Yes | Yes | Yes | Yes |
| Seat Belt Pretensioner | Yes | | No | |
| Seat Belt Load Limiter | Yes | | No | |

MDB LEFT EDGE IMPACT POINT DATA

| Measured Parameter | Units | Requirement | Value |
|--------------------|-------|-------------|------------|
| Horizontal Offset | mm | +/- 50 | -10 (left) |
| Vertical Offset | mm | +/- 20 | 0 |

DATA SHEET NO. 5

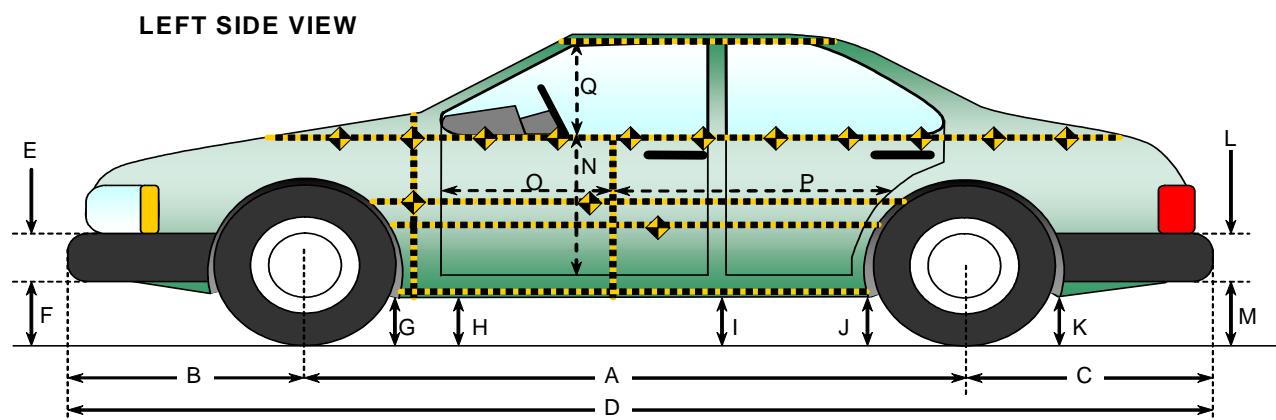
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

| Code | Measurement Description | Pre-Test | Post-Test | Difference |
|------|--|----------|-----------|------------|
| A | Wheelbase | 2599 | 2599 | 0 |
| B | Front Axle to FSOV | 928 | 938 | 10 |
| C | Rear Axle to RSOV | 827 | 825 | -2 |
| D | Total Length at Centerline | 4367 | 4374 | 7 |
| E | Front Bumper Thickness | 372 | 369 | -3 |
| F | Front Bumper Bottom to Ground | 220 | 246 | 26 |
| G | Sill Height at Front Wheel Well | 190 | 269 | 79 |
| H | Sill Height at Front Door Leading Edge | 191 | 291 | 100 |
| I | Sill Height at "B" Pillar | 200 | 280 | 80 |
| J1 | Sill Height at Rear Wheel Well | 185 | 244 | 59 |
| J2 | Pinch Weld Height at Rear Wheel Well | 195 | 281 | 86 |
| K | Sill Height aft of Rear Wheel Well | 220 | 251 | 31 |
| L | Rear Bumper Thickness | 294 | 300 | 6 |
| M | Rear Bumper Bottom to Ground | 283 | 319 | 36 |
| N | Sill Height to Window Bottom Sill | 730 | 640 | -90 |
| O | Front Door Leading Edge to Impact CL | 744 | 720 | -24 |
| P | Rear Door Trailing Edge to Impact CL | 1227 | 1202 | -25 |
| Q | Front Window Opening | 409 | 420 | 11 |
| R | Right Side Length | 3010 | 2992 | -18 |
| S | Left Side Length | 3010 | 3020 | 10 |
| T | Vehicle Width at "B" Post | 1723 | 1540 | -183 |

DATA SHEET NO. 6

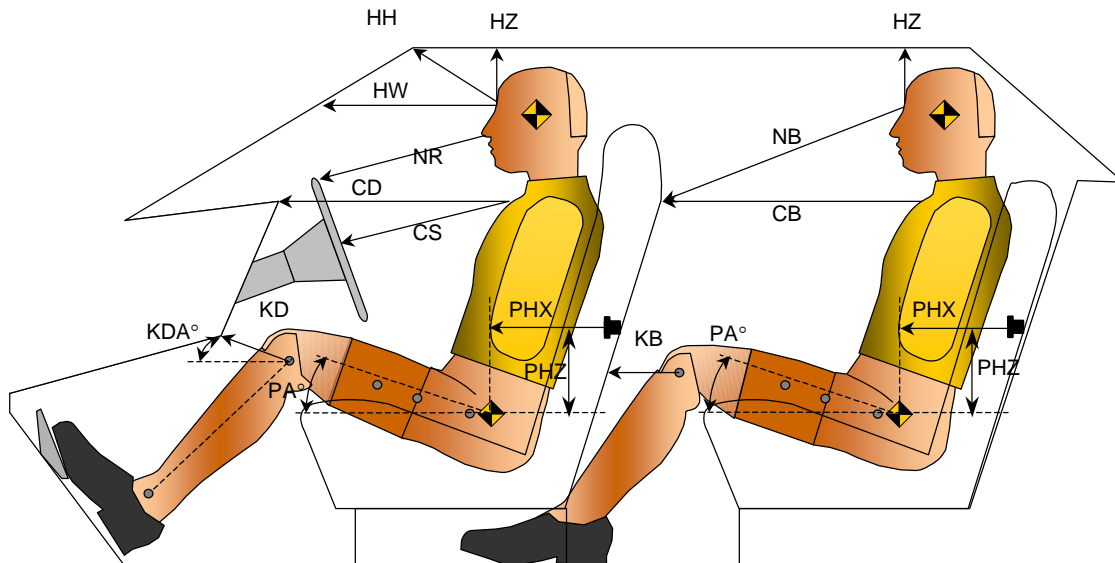
SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

| Driver Code | Pass. Code | Measurement Description | Driver | | Passenger | |
|-------------|------------|---------------------------------|------------|-------|------------|-------|
| | | | Length(mm) | Angle | Length(mm) | Angle |
| HH | | Head to Header | 360 | 15.0 | | |
| HW | | Head to Windshield | 587 | | | |
| HZ | HZ | Head to Roof | 220 | 90.0 | 215 | 90.0 |
| NR | NB | Nose to Rim/Nose to Seat Back | 460 | 18.5 | 675 | 20.0 |
| CD | CB | Chest to Dash or Seat Back | 606 | 6.5 | 587 | 2.2 |
| CS | | Chest to Steering Wheel | 303 | 4.5 | | |
| KDL | KBL | Left Knee to Dash or Seat Back | 163 | 17.0 | 212 | 0.0 |
| KDR | KBR | Right Knee to Dash or Seat Back | 170 | | 204 | |
| PA | PA | Pelvic Angle | | 23.4 | | 23.2 |
| PHX | PHX | H-Point to Striker (X-Axis) | 68 | | 279.5 | |
| PHZ | PHZ | H-Point to Striker (Z-Axis) | 220 | | 310 | |

DATA SHEET NO. 7

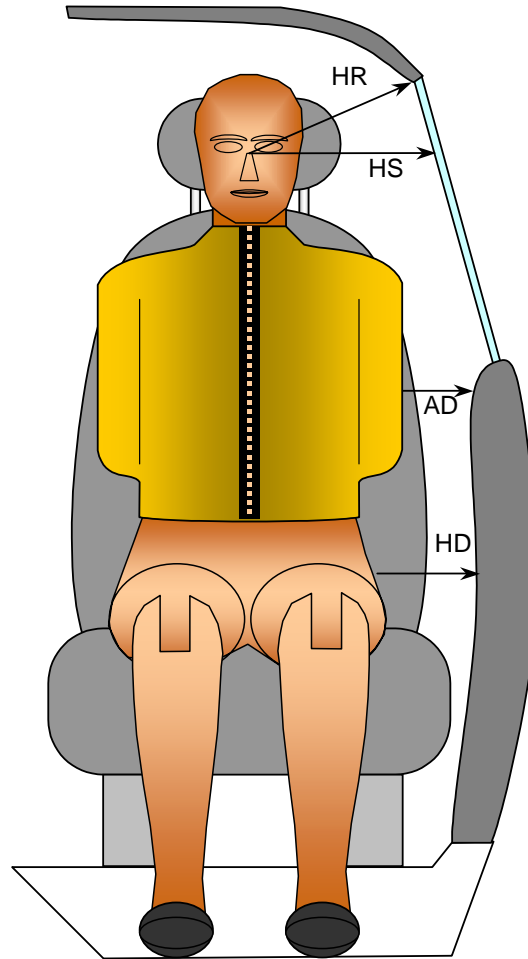
SID/HII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver | Passenger |
|------|-------------------------|-------|--------|-----------|
| HR | Head to Side Header | mm | 250 | 268 |
| HS | Head to Side Window | mm | 300 | 223 |
| AD | Arm to Door | mm | 64 | 92 |
| HD | H-Point to Door | mm | 142 | 144 |

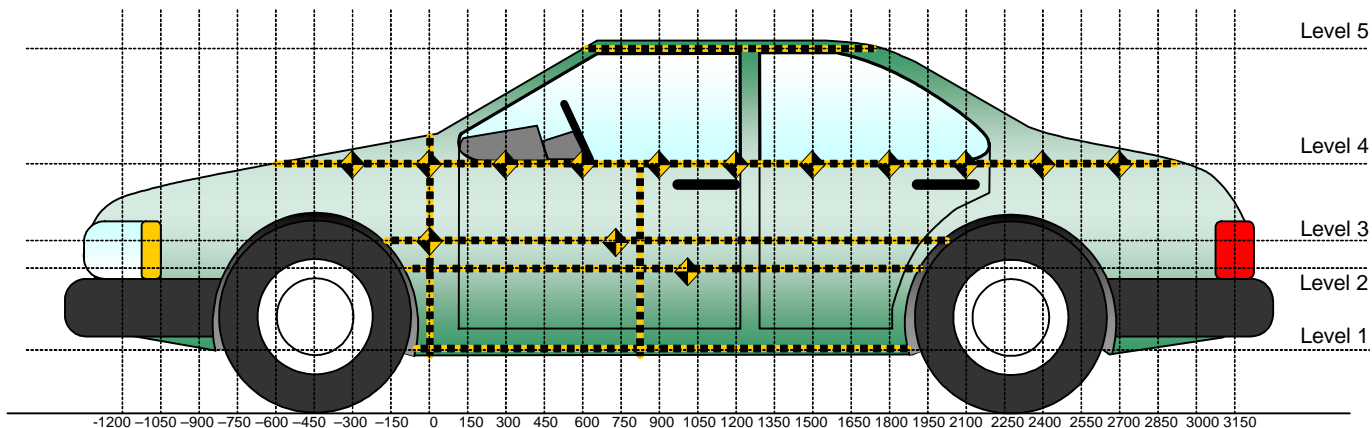
DATA SHEET NO. 8
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



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 | Height Above Ground |
|-------|-------------------------|---------------------|
| 1 | Sill Top | 264 |
| 2 | Occupant H-Point | 571 |
| 3 | Mid Door | 655 |
| 4 | Window Sill | 938 |
| 5 | Window Top | 1461 |

All Dimensions shown in millimeters

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

| | 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 | | | 625 | 721 | | | | 697 | 756 | | | | 72 | 35 | |
| 0 | 653 | 633 | 649 | 717 | | 703 | 746 | 749 | 753 | | 50 | 113 | 100 | 36 | |
| 150 | 663 | 655 | 651 | 703 | | 786 | 881 | 864 | 786 | | 123 | 226 | 213 | 83 | |
| 300 | 664 | 655 | 650 | 701 | | 782 | 940 | 910 | 830 | | 118 | 285 | 260 | 129 | |
| 450 | 664 | 653 | 650 | 693 | | 784 | 950 | 924 | 876 | | 120 | 297 | 274 | 183 | |
| 600 | 662 | 653 | 648 | 689 | | 791 | 930 | 916 | 870 | | 129 | 277 | 268 | 181 | |
| 750 | 660 | 655 | 644 | 686 | 955 | 793 | 935 | 909 | 861 | 976 | 133 | 280 | 265 | 175 | 21 |
| 900 | 660 | 654 | 640 | 685 | 945 | 793 | 931 | 906 | 846 | 971 | 133 | 277 | 266 | 161 | 26 |
| 1050 | 656 | 656 | 640 | 682 | 941 | 797 | 914 | 894 | 826 | 971 | 141 | 258 | 254 | 144 | 30 |
| 1200 | 659 | 657 | 641 | 682 | 934 | 792 | 960 | 926 | 895 | 967 | 133 | 303 | 285 | 213 | 33 |
| 1350 | 658 | 657 | 641 | 680 | 931 | 782 | 965 | 915 | 898 | 970 | 124 | 308 | 274 | 218 | 39 |
| 1500 | 658 | 658 | 648 | 680 | 931 | 775 | 944 | 916 | 880 | 966 | 117 | 286 | 268 | 200 | 35 |
| 1650 | 659 | 660 | 654 | 678 | 935 | 759 | 918 | 901 | 836 | 960 | 100 | 258 | 247 | 158 | 25 |
| 1800 | 656 | 663 | 658 | 681 | 935 | 721 | 869 | 885 | 779 | 958 | 65 | 206 | 227 | 98 | 23 |
| 1950 | | 633 | 631 | 684 | 935 | | 773 | 863 | 716 | 958 | | 140 | 232 | 32 | 23 |
| 2100 | | | | 681 | 948 | | | | 728 | 951 | | | | 47 | 3 |
| 2250 | | | | 685 | | | | | 720 | | | | | 35 | |
| 2400 | | | | 708 | | | | | 713 | | | | | 5 | |
| 2550 | | | | | | | | | | | | | | | |
| 2700 | | | | | | | | | | | | | | | |
| 2850 | | | | | | | | | | | | | | | |

All Dimensions shown in millimeters

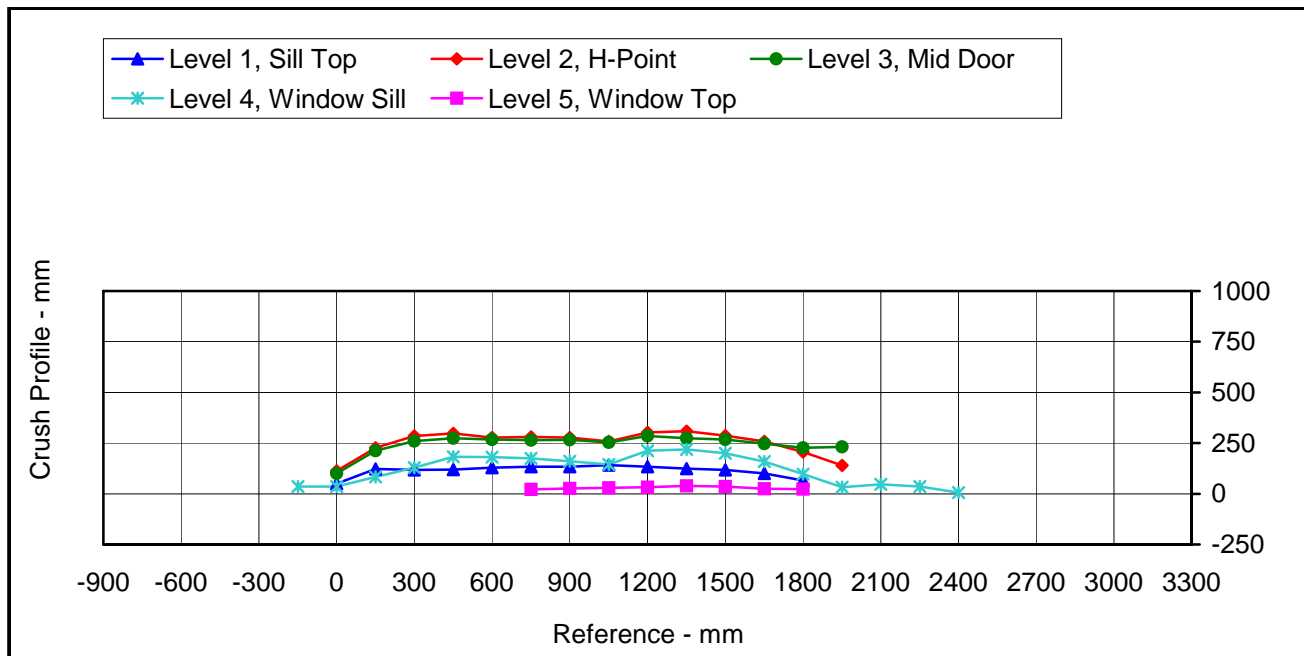
DATA SHEET NO. 9...(CONTINUED)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



| | Units | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|----------------------|-------|---------|---------|---------|---------|---------|
| Maximum Crush | mm | 141 | 308 | 285 | 218 | 39 |
| Distance from Impact | mm | 1050 | 1350 | 1200 | 1350 | 1350 |

DATA SHEET NO. 10

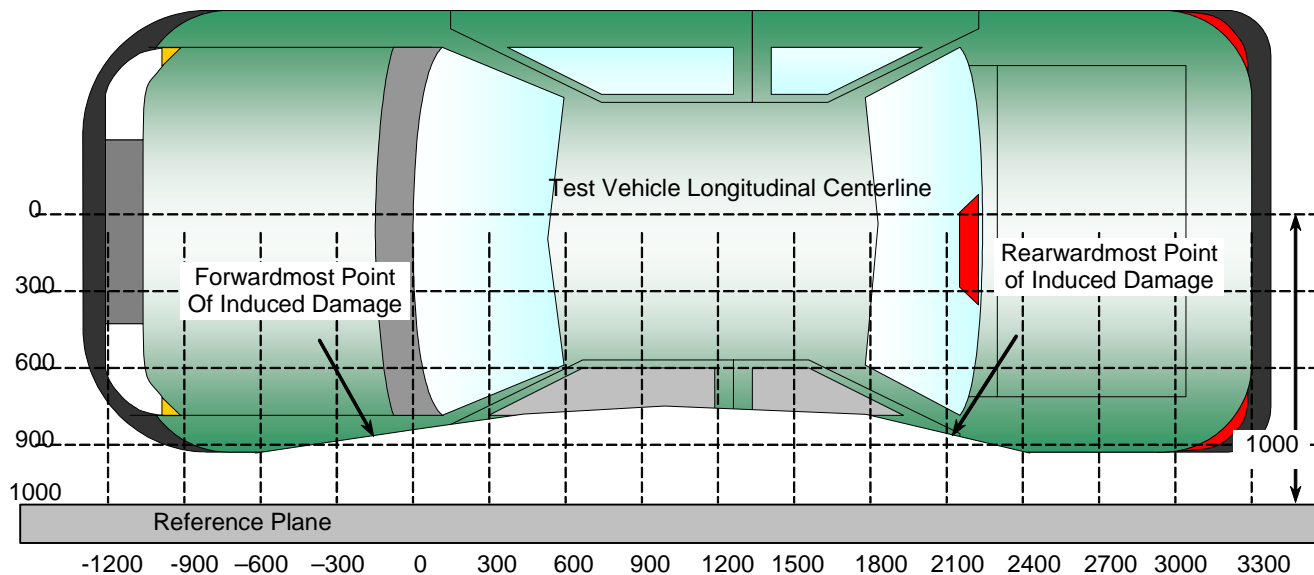
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



All Dimensions Shown in millimeters

TOP VIEW

DAMAGE PROFILE DISTANCES

| DPD | Distance From Impact Point in mm | Level | Pre-Test (mm) | Post-Test (mm) | Max. Static Crush (mm) |
|-----|----------------------------------|-------|---------------|----------------|------------------------|
| 1 | 2250 | 4 | 685 | 720 | 35 |
| 2 | 1800 | 3 | 658 | 885 | 227 |
| 3 | 1350 | 2 | 657 | 965 | 308 |
| 4 | 900 | 2 | 654 | 931 | 277 |
| 5 | 450 | 2 | 653 | 950 | 297 |
| 6 | 0 | 2 | 633 | 746 | 113 |

DATA SHEET NO. 11

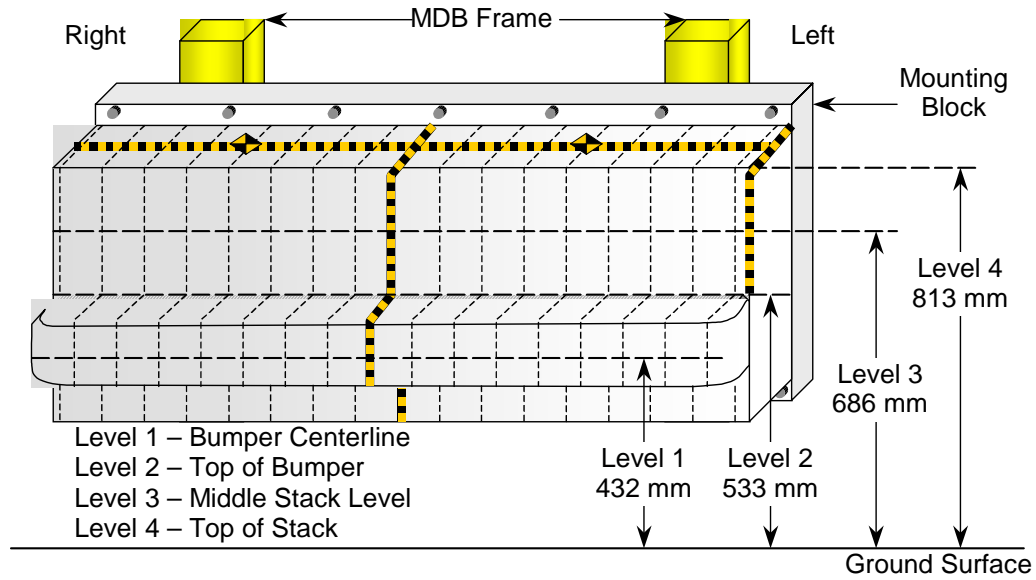
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



DEFORMABLE BARRIER STATIC CRUSH

| Stack Level | Distance Right of Center | | | | | | | | C/L | Distance Left of Center | | | | | | | |
|-------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 1 | 685 | 659 | 643 | 629 | 621 | 622 | 618 | 617 | 619 | 611 | 608 | 609 | 607 | 608 | 615 | 627 | 643 |
| 2 | 711 | 698 | 686 | 681 | 676 | 662 | 654 | 653 | 648 | 655 | 661 | 661 | 661 | 663 | 663 | 668 | 676 |
| 3 | 690 | 662 | 644 | 638 | 631 | 632 | 638 | 639 | 626 | 624 | 624 | 624 | 628 | 631 | 639 | 653 | 713 |
| 4 | 736 | 697 | 664 | 647 | 639 | 653 | 686 | 664 | 658 | 653 | 649 | 647 | 643 | 653 | 676 | 706 | 764 |

All Dimensions in mm

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

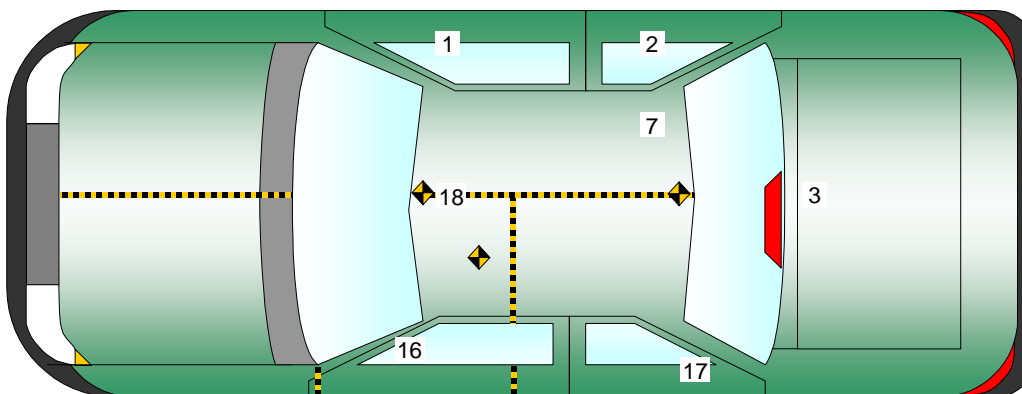
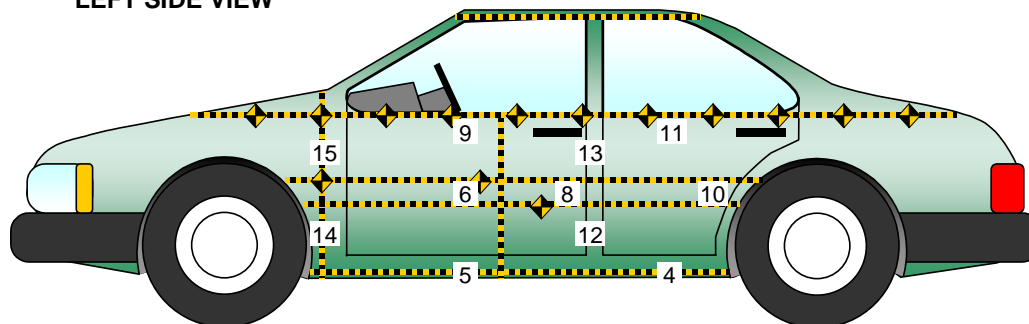
Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

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 LOCATIONS

Test Vehicle: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G70113
 Test Date: 5/17/07

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

| Loc. No. | Accelerometer Location | Measurements (mm) | | |
|----------|-----------------------------|-------------------|------|-----|
| | | X | Y | Z |
| 1 | Right Sill at Front Seat | 2230 | 685 | 341 |
| 2 | Right Sill at Rear Seat | 1535 | 685 | 341 |
| 3 | Rear Floorpan Above Axle | 765 | -100 | 412 |
| 4 | Left Sill at Rear Door | 1461 | -650 | 198 |
| 5 | Left Sill at Front Door | 2178 | -650 | 198 |
| 6 | Front Door Centerline | | | 1 |
| 7 | Rt. Rear Occ. Compartment | 1969 | 201 | 245 |
| 8 | Front Door Mid-Rear | | | 1 |
| 9 | Front Door Upper Centerline | | | 1 |
| 10 | Rear Door Mid-Rear | | | 1 |
| 11 | Rear Door Upper Centerline | | | 1 |
| 12 | B-Post Lower | 1935 | -669 | 810 |
| 13 | B-Post Middle | 1935 | -669 | 950 |
| 14 | A-Post Lower | 2955 | -807 | 374 |
| 15 | A-Post Middle | 2955 | -807 | 525 |
| 16 | Front Seat Track | 2451 | -619 | 392 |
| 17 | Rear Seat Structure | | | 1 |
| 18 | Vehicle CG | 2563 | 50 | 394 |

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

1.) Not installed

DATA SHEET NO. 13
MDB ACCELEROMETER LOCATIONS

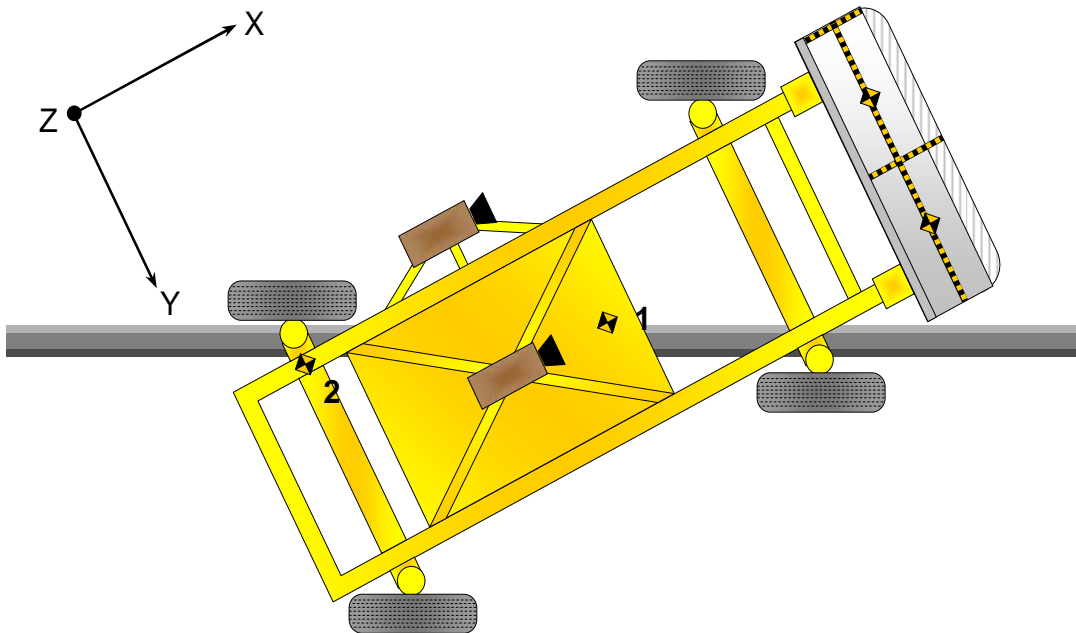
Test Vehicle: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G70113
 Test Date: 5/17/07

MDB ACCELEROMETER LOCATIONS

| Loc. No. | Accelerometer Locations | Measurements (mm) | | |
|----------|-------------------------|-------------------|------|-----|
| | | 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

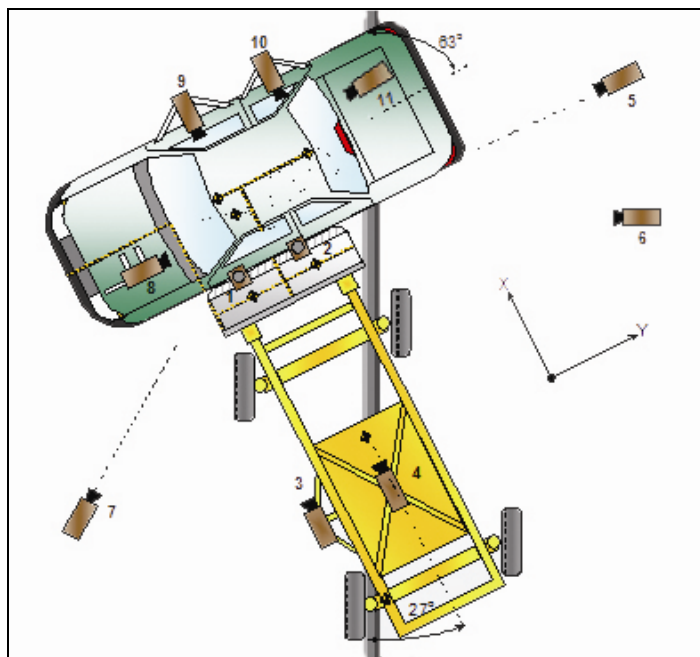
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



| No. | Camera View | Location (mm) | | | Angle (deg.) | Lens (mm) | Film Speed (fps) |
|-----|-------------------------|---------------|-------|-------|--------------|-----------|------------------|
| | | 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 | 14mm | 1000 |
| 2 | Overhead Close Up | 609 | 2287 | -5102 | -90 | Zoom | 1000 |
| 3 | Left Impact Point (MDB) | -2134 | 0 | -1143 | -2 | 12mm | 1000 |
| 4 | Side Overall (MDB) | -3912 | 838 | -1829 | -4 | 12mm | 1000 |
| 5 | Rear | -64 | 20485 | -1348 | 0 | 105mm | 1000 |
| 6 | Left Rear (MDB) | -2137 | -1302 | -339 | -4 | 85mm | 1000 |
| 7 | Left Front | -2266 | -3564 | -1475 | -2 | 24mm | 1000 |
| 8 | Driver Front (O.B.) | 583 | -445 | -1345 | -12 | 35mm | 1000 |
| 9 | Driver Side (O.B.) | 1604 | 778 | -1122 | -2 | 20mm | 1000 |
| 10 | Passenger Side (O.B.) | 1604 | 1512 | -1125 | -2 | 20mm | 1000 |

X = Barrier Face Y = Monorail Centerline Z = Ground DNR = Did Not Run NTM = No Timing Marks

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door NHTSA No.: G70113

Test Program: 55/28 km/h Side Impact NCAP Test Date: 5/17/07

Test Time: 12:09 PM Temperature: 32.8 Deg. C.

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)
- D. Spillage Details: No leakage occurred

DATA SHEET NO. 16

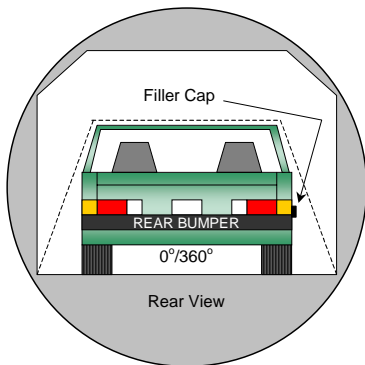
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

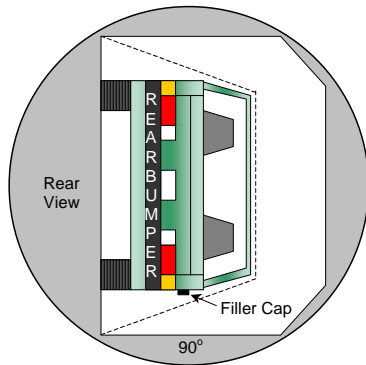
NHTSA No.: G70113

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

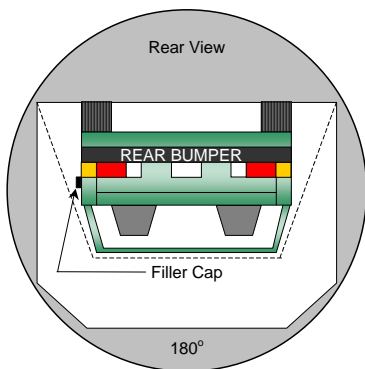
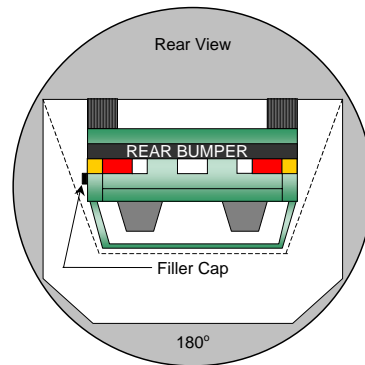
Test Date: 5/17/07



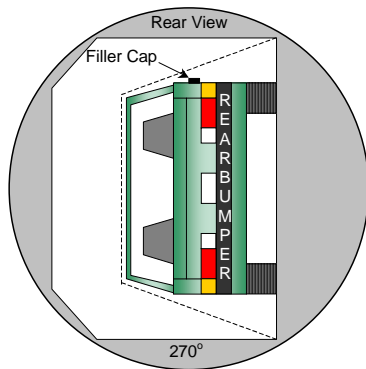
0° to 90°



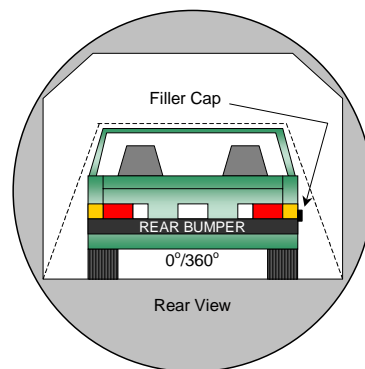
90° to 180°



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 SHEET

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

SOLVENT COLLECTION TIME TABLE IN SECONDS

| Test Phase | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90° | 88 | 300 | 388 |
| 90° to 180° | 83 | 300 | 383 |
| 180° to 270° | 82 | 300 | 382 |
| 270° to 360° | 81 | 300 | 381 |

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

| | |
|-----------------|-----|
| First 5 Minutes | 5.0 |
| Sixth Minute | 1.0 |
| Seventh Minute | 1.0 |
| Eighth Minute | 1.0 |

| 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 |

SOLVENT SPILLAGE LOCATION TABLE

| Test Phase | Spillage Location |
|--------------|-------------------|
| 0° to 90° | None |
| 90° to 180° | None |
| 180° to 270° | None |
| 270° to 360° | None |

**APPENDIX A
PHOTOGRAPHS**

LIST OF PHOTOGRAPHS

| Figure | | Page |
|--------|---|------|
| A-1 | Left Front $\frac{3}{4}$ View, as Received | A-1 |
| A-2 | Right Rear $\frac{3}{4}$ View, as Received | A-2 |
| A-3 | Manufacturer's Label | A-3 |
| A-4 | Tire Placard | A-4 |
| A-5 | Pre-Test Front View | A-5 |
| A-6 | Post-Test Front View | A-6 |
| A-7 | Pre-Test Left Front $\frac{3}{4}$ View | A-7 |
| A-8 | Post-Test Left Front $\frac{3}{4}$ View | A-8 |
| A-9 | Pre-Test Left Side View | A-9 |
| A-10 | Post-Test Left Side View | A-10 |
| A-11 | Pre-Test Left Rear $\frac{3}{4}$ View | A-11 |
| A-12 | Post-Test Left Rear $\frac{3}{4}$ View | A-12 |
| A-13 | Pre-Test Rear View | A-13 |
| A-14 | Post-Test Rear View | A-14 |
| A-15 | Pre-Test Right Rear $\frac{3}{4}$ View | A-15 |
| A-16 | Post-Test Right Rear $\frac{3}{4}$ View | A-16 |
| A-17 | Pre-Test Right Side View | A-17 |
| A-18 | Post-Test Right Side View | A-18 |
| A-19 | Pre-Test Right Front $\frac{3}{4}$ View | A-19 |
| A-20 | Post-Test Right Front $\frac{3}{4}$ View | A-20 |
| A-21 | Pre-Test Overhead View | A-21 |
| A-22 | Post-Test Overhead View | A-22 |
| A-23 | Pre-Test Overhead Close-up View | A-23 |
| A-24 | Post-Test Overhead Close-up View | A-24 |
| A-25 | Pre-Test Left Impact Point | A-25 |
| A-26 | Post-Test Left Impact Point | A-26 |
| A-27 | Pre-Test Front $\frac{3}{4}$ View of Left Side Doors | A-27 |
| A-28 | Post-Test Front $\frac{3}{4}$ View of Left Side Doors | A-28 |
| A-29 | Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors | A-29 |
| A-30 | Post-Test Rear $\frac{3}{4}$ View of Left Side Doors | A-30 |
| A-31 | Pre-Test Left Front Door | A-31 |
| A-32 | Post-Test Left Front Door | A-32 |
| A-33 | Pre-Test Left Rear Door | A-33 |
| A-34 | Post-Test Left Rear Door | A-34 |

LIST OF PHOTOGRAPHS...(CONTINUED)

| Figure | | Page |
|--------|--|------|
| A-35 | Pre-Test Driver Dummy (Door Open) | A-35 |
| A-36 | Pre-Test Driver Dummy (Through Window) | A-36 |
| A-37 | Post-Test Driver Dummy (Through Window) | A-37 |
| A-38 | Pre-Test Driver Dummy Clearance from Door | A-38 |
| A-39 | Post-Test Driver Dummy Clearance from Door | A-39 |
| A-40 | Pre-Test Driver Dummy Right Side View | A-40 |
| A-41 | Post-Test Driver Dummy Right Side View | A-41 |
| A-42 | Pre-Test Front Door Panel (Interior) | A-42 |
| A-43 | Post-Test Front Door Panel (Interior) | A-43 |
| A-44 | Pre-Test Passenger Dummy Left Side (Door Open) | A-44 |
| A-45 | Pre-Test Passenger Dummy Left Side (Through Window) | A-45 |
| A-46 | Post-Test Passenger Dummy Left Side (Through Window) | A-46 |
| A-47 | Pre-Test Passenger Dummy Clearance from Door | A-47 |
| A-48 | Post-Test Passenger Dummy Clearance from Door | A-48 |
| A-49 | Pre-Test Passenger Dummy Right Side View | A-49 |
| A-50 | Post-Test Passenger Dummy Right Side View | A-50 |
| A-51 | Pre-Test Rear Door Panel (Interior) | A-51 |
| A-52 | Post-Test Rear Door Panel (Interior) | A-52 |
| A-53 | Pre-Test Front View of Deformable Barrier | A-53 |
| A-54 | Post-Test Front View of Deformable Barrier | A-54 |
| A-55 | Pre-Test Top View of Deformable Barrier | A-55 |
| A-56 | Post-Test Top View of Deformable Barrier | A-56 |
| A-57 | Pre-Test Right Side View of Deformable Barrier | A-57 |
| A-58 | Post-Test Right Side View of Deformable Barrier | A-58 |
| A-59 | Pre-Test Left Side View of Deformable Barrier | A-59 |
| A-60 | Post-Test Left Side View of Deformable Barrier | A-60 |
| A-61 | Vehicle on Rollover Device (0°) | A-61 |
| A-62 | Vehicle on Rollover Device (90°) | A-62 |
| A-63 | Vehicle on Rollover Device (180°) | A-63 |
| A-64 | Vehicle on Rollover Device (270°) | A-64 |
| A-65 | Vehicle Impact | A-65 |



A-1

TR-P27125-01-NC

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



A-2

TR-P27125-01-NC

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

MFD.BY: NEW UNITED MOTOR MANUFACTURING
INC. 12 / 06

GVWR 3845LB GAWR FR 2015 LB RR 1850LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.

5Y2SL67817Z419186

PASS CAR



BA4229382

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 385kg or 850lbs.

| TIRE | SIZE | COLD TIRE PRESSURE |
|-------|------------|--------------------|
| FRONT | P205/55R16 | 220kPa, 32PSI |
| REAR | P205/55R16 | 220kPa, 32PSI |
| SPARE | T135/70R16 | 420kPa, 60PSI |

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

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACÉS ASSISES : TOTAL 5
AVANT 2 : ARRIÈRE 3

Le poids total des occupants et du chargement ne doit jamais être supérieur à 385kg ou 850lb.

| PNEUS | DIMENSION | PRESSION DE GONFLAGE À FROID |
|---------|------------|------------------------------|
| AVANT | P205/55R16 | 220kPa, 32PSI |
| ARRIÈRE | P205/55R16 | 220kPa, 32PSI |
| SECOURS | T135/70R16 | 420kPa, 60PSI |

**POUR DE PLUS AMPLES INFORMATIONS,
VOIR LE MANUEL DU PROPRIÉTAIRE**

01172 Z7

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 ¾ View



Figure A-8: Post-Test Left Front 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 ¾ View



Figure A-13: Pre-Test Rear View



Figure A-14: Post-Test Rear View



A-15

TR-P27125-01-NC

Figure A-15: Pre-Test Right Rear ¾ View



A-16

TR-P27125-01-NC

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



A-19

TR-P27125-01-NC

Figure A-19: Pre-Test Right Front 3/4 View



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



Figure A-21: Pre-Test Overhead View



A-22

TR-P27125-01-NC

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 ¾ View of Left Side Door



Figure A-29: Pre-Test Rear ¾ 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 Intentionally Left Blank



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)



A-43

TR-P27125-01-NC

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



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

This Space Intentionally Left Blank



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

A-45

TR-P27125-01-NC



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



Figure A-49: Pre-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

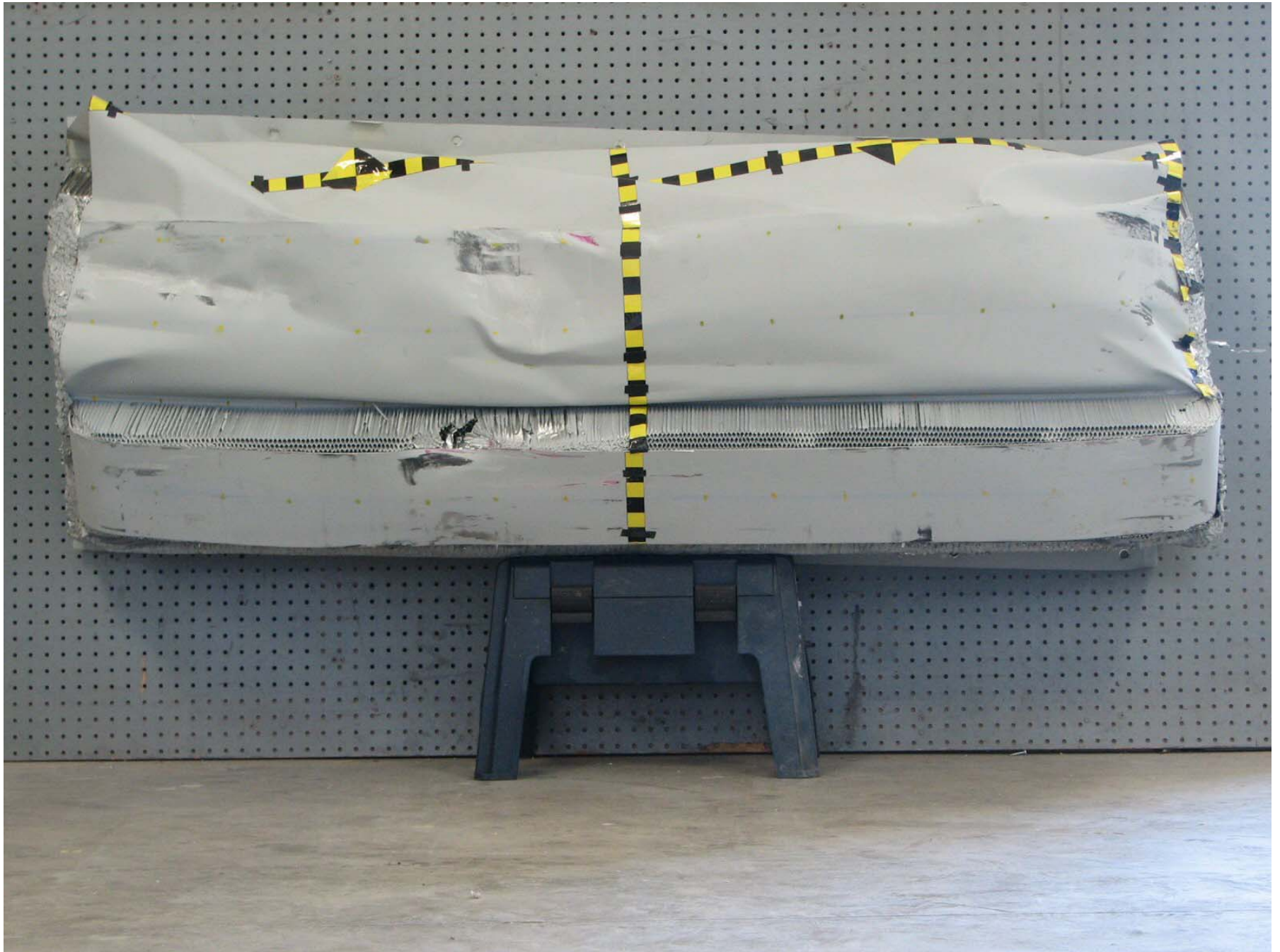


Figure A-54: Post-Test Front View of Deformable Barrier



A-55

TR-P27125-01-NC

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

A-59

TR-P27125-01-NC



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°)

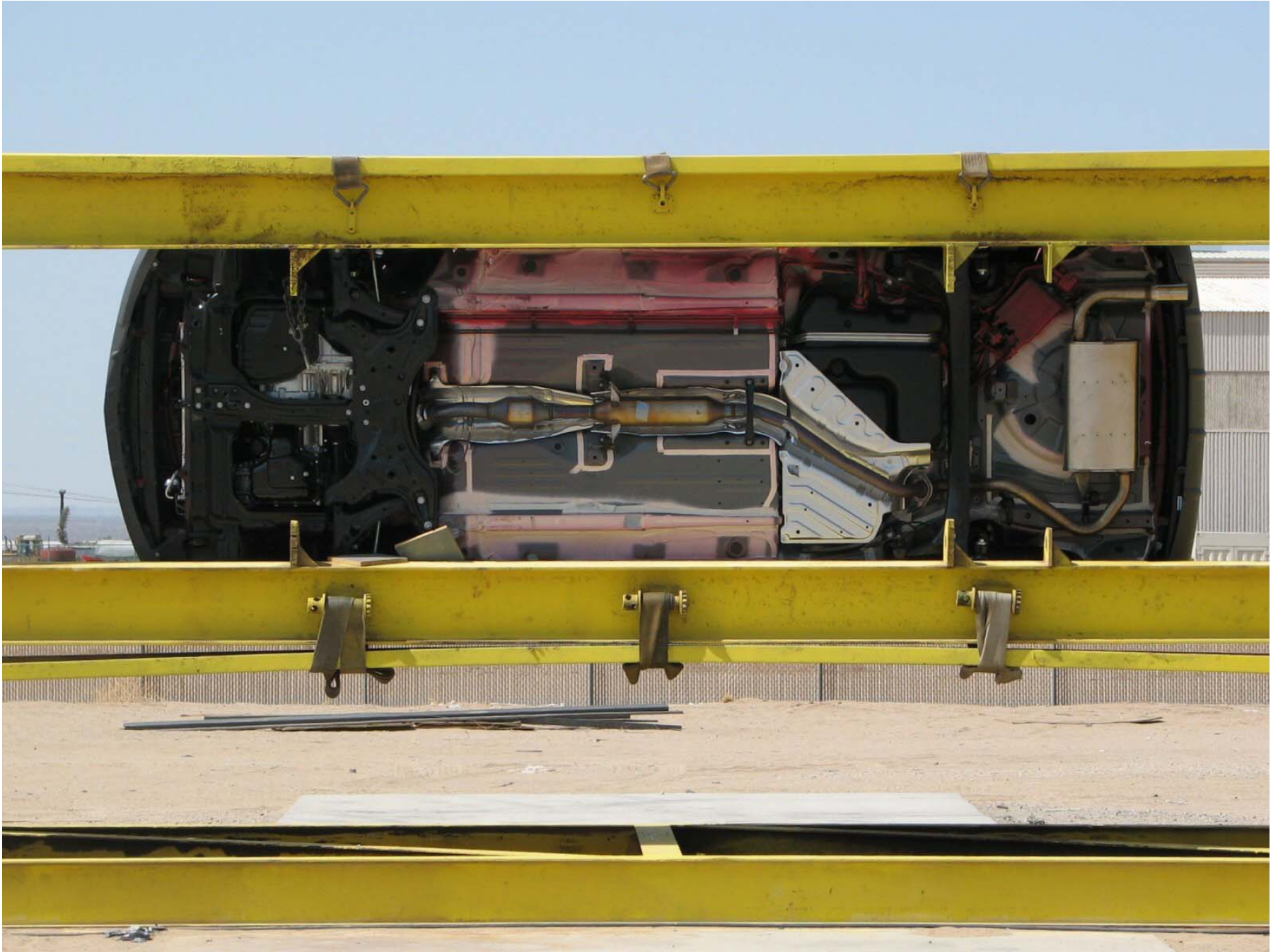


Figure A-64: Vehicle on Rollover Device (270°)



A-65

TR-P27125-01-NC

Figure A-65: Vehicle Impact

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

| <u>Data Plot</u> | | <u>Page</u> |
|------------------|---------------------------------|-------------|
| B-1 | Driver Upper Rib Primary Y | B-1 |
| | Driver Lower Rib Primary Y | B-1 |
| | Driver Lower Spine Primary Y | B-1 |
| | Driver Pelvis Primary Y | B-1 |
| B-2 | Passenger Upper Rib Primary Y | B-2 |
| | Passenger Lower Rib Primary Y | B-2 |
| | Passenger Lower Spine Primary Y | B-2 |
| | Passenger Pelvis Primary Y | B-2 |

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)

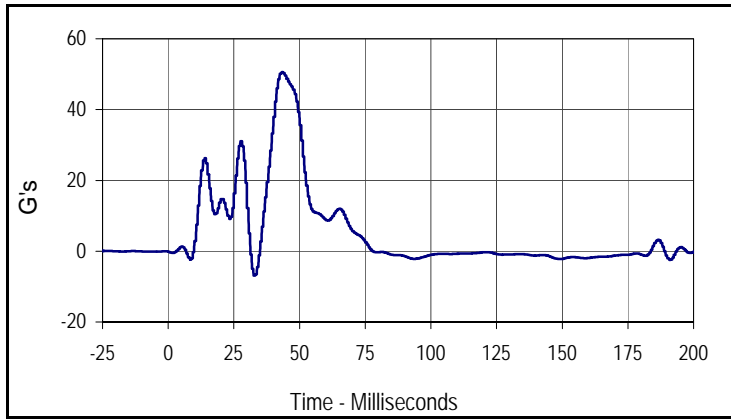
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Left Sill at Rear Door Y Velocity
Vehicle Left Sill at Front Door Y Velocity
Vehicle Left Front Door C/L Y
Vehicle Right Rear Occupant Compartment
Vehicle Left Front Door Mid Rear Y
Vehicle Left Front Door Upper CL Y
Vehicle Left 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)

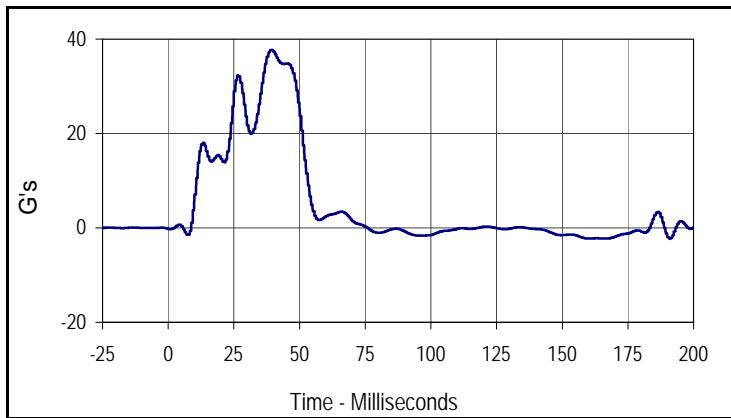
Driver Upper Rib Primary Y
Driver Lower Rib Primary Y
Driver Lower Spine Primary Y
Driver Pelvis Primary Y
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Passenger Upper Rib Primary Y
Passenger Lower Rib Primary Y
Passenger Lower Spine 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: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

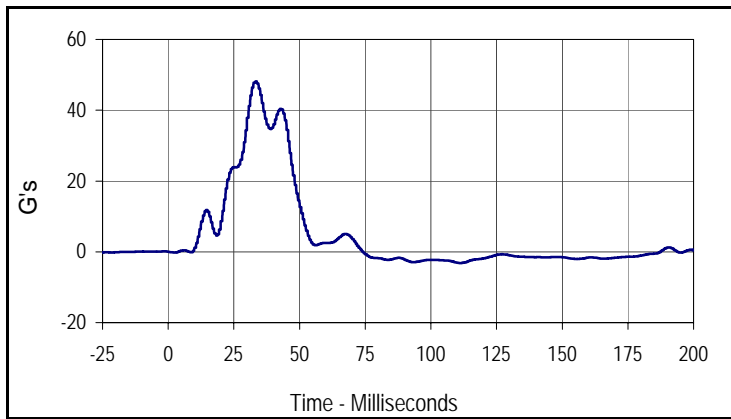
Test Date: 5/17/07
 NHTSA No.: G70113



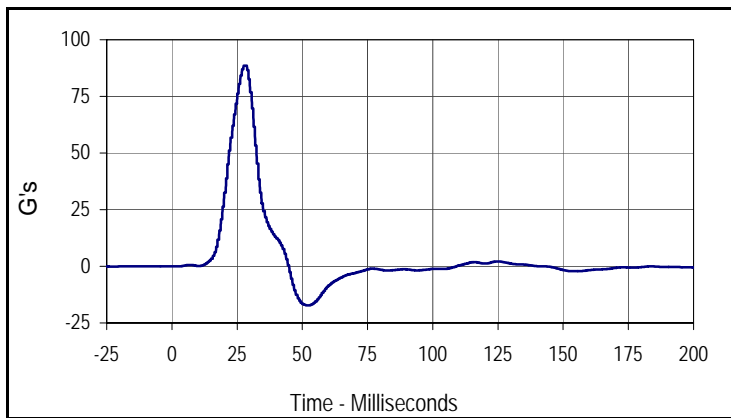
| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Driver Upper Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 50.6 | 43.2 | -6.9 | 32.5 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Driver Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 37.7 | 38.8 | -2.3 | 190.7 |



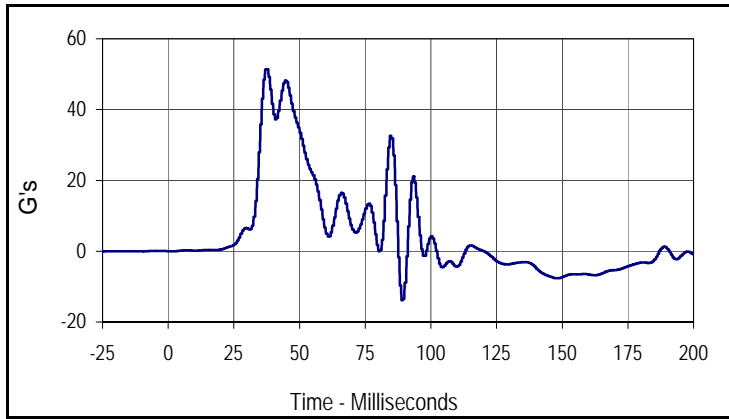
| Curve Description | | | |
|------------------------------|------|-----------|-------|
| Driver Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 48.1 | 33.2 | -3.2 | 111.3 |



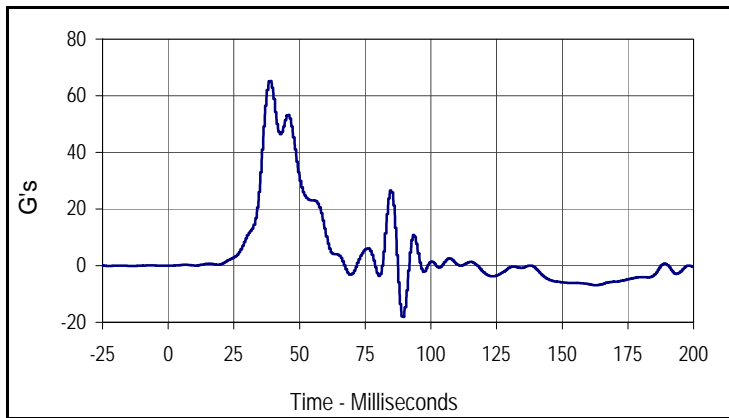
| Curve Description | | | |
|-------------------------|------|-----------|-------|
| Driver Pelvis Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 88.6 | 27.5 | -17.3 | 51.9 |

Test Vehicle: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

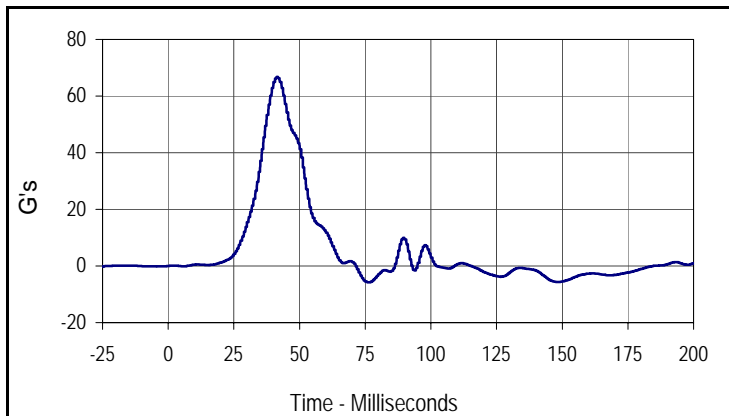
Test Date: 5/17/07
 NHTSA No.: G70113



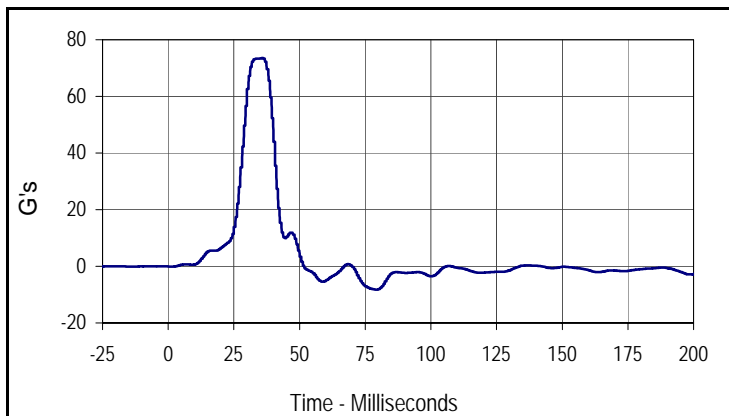
| Curve Description | | | |
|-------------------------------|------|-----------|-------|
| Passenger Upper Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 51.4 | 37.5 | -13.8 | 88.8 |



| Curve Description | | | |
|-------------------------------|------|-----------|-------|
| Passenger Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 65.2 | 38.8 | -18.1 | 89.4 |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Passenger Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 007 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 66.7 | 41.3 | -5.8 | 76.3 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Passenger Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 008 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 73.6 | 35.7 | -8.2 | 78.8 |

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

Test Date: 5/11/07

ATD Serial No.: 275

Test I.D.: N/A



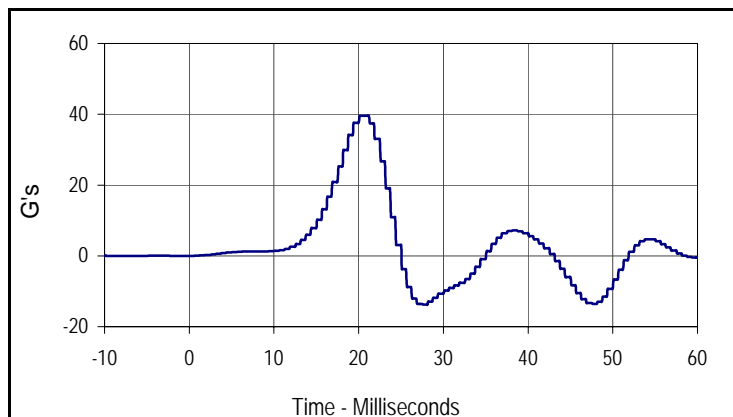
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------|-------|----------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| SH- Seated Height | mm | 889 to 909 | 892 | 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 | 513 | Pass |
| KV- Knee Pivot From Floor | mm | 490 to 505 | 503 | Pass |
| HW- Hip Width | mm | 356 to 391 | 375 | Pass |
| Overall Test Results | | | | Pass |

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

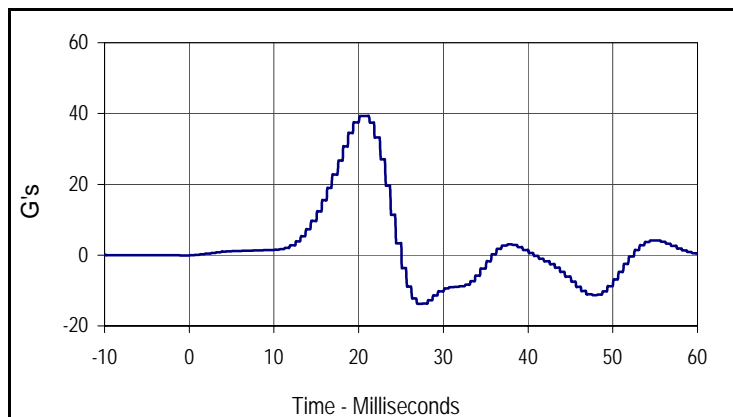
Test Date: 5/10/07
 Test I.D.: TH05R



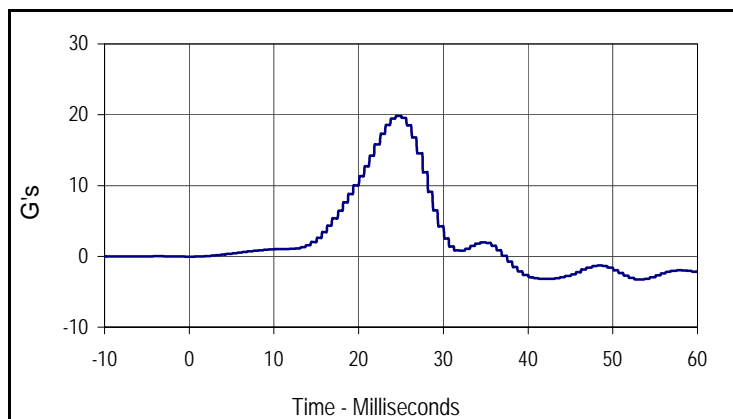
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.21 to 4.33 | 4.30 | Pass |
| Upper Rib Acceleration | G's | 37.0 to 46.0 | 37.6 | Pass |
| Lower Rib Acceleration | G's | 37.0 to 46.0 | 37.7 | Pass |
| Thoracic Spine Acceleration | G's | 15.0 to 22.0 | 20.3 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Upper Rib Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 37.6 | 18.9 | -10.2 | 28.9 |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Lower Rib Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 37.7 | 18.9 | -12.6 | 28.3 |



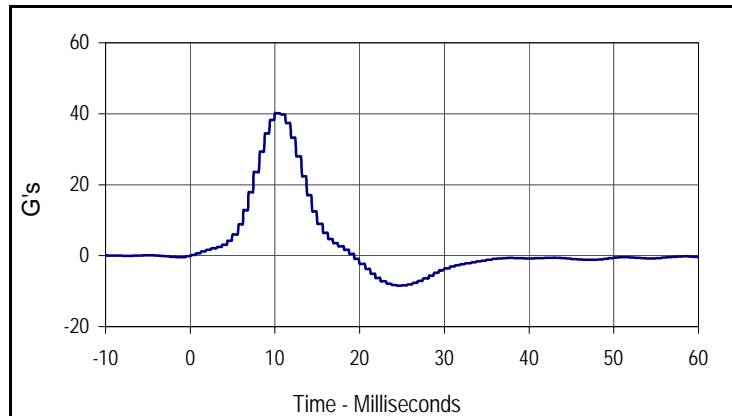
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Lower Spine Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 20.3 | 23.3 | -3.6 | 60.8 |

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

Test Date: 5/10/07
 Test I.D.: PL05T



| 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 | 4.28 | Pass |
| Peak Pelvis Acceleration | G's | 40.0 to 60.0 | 40.1 | Pass |
| Acceleration Time Above 20 G's | Msec. | 3.0 to 7.0 | 4.90 | Pass |
| Overall Test Results | | | | Pass |



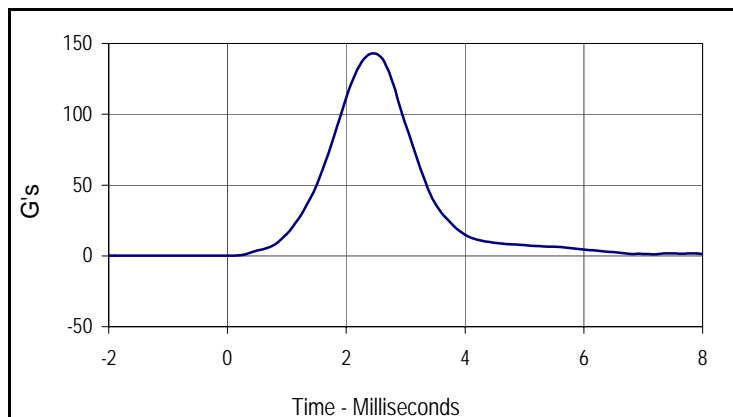
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 40.1 | 10.0 | -8.4 | 24.4 |

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

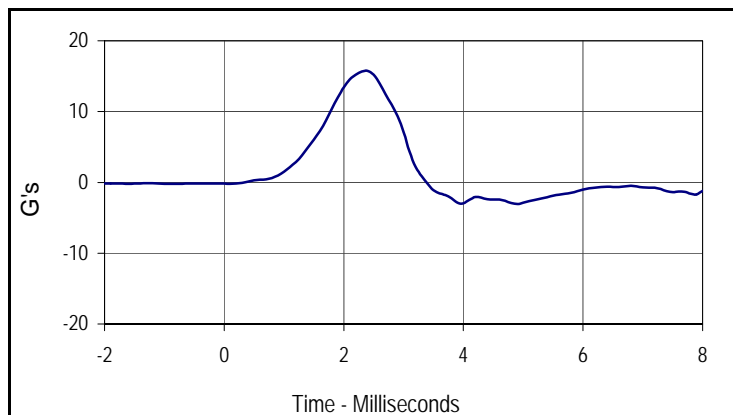
Test Date: 5/10/07
 Test I.D.: HD05R



| 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 | 137.6 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15.0 | 12.8 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 5.4 | Pass |
| Overall Test Results | | | Pass | Pass |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 137.6 | 2.3 | 0.4 | -1.8 |



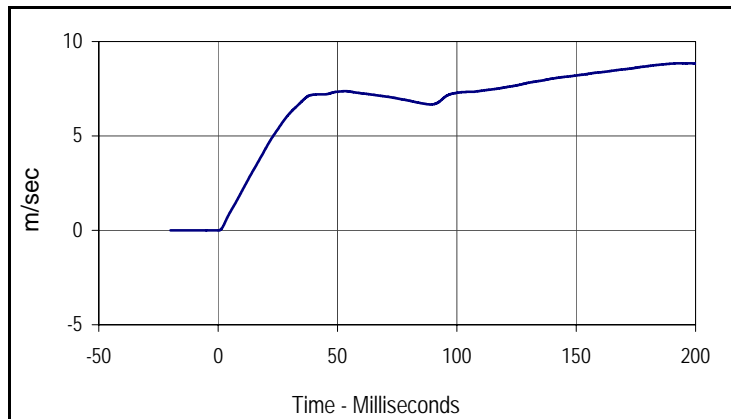
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 0.3 | -0.8 | -12.8 | 2.3 |

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

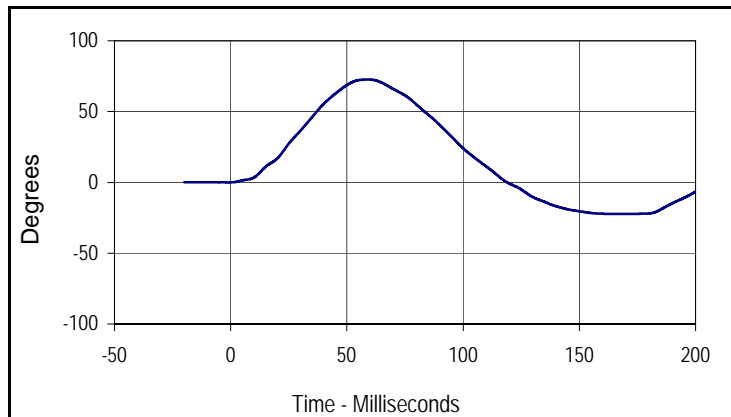
Test Date: 5/11/07
 Test I.D.: NB05R



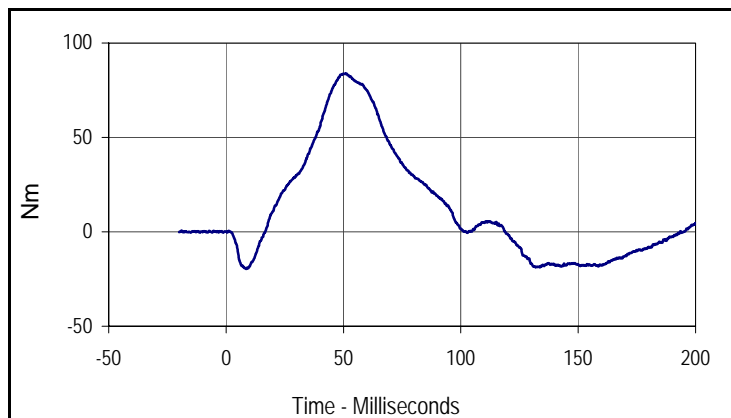
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|---------------------------------------|----------|---------------|--------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/sec | 6.89 to 7.13 | 7.07 | Pass | |
| Pendulum Deceleration | 10 Msec. | m/sec | 1.96 to 2.55 | 2.09 | Pass |
| | 20 Msec. | m/sec | 4.12 to 5.10 | 4.36 | Pass |
| | 30 Msec. | m/sec | 5.73 to 7.01 | 6.21 | Pass |
| | 40 to 70 | m/sec | 6.27 to 7.64 | 7.37 | Pass |
| "D" Plane Rotation | Max | Degrees | 66.0 to 82.0 | 72.6 | 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 | 83.8 | 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 |
| 8.8 | 192.7 | 0.0 | 0.0 |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| "D" Plane Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 60 | Degrees |
| Max | Time | Min | Time |
| 72.6 | 58.9 | -22.3 | 165.2 |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 83.8 | 51.2 | -19.6 | 8.6 |

Test Program: SID / HIII External Measurements

Test Date: 5/11/07

ATD Serial No.: 274

Test I.D.: N/A



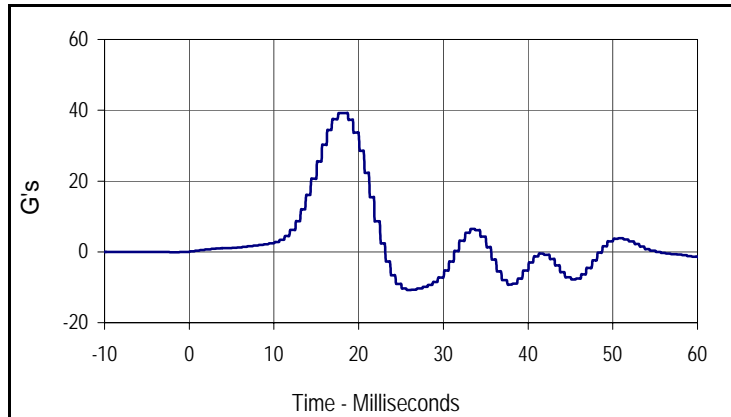
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------|-------|----------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| SH- Seated Height | mm | 889 to 909 | 890 | Pass |
| HP- Hip Point Height | mm | 99 (reference) | 99 | Pass |
| RH- Rib Height | mm | 502 to 520 | 509 | Pass |
| KH- Knee Pivot From Back Line | mm | 511 to 526 | 511 | Pass |
| KV- Knee Pivot From Floor | mm | 490 to 505 | 499 | Pass |
| HW- Hip Width | mm | 356 to 391 | 375 | Pass |
| Overall Test Results | | | | Pass |

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

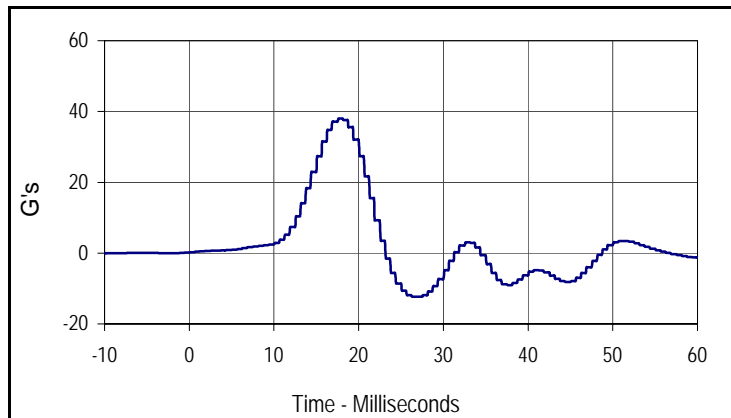
Test Date: 5/10/07
 Test I.D.: TH05Q



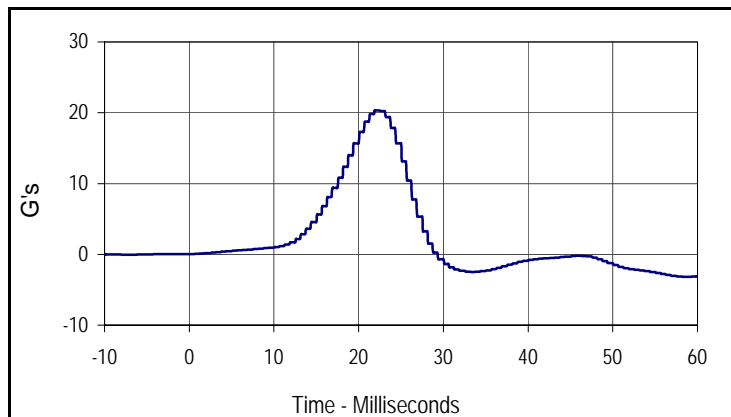
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.21 to 4.33 | 4.27 | Pass |
| Upper Rib Acceleration | G's | 37.0 to 46.0 | 37.6 | Pass |
| Lower Rib Acceleration | G's | 37.0 to 46.0 | 37.7 | Pass |
| Thoracic Spine Acceleration | G's | 15.0 to 22.0 | 20.3 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Upper Rib Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 37.6 | 18.9 | -10.2 | 28.9 |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Lower Rib Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 37.7 | 18.9 | -12.6 | 28.3 |



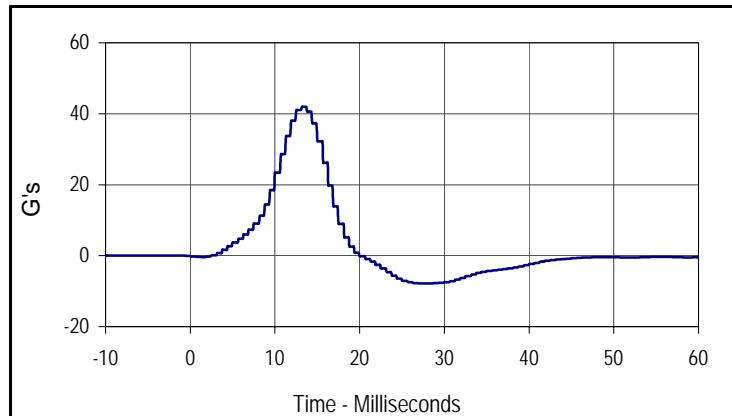
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Lower Spine Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 20.3 | 23.3 | -3.6 | 60.8 |

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

Test Date: 5/10/07
 Test I.D.: PL05R



| 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 |
| Peak Pelvis Acceleration | G's | 40.0 to 60.0 | 41.9 | Pass |
| Acceleration Time Above 20 G's | Msec. | 3.0 to 7.0 | 4.90 | Pass |
| Overall Test Results | | | | Pass |



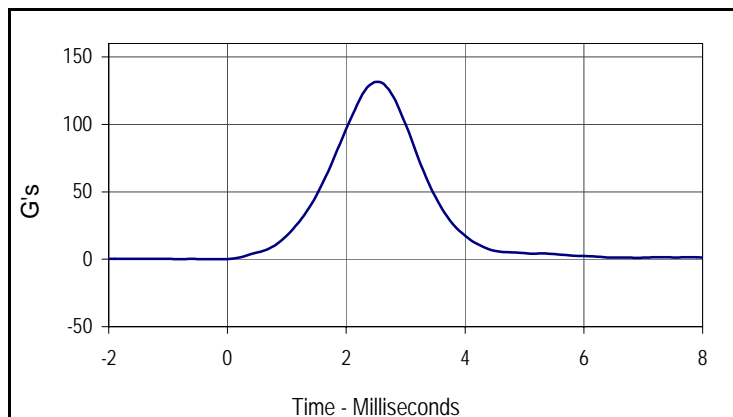
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 41.9 | 13.2 | -7.8 | 27.5 |

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

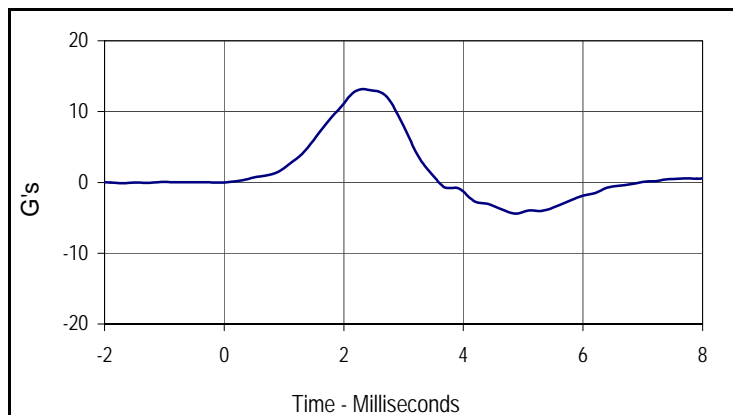
Test Date: 5/11/07
 Test I.D.: HD05Q



| 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 | 131.5 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15.0 | 13.2 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 3.4 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 131.5 | 2.5 | 0.1 | 0.0 |



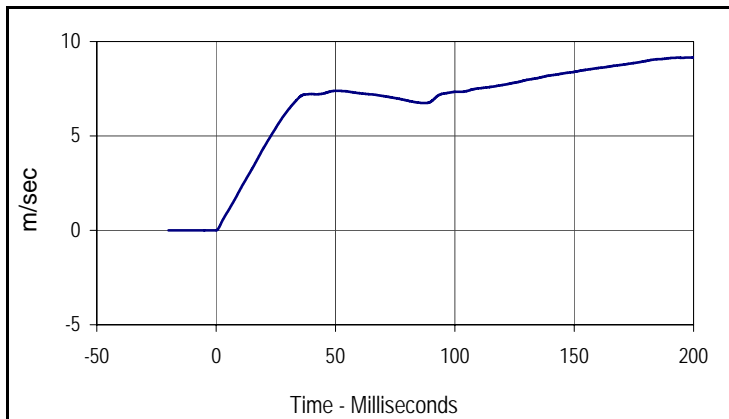
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 13.2 | 2.3 | -4.4 | 4.9 |

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

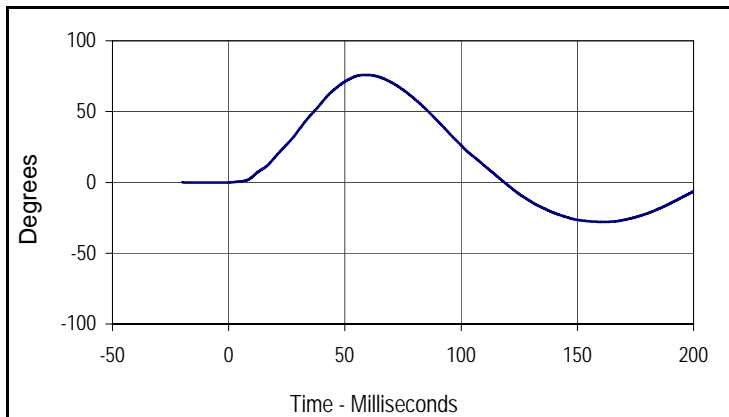
Test Date: 5/11/07
 Test I.D.: NB05Q



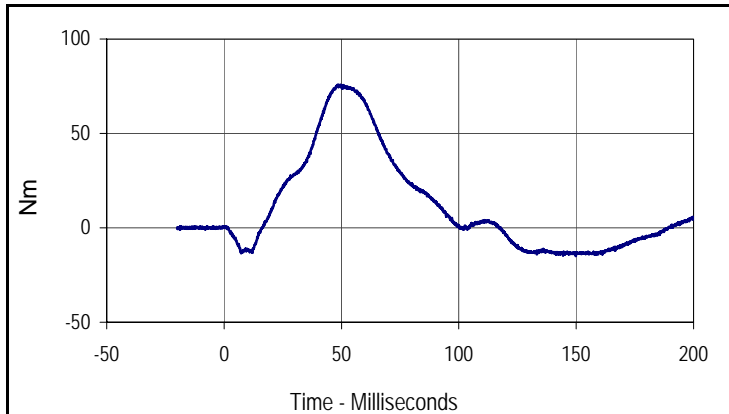
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|---------------------------------------|----------|---------------|--------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/sec | 6.89 to 7.13 | 7.08 | Pass | |
| Pendulum Deceleration | 10 Msec. | m/sec | 1.96 to 2.55 | 2.15 | Pass |
| | 20 Msec. | m/sec | 4.12 to 5.10 | 4.39 | Pass |
| | 30 Msec. | m/sec | 5.73 to 7.01 | 6.36 | Pass |
| | 40 to 70 | m/sec | 6.27 to 7.64 | 7.39 | Pass |
| "D" Plane Rotation | Max | Degrees | 66.0 to 82.0 | 75.9 | Pass |
| Max Rotation Time After Peak Moment | Msec. | 2.0 to 16.0 | 9.4 | Pass | |
| Rotation Time From Peak to Zero Angle | Msec. | 58.0 to 67.0 | 59.4 | Pass | |
| Moment About Occipital Condyle | Nm | 73.0 to 88.0 | 75.8 | 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 |
| 9.2 | 198.8 | 0.0 | -0.5 |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| "D" Plane Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 60 | Degrees |
| Max | Time | Min | Time |
| 75.9 | 59.2 | -27.8 | 161.2 |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 60 | Nm |
| Max | Time | Min | Time |
| 75.8 | 49.8 | -14.9 | 149.8 |

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

Test Program: SID / HIII External Measurements

Test Date: 5/11/07

ATD Serial No.: 275

Test I.D.: N/A



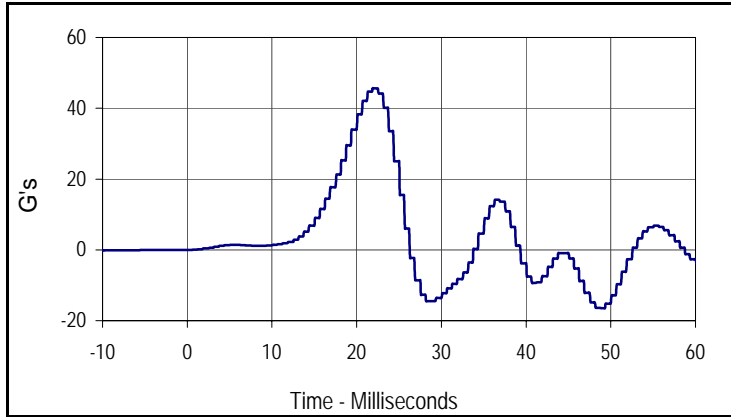
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------|-------|----------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| SH- Seated Height | mm | 889 to 909 | 891 | Pass |
| HP- Hip Point Height | mm | 99 (reference) | 99 | Pass |
| RH- Rib Height | mm | 502 to 520 | 513 | Pass |
| KH- Knee Pivot From Back Line | mm | 511 to 526 | 515 | Pass |
| KV- Knee Pivot From Floor | mm | 490 to 505 | 501 | Pass |
| HW- Hip Width | mm | 356 to 391 | 374 | Pass |
| Overall Test Results | | | | Pass |

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

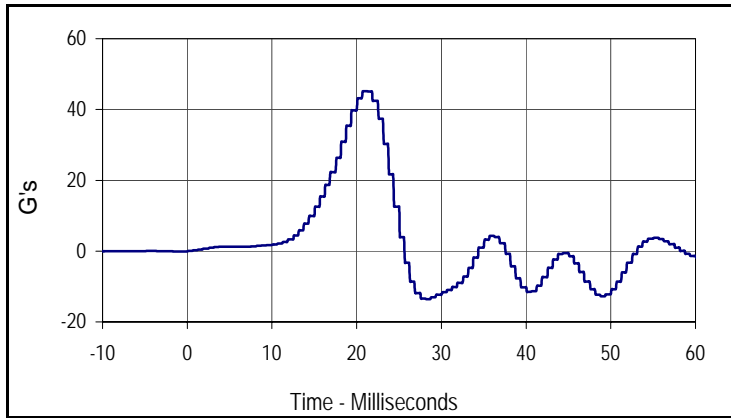
Test Date: 5/16/07
 Test I.D.: TH05U



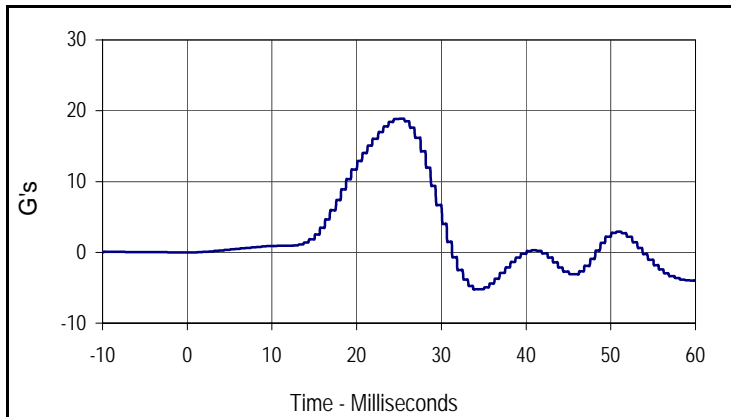
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.21 to 4.33 | 4.31 | Pass |
| Upper Rib Acceleration | G's | 37.0 to 46.0 | 45.6 | Pass |
| Lower Rib Acceleration | G's | 37.0 to 46.0 | 45.2 | Pass |
| Thoracic Spine Acceleration | G's | 15.0 to 22.0 | 18.9 | 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 |
| 45.6 | 21.9 | -16.5 | 48.8 |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 45.2 | 20.7 | -13.6 | 28.2 |



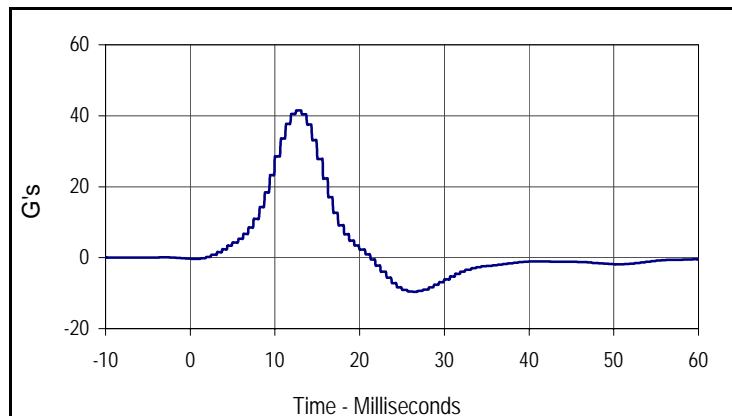
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 18.9 | 25.1 | -5.2 | 34.4 |

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

Test Date: 5/17/07
 Test I.D.: PL05U



| 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 | 41.5 | Pass |
| Acceleration Time Above 20 G's | Msec. | 3.0 to 7.0 | 5.50 | Pass |
| Overall Test Results | | | | Pass |



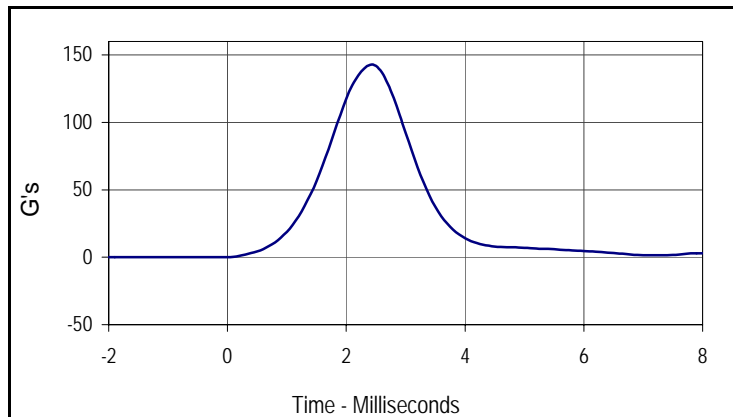
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 41.5 | 12.5 | -9.6 | 26.3 |

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

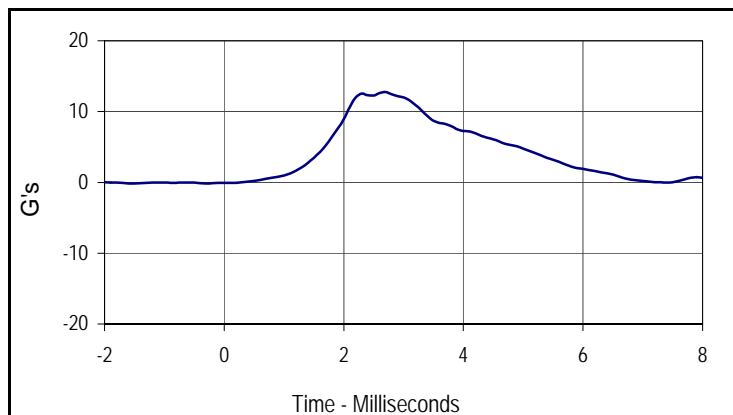
Test Date: 5/17/07
 Test I.D.: HD05U



| 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 | 120.0 to 150.0 | 142.7 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15.0 | 12.8 | 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 |
| 142.7 | 2.4 | 0.0 | -0.7 |



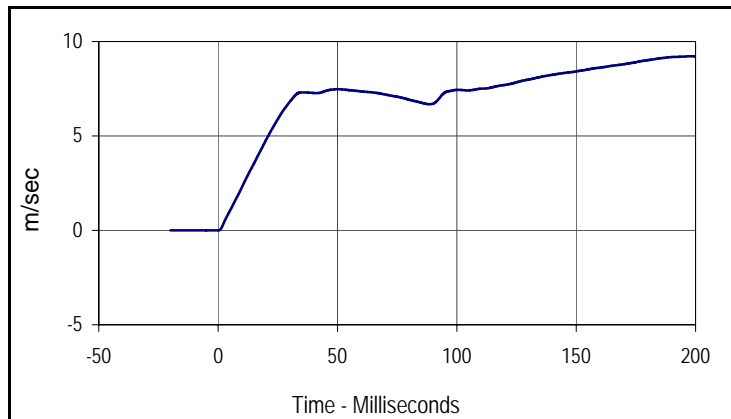
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 12.8 | 2.7 | -0.1 | -1.5 |

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

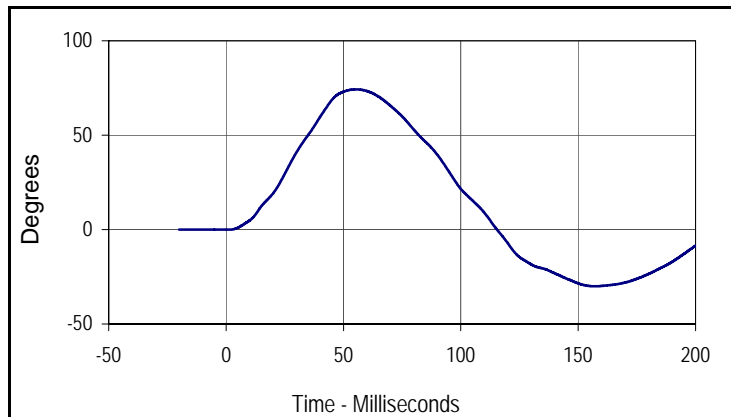
Test Date: 5/17/07
 Test I.D.: NB05U



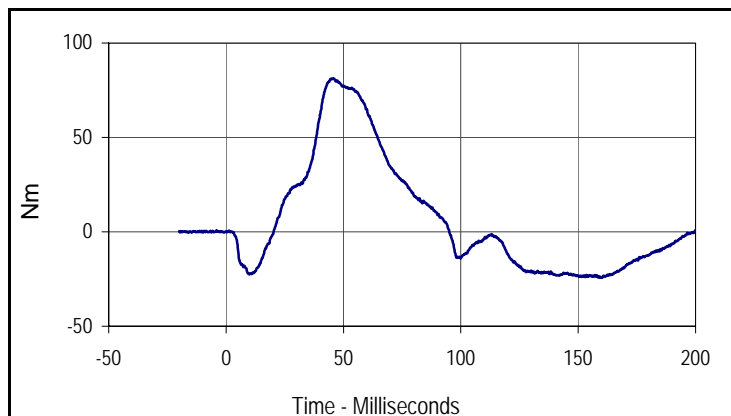
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|---------------------------------------|----------|---------------|--------------|-------------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/sec | 6.89 to 7.13 | 7.08 | Pass | |
| Pendulum Deceleration | 10 Msec. | m/sec | 1.96 to 2.55 | 2.30 | Pass |
| | 20 Msec. | m/sec | 4.12 to 5.10 | 4.77 | Pass |
| | 30 Msec. | m/sec | 5.73 to 7.01 | 6.81 | Pass |
| | 40 to 70 | m/sec | 6.27 to 7.64 | 7.47 | Pass |
| "D" Plane Rotation | Max | Degrees | 66.0 to 82.0 | 74.3 | 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 | 81.2 | 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 |
| 9.2 | 198.6 | 0.0 | -0.1 |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| "D" Plane Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 60 | Degrees |
| Max | Time | Min | Time |
| 74.3 | 55.3 | -30.1 | 157.1 |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 81.2 | 45.5 | -24.3 | 160.2 |

Test Program: SID / HIII External Measurements

Test Date: 5/17/07

ATD Serial No.: 274

Test I.D.: N/A



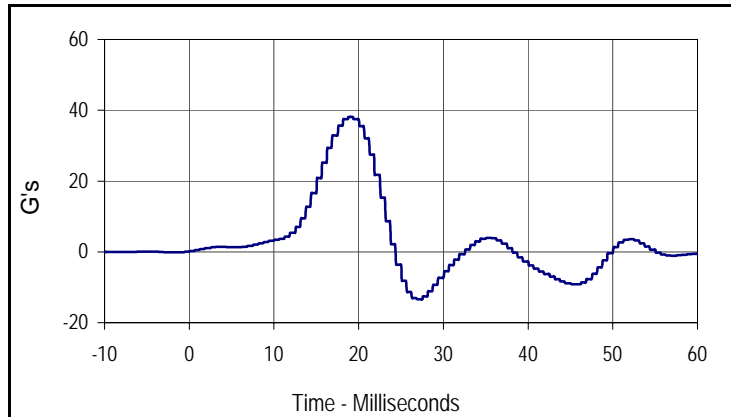
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------|-------|----------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| SH- Seated Height | mm | 889 to 909 | 892 | 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 | 513 | Pass |
| KV- Knee Pivot From Floor | mm | 490 to 505 | 500 | Pass |
| HW- Hip Width | mm | 356 to 391 | 374 | Pass |
| Overall Test Results | | | | Pass |

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

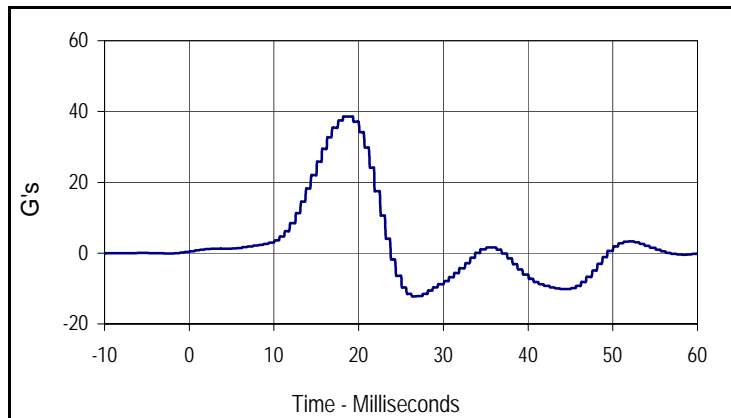
Test Date: 5/17/07
 Test I.D.: TH05V



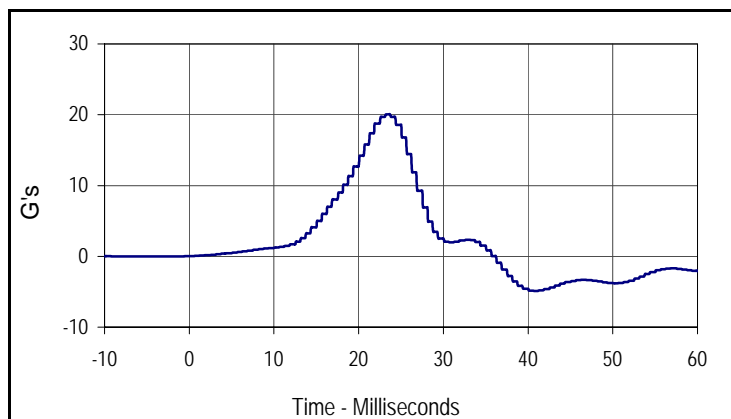
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | °C | 18.9 to 25.6 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass |
| Probe Velocity | m/s | 4.21 to 4.33 | 4.24 | Pass |
| Upper Rib Acceleration | G's | 37.0 to 46.0 | 38.1 | Pass |
| Lower Rib Acceleration | G's | 37.0 to 46.0 | 38.6 | Pass |
| Thoracic Spine Acceleration | G's | 15.0 to 22.0 | 20.1 | 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 |
| 38.1 | 18.8 | -13.4 | 26.9 |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 38.6 | 18.2 | -12.2 | 26.3 |



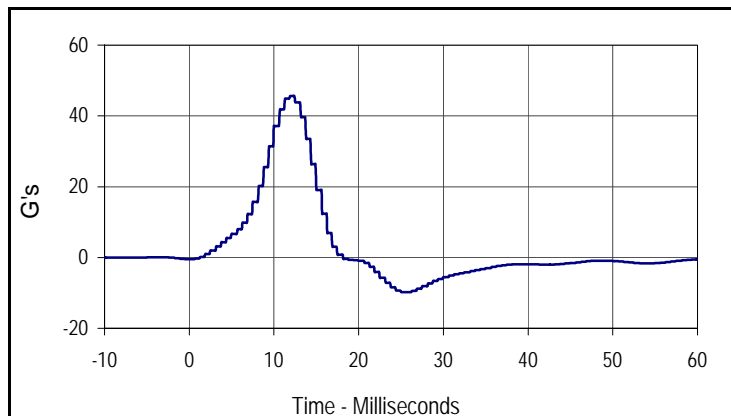
| Curve Description | | | |
|-----------------------|------|-----------|-------|
| Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 20.1 | 23.2 | -4.9 | 40.7 |

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

Test Date: 5/17/07
 Test I.D.: PL05V



| 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 | 45.6 | Pass |
| Acceleration Time Above 20 G's | Msec. | 3.0 to 7.0 | 6.70 | Pass |
| Overall Test Results | | | | Pass |



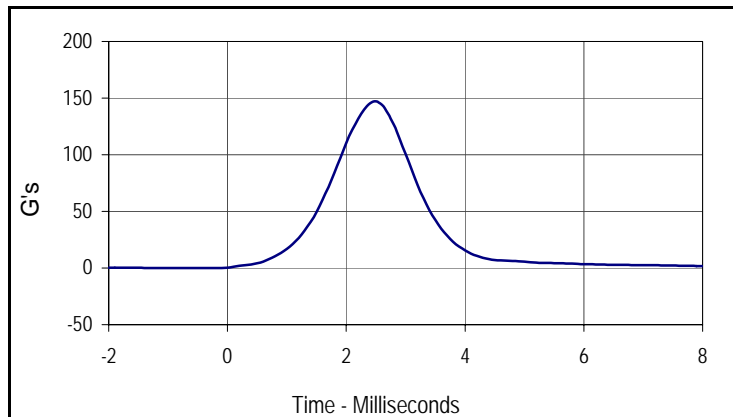
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | FIR100 | G's |
| Max | Time | Min | Time |
| 45.6 | 11.9 | -9.7 | 25.0 |

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

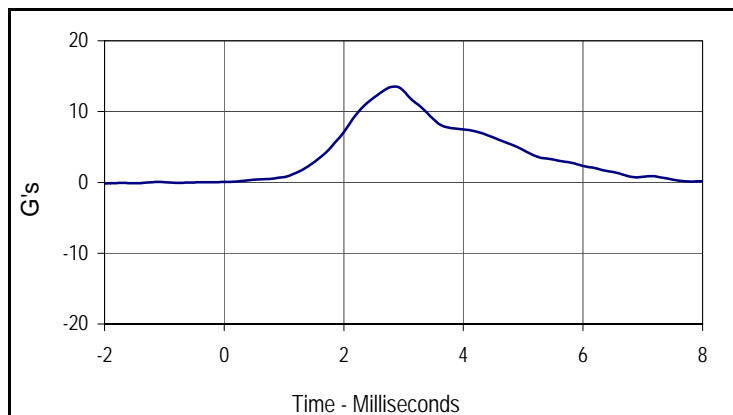
Test Date: 5/17/07
 Test I.D.: HD05V



| 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 | 147.3 | Pass |
| Peak Longitudinal Acceleration | G's | ≤15.0 | 13.5 | Pass |
| Is Acceleration Unimodal? | Yes/No | Yes | Yes | Pass |
| Oscillations After Main Pulse | % | <15 | 3.8 | Pass |
| Overall Test Results | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Resultant | | | |
| CURNO | Type | SAE Class | Units |
| 001 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 147.3 | 2.5 | 0.0 | -0.1 |



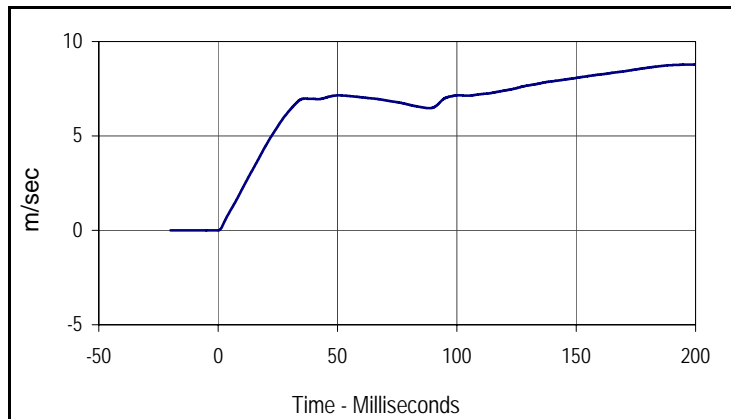
| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head X | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 13.5 | 2.8 | -0.1 | -2.0 |

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

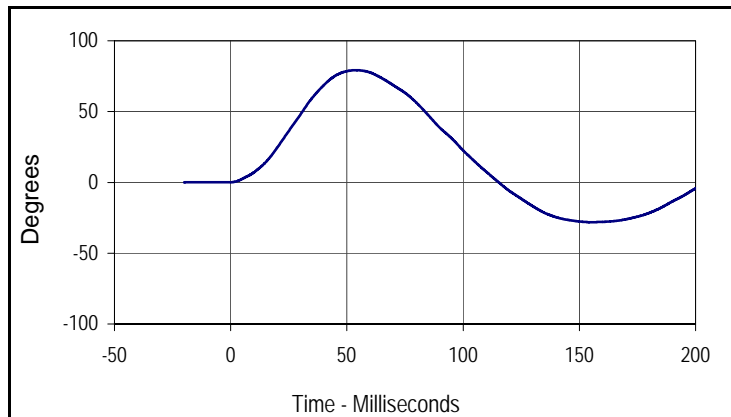
Test Date: 5/17/07
 Test I.D.: NB05V



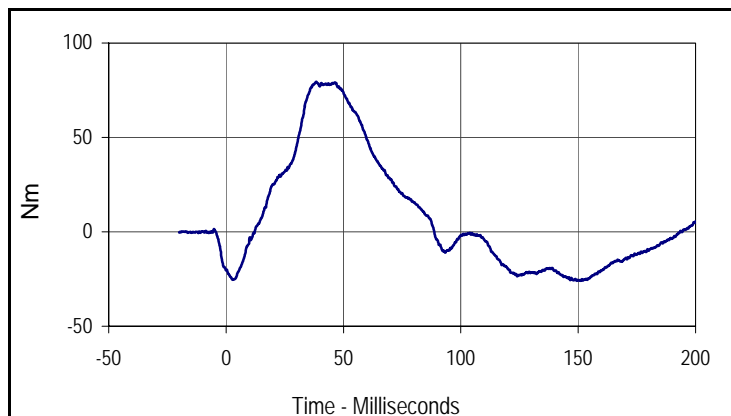
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|---------------------------------------|----------|---------------|--------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/sec | 6.89 to 7.13 | 7.06 | Pass | |
| Pendulum Deceleration | 10 Msec. | m/sec | 1.96 to 2.55 | 2.18 | Pass |
| | 20 Msec. | m/sec | 4.12 to 5.10 | 4.49 | Pass |
| | 30 Msec. | m/sec | 5.73 to 7.01 | 6.37 | Pass |
| | 40 to 70 | m/sec | 6.27 to 7.64 | 7.15 | Pass |
| "D" Plane Rotation | Max | Degrees | 66.0 to 82.0 | 79.3 | Pass |
| Max Rotation Time After Peak Moment | Msec. | 2.0 to 16.0 | 15.5 | Pass | |
| Rotation Time From Peak to Zero Angle | Msec. | 58.0 to 67.0 | 61.6 | Pass | |
| Moment About Occipital Condyle | Nm | 73.0 to 88.0 | 79.5 | 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 |
| 8.8 | 196.6 | 0.0 | -0.1 |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| "D" Plane Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 60 | Degrees |
| Max | Time | Min | Time |
| 79.3 | 53.8 | -28.1 | 155.3 |



| Curve Description | | | |
|--------------------------------|------|-----------|-------|
| Moment About Occipital Condyle | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 79.5 | 38.3 | -26.0 | 151.0 |

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P27125-01-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 PONTIAC VIBE
4-DOOR**

NHTSA NUMBER: G70113

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




MAY 17, 2007


FINAL REPORT


**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: W43-410
400 SEVENTH STREET, SW, ROOM 5311
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.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by:  Date: May 17, 2007
Mr. Johnny H. Dutto, Project Engineer
KARCO Engineering, LLC

Reviewed by:  Date: May 17, 2007
Mr. Michael L. Dunlap, Quality Assurance Manager
KARCO Engineering, LLC

Approved by:  Date: May 17, 2007
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

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-P27125-01-NC | 2. Government Accession No. | 3. Recipients Catalog No. | | |
| 4. Title and Subtitle Final Report of a Combi Connection CRS NHTSA No. G70113 | | 5. Report Date May 17, 2007 | | |
| | | 6. Performing Organization Code KAR | | |
| 7. Authors Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco | | 8. Performing Organization Report No. TR-P27125-01-NC | | |
| 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: W43-410 1200 New Jersey Ave SE Washington, D.C 20590 | | 13. Type of Report and Period Covered Final Test Report Base Year | | |
| | | 14. Sponsoring Agency Code DOT/NHTSA/NRMOCS | | |
| 15. Supplementary Notes | | | | |
| 16. Abstract A side impact test was conducted on the subject CRS Combi Connection in conjunction with side impact NCAP testing on a 2007 Pontiac Vibe 4-Door and in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at Karco Engineering, LLC on May 17, 2007. | | | | |
| Measurement Description | | Units | Threshold | Right Rear (P3) |
| Head Injury Criteria (HIC15) | | N/A | 390 | 122.8 |
| 3 msec. Chest Clip | | G's | 50 | 36.7 |
| 17. Key Words New Car Assessment Program (Side Impact NCAP) Side Impact Moving Deformable Barrier (MDB) Final Report of a Combi Connection CRS | | | 18. Distribution of Statement Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, D.C. 20590 | |
| 19. Security Classification (this report) Unclassified | 20. Security Classification (this page) Unclassified | 21. No. of Pages 44 | 22. Price | |

TABLE OF CONTENTS

| <u>Section</u> | <u>Description</u> | <u>Page</u> |
|-------------------|------------------------------------|---------------|
| D-1 | Purpose and Summary of Test G70113 | D1-1 to D1-8 |
| D-2 | Photographs | D2-1 to D2-18 |
| D-3 | CRABI Response and CRS Data Traces | D3-1 to D3-2 |
| D-4 | CRABI Calibration Information | D4-1 to D4-6 |
| <u>Data Sheet</u> | <u>Description</u> | <u>Page</u> |
| 1 | Crash Test Summary | D1-2 |
| 2 | Vehicle Parameter Data | D1-3 |
| 3 | CRABI Positioning in Vehicle | D1-4 |
| 4 | CRS Performance Data | D1-6 |
| 5 | CRS Accelerometer Locations | D1-7 |
| 6 | CRS Camera Locations and Data | D1-8 |

SECTION D-1

PURPOSE AND SUMMARY OF TEST G70113

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 anchors.

The right rear (Serial No. 017) CRABI was calibrated prior to this test. CRABI calibration information is found in Section D-4.

| CHILD DUMMY VALUES | | |
|--------------------|-------------|--------------------|
| Location | HIC15 Value | 3 Msec. Chest Clip |
| CRABI (P3) | 122.8 | 36.7 |

DATA SHEET NO.1
CRASH TEST SUMMARY

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

CHILD RESTRAINT SYSTEM INFORMATION

| Description | Position #3 CRS |
|------------------|-----------------|
| Manufacturer | Combi |
| Model Name | Connection |
| Serial No. | XCC-024970 |
| Type | Infant |
| Forward/Rearward | Rearward |

VISIBLE DUMMY CONTACT POINTS

| Description | Position #3 CRS |
|--------------------|-----------------|
| Head Contact | None |
| Chest Contact | None |
| Abdomen Contact | None |
| Left Knee Contact | None |
| Right Knee Contact | None |
| Left Toe Contact | Seat back |
| Right Toe Contact | Seat back |

POST-TEST DOOR OPENINGS

| Description | Position #3 CRS |
|-----------------|---|
| Right Rear Door | Opened without tools, Remained closed during test |

CAMERA COVERAGE

| 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: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

TEST VEHICLE WEIGHTS

| | Units | As Delivered Weights (UVW) | | | As Tested Weights (ATW) | | |
|--------|-------|----------------------------|-----------|-------|-------------------------|-----------|-------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 380 | 261 | 641 | 436 | 330 | 766 |
| Right | kg | 371 | 254 | 625 | 399 | 302 | 701 |
| Ratio | % | 59.3 | 40.7 | 100 | 56.9 | 43.1 | 100 |
| Totals | kg | 751 | 515 | 1266 | 835 | 632 | 1467 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value |
|---------------------------------------|-------|-------|
| Total Delivered Weight (UVW) | kg | 1266 |
| Weight of 2 P572 ATD's | kg | 161 |
| Rated Cargo/Luggage Wt. (RCLW) | kg | 45 |
| Calculated Vehicle Target Wt. (TVTWT) | kg | 1472 |

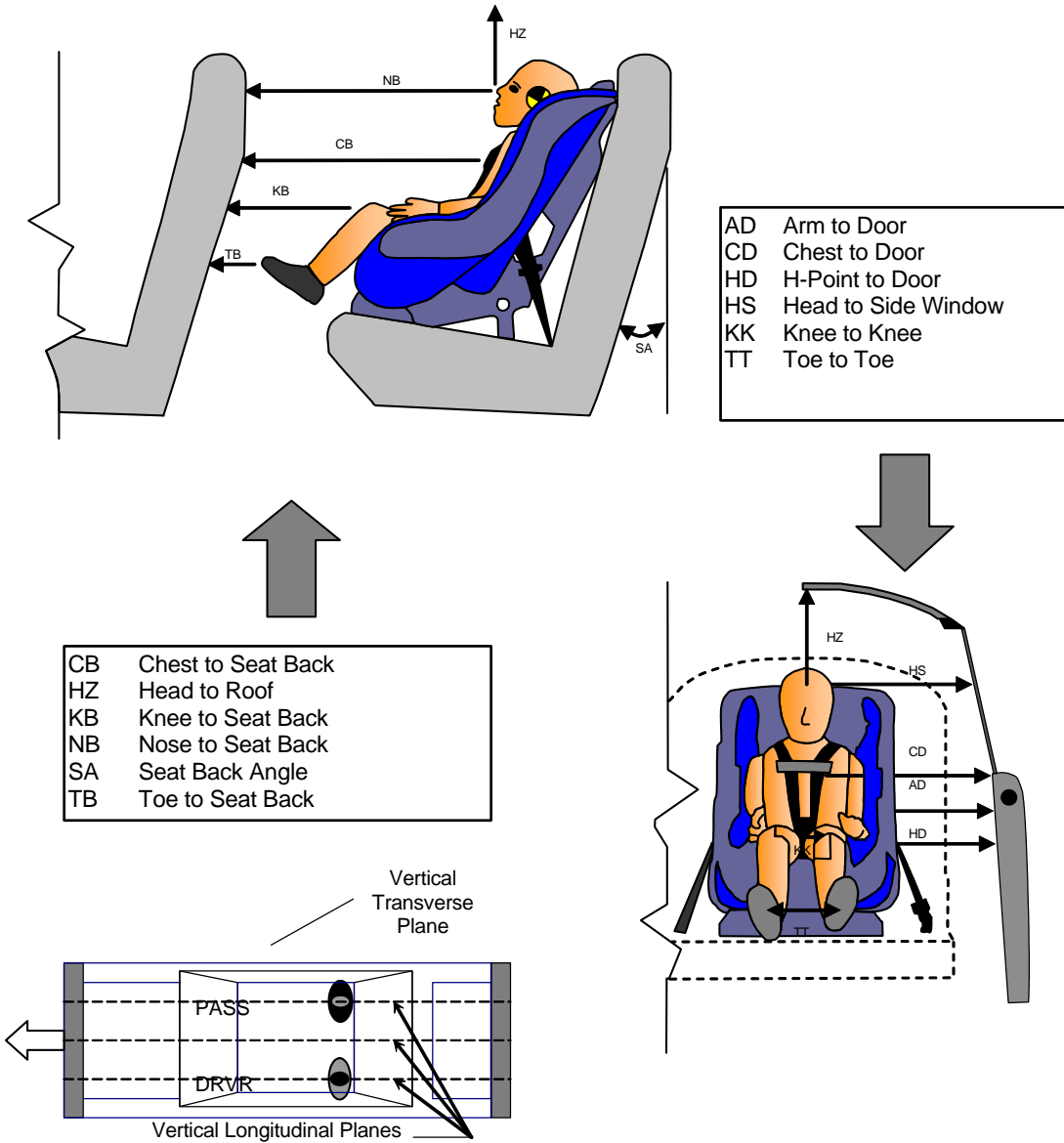
DATA SHEET NO.3
CRABI POSITIONING IN VEHICLE

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07



DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO.3
CRABI POSITIONING IN VEHICLE...(CONTINUED)

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

CRABI POSITION MEASUREMENTS

| Code | Measurement | P3 (Passenger's Side) | |
|----------|---------------------|-----------------------|-----------|
| | | Length (mm) | Angle (°) |
| SA | Seat Back Angle | | 69.7 |
| HZ | Head to Roof (Z) | 484 | |
| CD | Chest to Door | 404 | |
| KK | Knee to Knee (Y) | 160 | |
| HS | Head to Side Window | 375 | |
| HD | H-Point to Door (Y) | 310 | |
| AD | Arm to Door | 262 | |
| NB | Nose to Seat Back | 504 | |
| CB | Chest to Seat Back | 442 | |
| FF | Foot to Foot | 195 | |
| KB-Left | Knee to Seat Back | 195 | |
| KB-Right | Knee to Seat Back | 188 | |
| TB-Left | Toe to Seat Back | 2 | |
| TB-Right | Toe to Seat Back | 3 | |

DATA SHEET NO.4
CRS PERFORMANCE DATA

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

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 | None |
| Lower Anchor Buckle | No | None |
| Lower Anchor Hooks | No | None |
| Veh. Lower CRS Anchors | No | None |
| 5-Point Harness Connections | No | None |
| Cracks on CRS | No | None |
| Fabric Tears on CRS | No | None |
| Vehicle Seat Structure | No | None |
| Vehicle Seat Fabric Tears | No | None |

DATA SHEET NO. 5...(CONTINUED)
CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

| Loc. No. | Accelerometer Location | Measurements (mm) | | |
|----------|------------------------|-------------------|-----|-----|
| | | X | Y | Z |
| 1 | CRS | 1602 | 509 | 742 |
| 2 | CRS Base | 1602 | 509 | 621 |

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: 2007 Pontiac Vibe 4-Door

NHTSA No.: G70113

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

Test Date: 5/17/07

CAMERA LOCATIONS

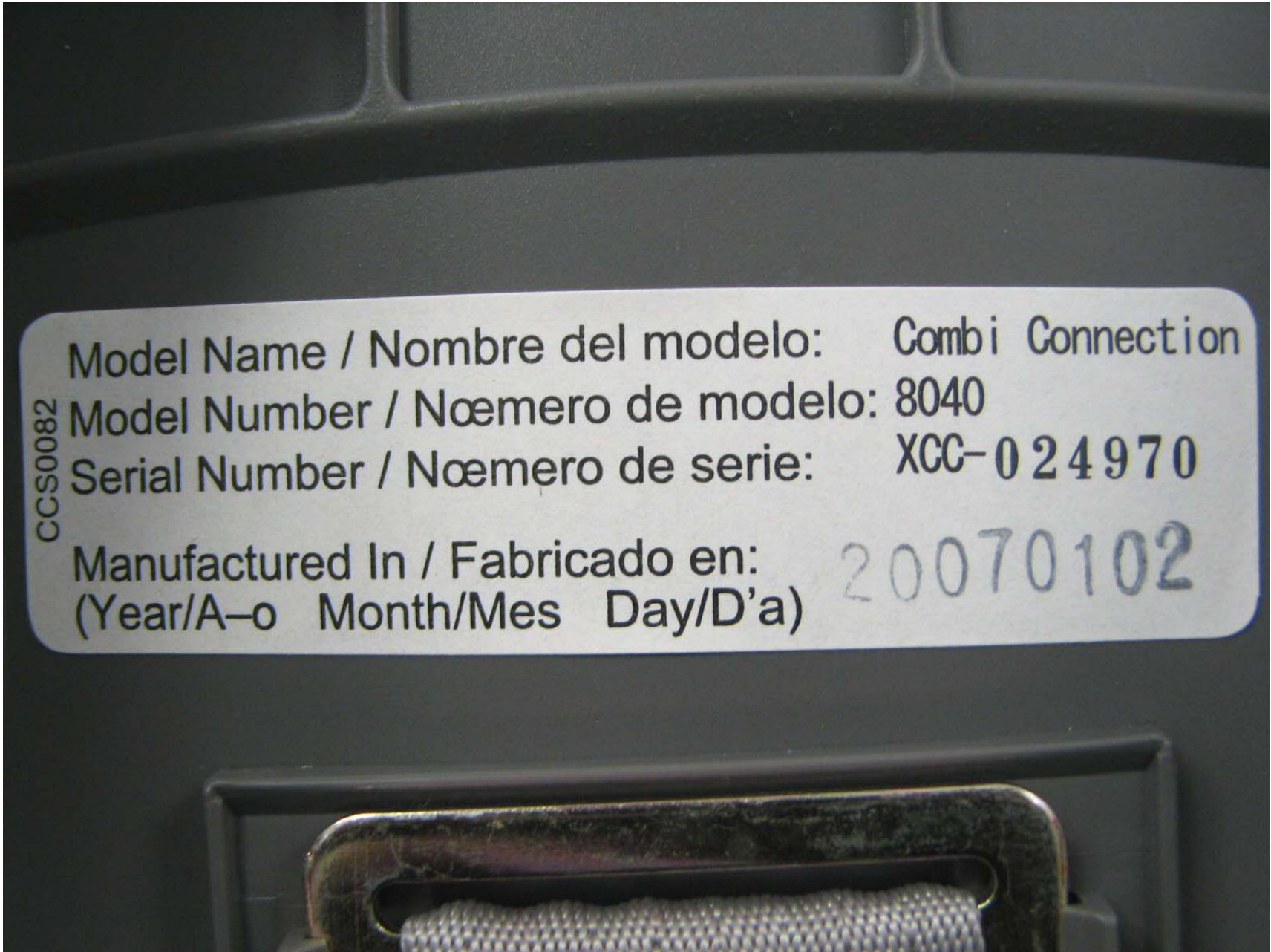
| No. | Camera View | Location(mm) | | | Angle (Deg.) | Film Plane to Head | Lens (mm) | Speed (fps) |
|-----|----------------------|--------------|------|-------|--------------|--------------------|-----------|-------------|
| | | X | Y | Z | | | | |
| 1 | Passenger CRS (O.B.) | 1838 | 2040 | -1328 | -2 | n/a | 10 | 1000 |

X = Barrier Face Y = Monorail Centerline 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 |
| 11 | Post-Test Position 3 Front View (Head and Seat Belt Position) | D-11 |
| 12 | Pre-Test Position 3 Front View (Seat Belt Position) | D-12 |
| 13 | Post-Test Position 3 Front View (Seat Belt Position) | D-13 |
| 14 | Pre-Test Position 3 Right Side View | D-14 |
| 15 | Post-Test Position 3 Right Side View | D-15 |
| 16 | Pre-Test Position 3 Left Side View | D-16 |
| 17 | Post-Test Position 3 Left Side View | D-17 |
| 18 | Post-Test Position 3 Dummy Legs | D-18 |



Model Name / Nombre del modelo: Combi Connection
Model Number / Nømero de modelo: 8040
Serial Number / Nømero de serie: XCC-024970
Manufactured In / Fabricado en: 20070102
(Year/A-o Month/Mes Day/D'a)

CCS0082

Figure D2-1: Position 3 CRS Label

This Space Intentionally Left Blank



D2-2

TR-P27125-01-NC

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



D2-3

TR-P27125-01-NC

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



D2-4

TR-P27125-01-NC

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)

**Photograph Not
Available**

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)

**Photograph Not
Available**

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



D2-14

TR-P27125-01-NC

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

**Photograph Not
Available**

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



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

**Photograph Not
Available**

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

Photograph Not Available

SECTION D3

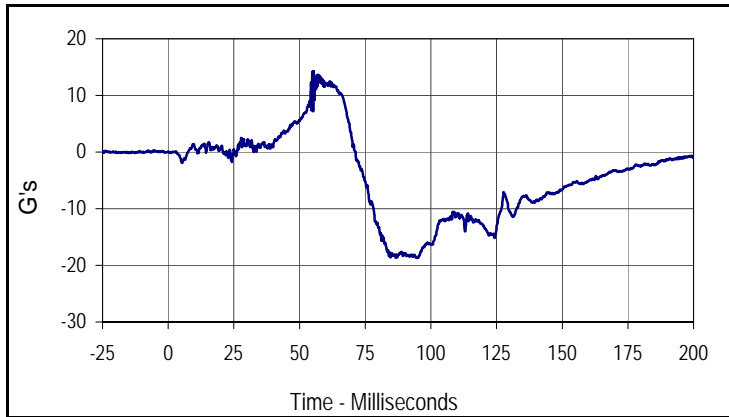
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

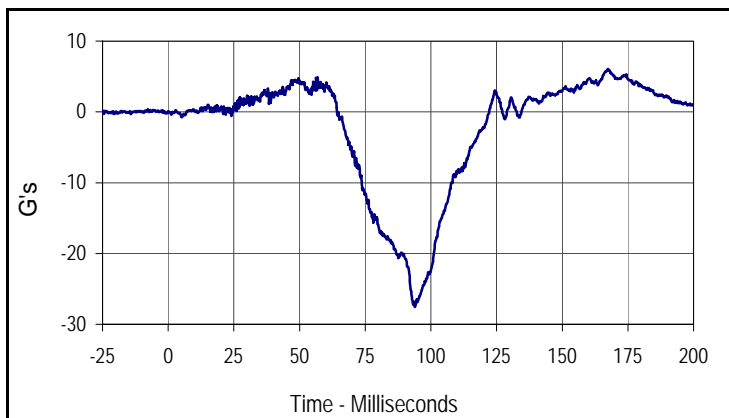
| <u>Data Plot</u> | | <u>Page</u> |
|------------------|----------------------------------|-------------|
| D3-1 | Right Rear CRABI Head X | D3-1 |
| | Right Rear CRABI Head Y | D3-1 |
| | Right Rear CRABI Head Z | D3-1 |
| | Right Rear CRABI Head Resultant | D3-1 |
| D3-2 | Right Rear CRABI Chest X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

Test Vehicle: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

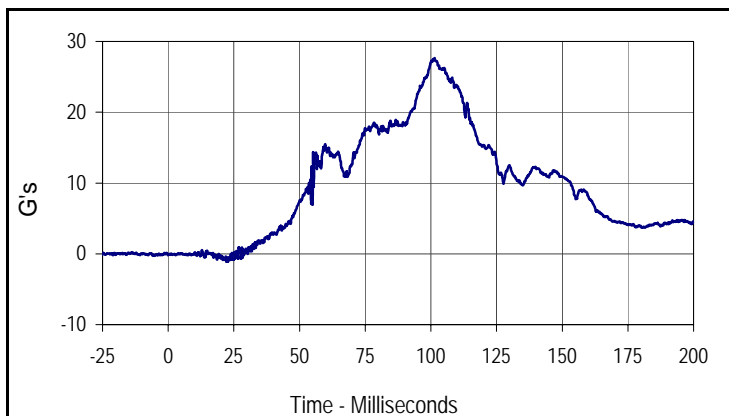
Test Date: 5/17/07
 NHTSA No.: G70113



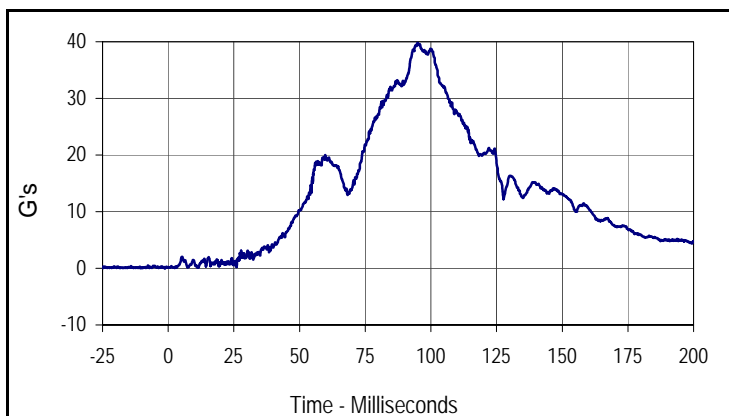
| Curve Description | | | |
|-------------------|------|-----------|-------|
| CRABI Head X (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 072 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 14.2 | 55.4 | -18.7 | 94.7 |



| Curve Description | | | |
|-------------------|-------|-----------|-------|
| CRABI Head Y (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 073 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 6.0 | 167.5 | -27.5 | 93.9 |



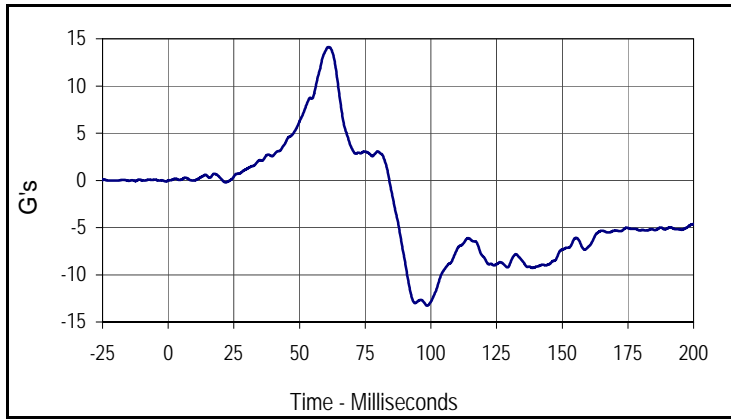
| Curve Description | | | |
|-------------------|-------|-----------|-------|
| CRABI Head Z (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 074 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 27.6 | 101.4 | -1.1 | 22.2 |



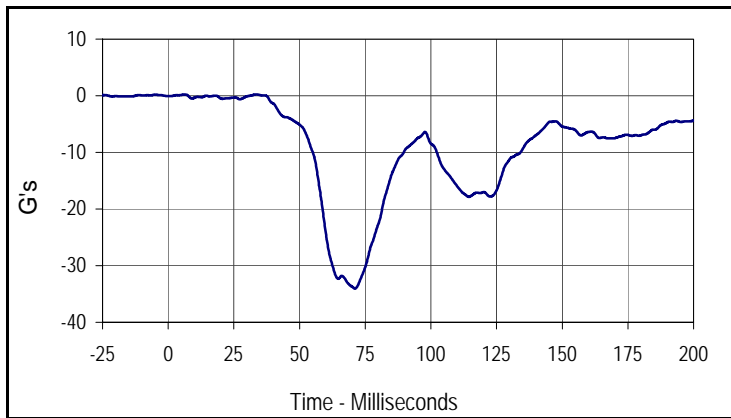
| Curve Description | | | |
|---------------------------|------|-----------|-------|
| CRABI Head Resultant (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 072 | RES | 1000 | G's |
| Max | Time | Min | Time |
| 39.8 | 95.0 | 0.1 | 2.4 |

Test Vehicle: 2007 Pontiac Vibe 4-Door
 Test Program: 55/28 km/h Side Impact NCAP

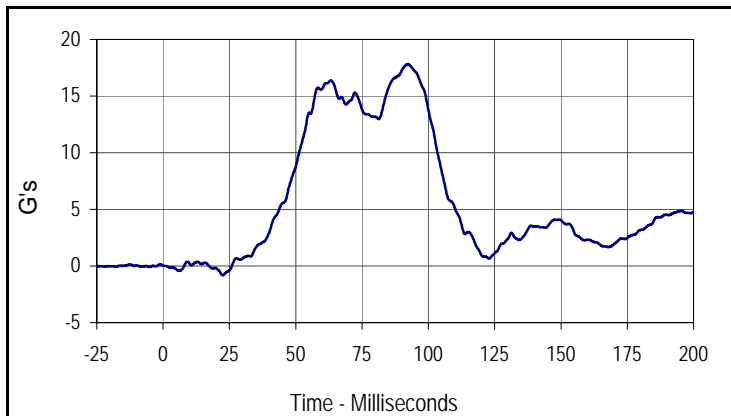
Test Date: 5/17/07
 NHTSA No.: G70113



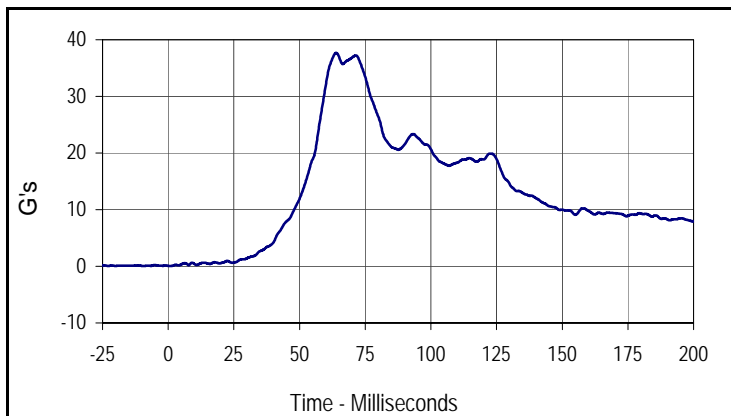
| Curve Description | | | |
|--------------------|------|-----------|-------|
| CRABI Chest X (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 082 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 14.1 | 61.1 | -13.3 | 98.6 |



| Curve Description | | | |
|--------------------|------|-----------|-------|
| CRABI Chest Y (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 083 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 0.2 | 33.3 | -34.1 | 71.1 |



| Curve Description | | | |
|--------------------|------|-----------|-------|
| CRABI Chest Z (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 084 | FIL | 180 | G's |
| Max | Time | Min | Time |
| 17.8 | 92.3 | -0.8 | 22.5 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| CRABI Chest Resultant (P3) | | | |
| CURNO | Type | SAE Class | Units |
| 082 | RES | 180 | G's |
| Max | Time | Min | Time |
| 37.7 | 63.9 | 0.1 | 0.1 |

SECTION D4

CRABI CALIBRATION INFORMATION

Test Program: CRABI 12 Month Old Frontal Head Drop Test

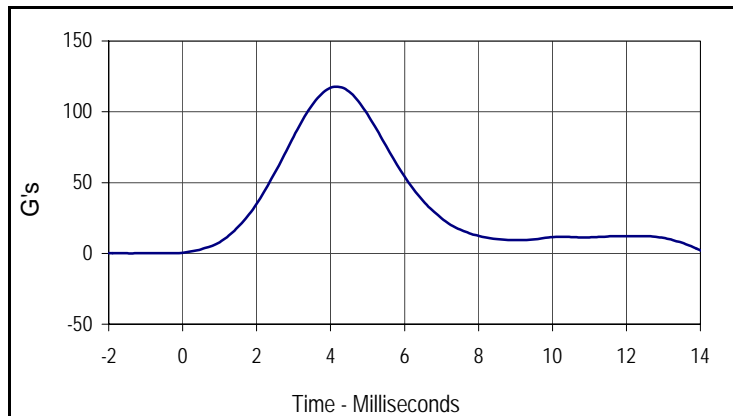
Test Date: 5/15/07

ATD Serial No.: 022

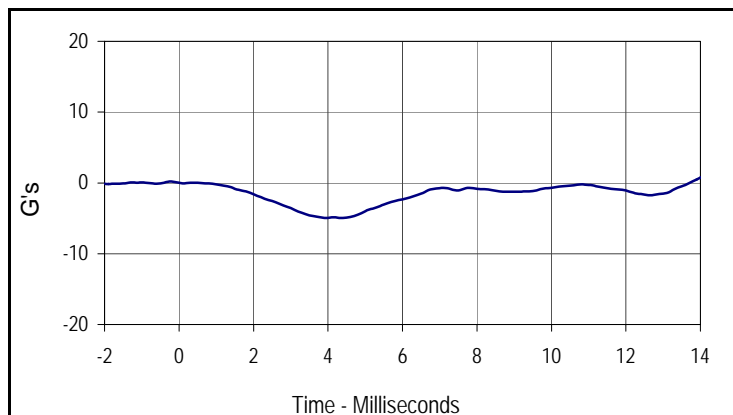
Test I.D.: HD05Y



| 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 | 117.7 | Pass |
| Peak Lateral Acceleration | G's | ≤15.0 | 5.0 | 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 |
| 117.7 | 4.2 | 0.0 | -1.4 |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Head Y | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 1000 | G's |
| Max | Time | Min | Time |
| 0.2 | -0.2 | -5.0 | 4.4 |

Test Program: CRABI 12 Month Old Rear Head Drop Test

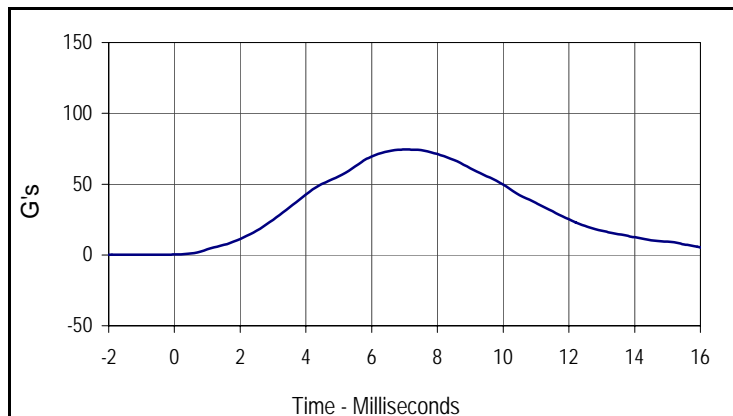
Test Date: 5/15/07

ATD Serial No.: 022

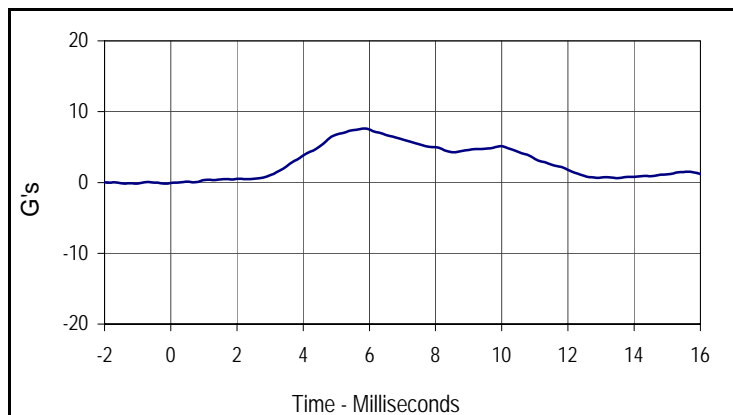
Test I.D.: RHD05Y



| 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 | 69.5 | 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 |
| 69.5 | 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

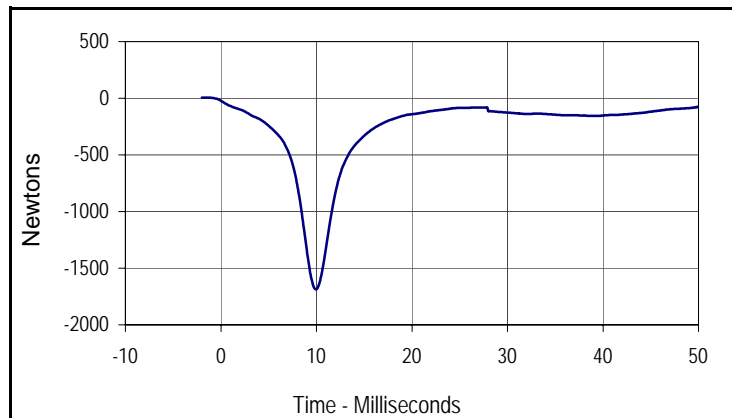
Test Date: 5/15/07

ATD Serial No.: 022

Test I.D.: CH05Y



| 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 | 4.90 | Pass |
| Peak Probe Force | Newtons | -1514 to -1796 | -1687 | Pass |
| Overall Test Results | | | | Pass |



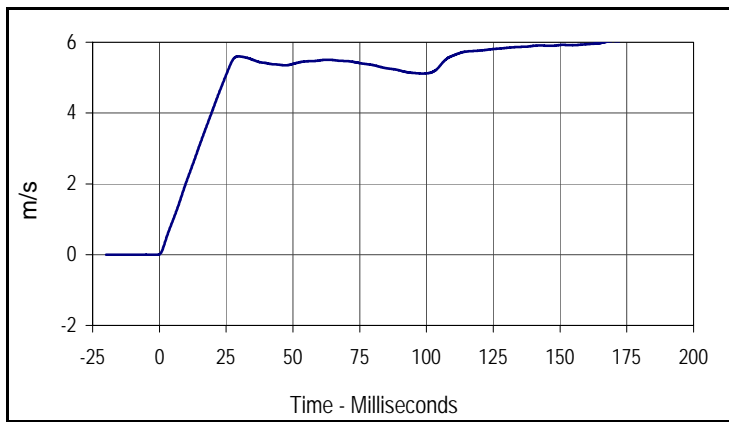
| Curve Description | | | |
|-------------------|------|-----------|---------|
| Probe Force | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | Newtons |
| Max | Time | Min | Time |
| 6.0 | -1.7 | -1687.4 | 10.0 |

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

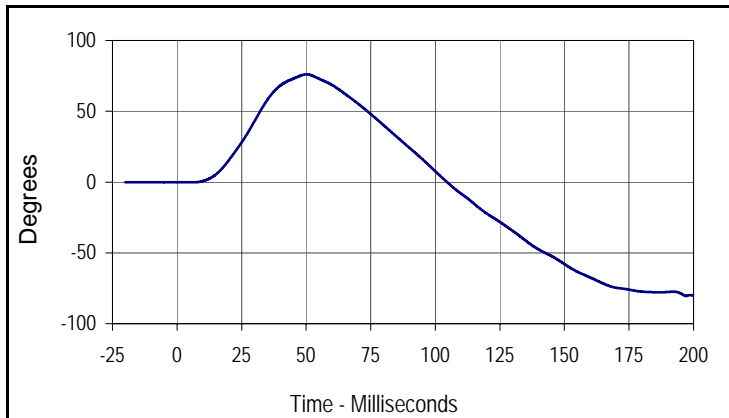
Test Date: 5/16/04
 Test I.D.: NF05Y



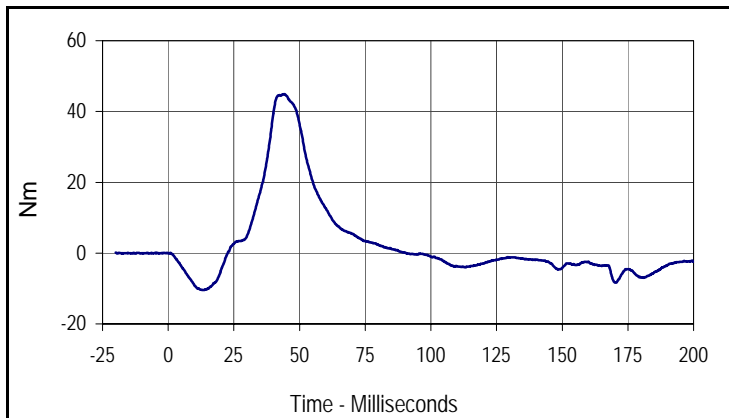
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|-------------------------------------|----------|---------------|--------------|-------------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 5.10 to 5.30 | 5.18 | Pass | |
| Pendulum Deceleration | 10 Msec. | m/s | 1.6 to 2.3 | 2.0 | Pass |
| | 20 Msec. | m/s | 3.4 to 4.2 | 4.1 | Pass |
| | 25 Msec. | m/s | 4.3 to 5.2 | 5.1 | 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 | 42.0 | Pass |
| Positive Moment Decay, Time To 5 Nm | Msec. | | 60.0 to 80.0 | 71.0 | Pass |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|-------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | m/s |
| Max | Time | Min | Time |
| 6.2 | 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 |



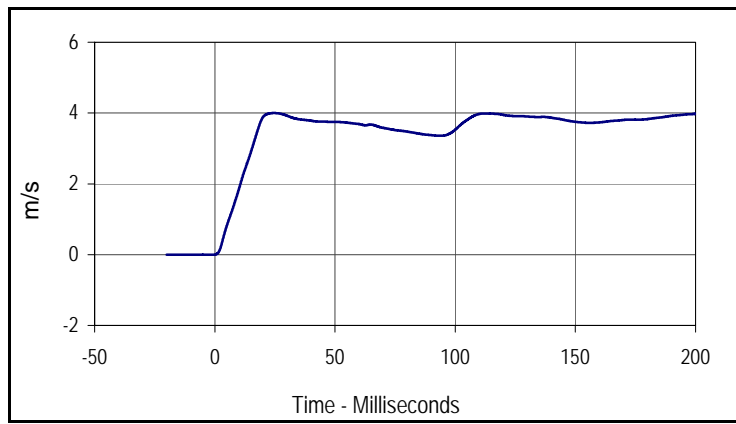
| Curve Description | | | |
|--------------------|------|-----------|-------|
| Upper Neck Force Y | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 44.9 | 44.3 | -10.4 | 13.5 |

Test Program: CRABI 12 Month Old Neck Extension Test
 ATD Serial No.: 017

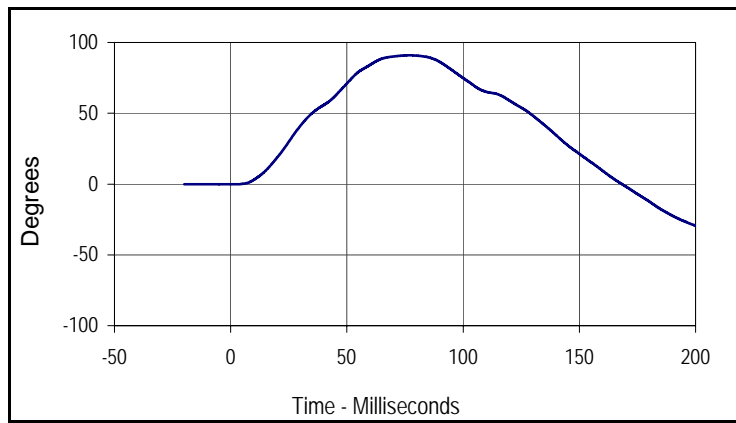
Test Date: 5/15/07
 Test I.D.: NE05Y



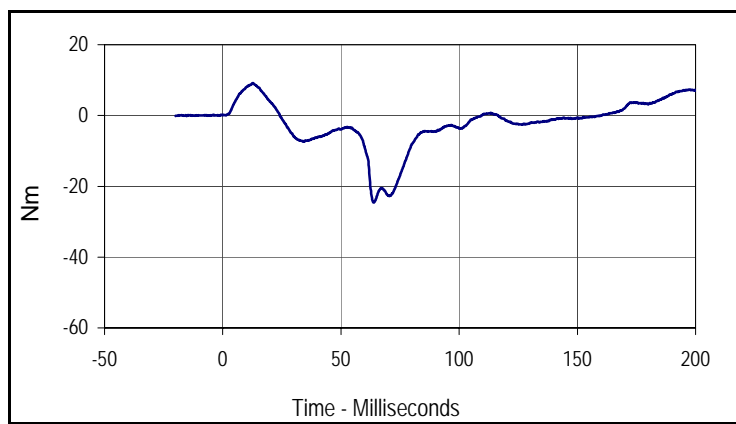
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--------------------------------------|----------|---------------|--------------|-----------|------|
| Laboratory Temperature | °C | 20.6 to 22.2 | 21.1 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 30 | Pass | |
| Pendulum Velocity | m/s | 2.4 to 2.6 | 2.41 | Pass | |
| Pendulum Deceleration | 6 Msec. | m/s | 0.8 to 1.2 | 1.0 | Pass |
| | 10 Msec. | m/s | 1.5 to 2.1 | 1.8 | Pass |
| | 14 Msec. | m/s | 2.2 to 2.9 | 2.7 | Pass |
| "D" Plane Rotation | Max | Degrees | 80.0 to 92.0 | 90.9 | Pass |
| Peak Moment in Rotation | Max | Nm | -12 to -23 | -13.0 | Pass |
| Positive Moment Decay, Time To -5 Nm | Msec. | | 76.0 to 90.0 | 80.1 | Pass |
| Overall Test Results | | | | Pass | |



| Curve Description | | | |
|-------------------|------|-----------|-------|
| Pendulum Velocity | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIL | 180 | m/s |
| Max | Time | Min | Time |
| 4.0 | 24.6 | 0.0 | -0.7 |



| Curve Description | | | |
|--------------------|------|-----------|---------|
| "D" Plane Rotation | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIL | 60 | Degrees |
| Max | Time | Min | Time |
| 90.9 | 77.0 | -29.3 | 200.0 |



| Curve Description | | | |
|---------------------|------|-----------|-------|
| Upper Neck Moment Y | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIL | 600 | Nm |
| Max | Time | Min | Time |
| 9.1 | 12.8 | -24.6 | 63.8 |

Test Program: CRABI 12 Month Old External Dimensions

Test Date: 5/14/07

ATD Serial No.: 022

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 | 457 | Pass |
| B - Shoulder pivot height | mm | 276.6 to 291.8 | 280 | Pass |
| C - "H" point height | mm | 27.9 to 38.1 | 36 | 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 | 54 | Pass |
| F - Thigh clearance | mm | 63.0 to 73.2 | 65 | Pass |
| G - Elbow pivot to fingertip | mm | 176.6 to 191.8 | 180 | Pass |
| I - Shoulder pivot to elbow pivot | mm | 99.1 to 114.3 | 104 | Pass |
| J - Elbow rest height | mm | 150.1 to 165.3 | 157 | Pass |
| K - Buttock to knee length | mm | 202.7 to 217.9 | 203 | Pass |
| L - Popliteal length | mm | 138.7 to 153.9 | 140 | Pass |
| M - Knee pivot height | mm | 165.1 to 180.3 | 168 | Pass |
| N - Buttock popliteal length | mm | 144.8 to 160.0 | 149 | Pass |
| O - Chest depth with jacket | mm | 107.5 to 122.7 | 109 | Pass |
| P - Foot length | mm | 92.4 to 102.6 | 101 | 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 | 132 | Pass |
| T - Head Depth | mm | 149.9 to 165.1 | 154 | Pass |
| U - Hip breadth | mm | 158.5 to 173.7 | 163 | Pass |
| V - Shoulder breadth | mm | 200.7 to 215.9 | 213 | Pass |
| W - Foot breadth | mm | 39.1 to 49.3 | 45 | Pass |
| Y - Chest circumference with jacket | mm | 452.4 to 477.8 | 462 | Pass |
| Z - Waist circumference | mm | 447.0 to 472.4 | 454 | Pass |
| AA - Reference location for dimension Y & O | mm | 256.5 to 266.7 | 262 | Pass |
| BB - Reference Location For dimension Z | mm | 106.7 to 116.9 | 108 | Pass |
| CC - Shoulder Height | mm | 299.7 to 314.9 | 307 | Pass |
| DD - Chin Height | mm | 289.6 to 304.8 | 299 | Pass |
| Overall Test Results | | | | Pass |