

REPORT NUMBER TR-P28003-10-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**FORD MOTOR CO.
2009 FORD FLEX SE
5-DOOR MPV**

NHTSA NUMBER: M90201

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




JULY 15, 2008


FINAL REPORT


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U.S. DEPARTMENT OF TRANSPORTATION
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Prepared by:  _____ Date: July 15, 2008
Mr. Kelsey A. Chiu, Project Engineer
KARCO Engineering, LLC

Reviewed by:  _____ Date: July 15, 2008
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC

Approved by:  _____ Date: July 15, 2008
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

Manager, Side Impact NCAP

Date of Acceptance

Technical Report Documentation Page

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| 4. Title and Subtitle Final Report of Side Impact New Car Assessment Program Testing of a 2009 Ford Flex SE 5-Door MPV NHTSA No. M90201 | | 5. Report Date July 15, 2008 | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 15. Supplementary Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. Abstract A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2009 Ford Flex SE 5-Door MPV 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 July 15, 2008. The impact velocity of the Moving Deformable Barrier was 61.96 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 33.9 deg. C. The target vehicle's maximum post-test static crush was 265 mm located at level 3. The test vehicle's occupant performance data is as follows: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Measurement Description</th> <th style="width: 20%;">Driver SID/HIII</th> <th style="width: 20%;">Pass. SID/HIII</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) G's</td> <td style="text-align: center;">24.5</td> <td style="text-align: center;">27.0</td> <td></td> </tr> <tr> <td>Left Lower Rib (LLR) G's</td> <td style="text-align: center;">19.4</td> <td style="text-align: center;">31.9</td> <td></td> </tr> <tr> <td>Lower Spine (T₁₂) G's</td> <td style="text-align: center;">31.0</td> <td style="text-align: center;">32.3</td> <td></td> </tr> <tr> <td>Thoracic Trauma Index (TTI) G's</td> <td style="text-align: center;">28.0</td> <td style="text-align: center;">32.0</td> <td></td> </tr> <tr> <td>Pelvis (PEV) G's</td> <td style="text-align: center;">43.6</td> <td style="text-align: center;">55.7</td> <td></td> </tr> </tbody> </table> | | | | Measurement Description | Driver SID/HIII | Pass. SID/HIII | | Left Upper Rib (LUR) G's | 24.5 | 27.0 | | Left Lower Rib (LLR) G's | 19.4 | 31.9 | | Lower Spine (T ₁₂) G's | 31.0 | 32.3 | | Thoracic Trauma Index (TTI) G's | 28.0 | 32.0 | | Pelvis (PEV) G's | 43.6 | 55.7 | |
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| Left Upper Rib (LUR) G's | 24.5 | 27.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Left Lower Rib (LLR) G's | 19.4 | 31.9 | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Pelvis (PEV) G's | 43.6 | 55.7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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, Room W43-410 Washington, DC 20590 | | | | | | | | | | | | | | | | | | | | | | | | | |
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2008 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact data on a 2009 Ford Flex SE 5-door MPV manufactured by Ford Motor Co.

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 2009 Ford Flex SE 5-Door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.96 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 2222 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on July 15, 2008.

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

Both the driver and passenger doors remained closed during the impact. The test vehicle sustained a maximum static crush of 265 mm at level 3, 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 are summarized as follows:

| Measurement | Units | Driver | Passenger |
|-----------------------------|-------|--------|-----------|
| Thoracic Trauma Index (TTI) | G's | 28 | 32 |
| Peak Pelvic G's (PEV) | G's | 44 | 56 |

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

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 | 1.609344 |
| Length or Distance | Measurements | in | mm | 25.4 |
| Volume | Fuel Systems | gal | liter | 3.785 |
| Volume | Small Fluids | oz | mL | 29.573 |
| Pressure | Tire Pressures | lbf/in ² | kPa | 7.0 |
| Volume | Liquid | gal | liter | 3.785 |
| Temperature | General Use | °F | °C | $=(tf - 32)/1.8$ |
| 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: 2009 Ford Flex SE 5-Door MPV NHTSA No.: M90201
 Test Program: 55/28 km/h Side Impact NCAP Test Date: 07/15/08

TEST VEHICLE INFORMATION AND OPTIONS

| | |
|------------------|-------------------|
| NHTSA No. | M90201 |
| Make | Ford |
| Model | Flex SE |
| Body Style | 5-Door MPV |
| Vin No. | 2FMDK51C09BA07653 |
| Color | White |
| Delivery Date | 7/8/2008 |
| Odometer (Miles) | 61.7 |
| Dealer | Sunrise Ford |
| Transmission | 4-Speed Automatic |
| Final Drive | Front |
| Type/No. Cyl. | V6 |
| Engine Disp. (L) | 3.5 |
| Engine Placement | Transverse |
| Roof Rack | No |
| Sunroof/T-Top | No |
| Tinted Glass | Yes |
| Traction Control | Yes |
| Power Brakes | Yes |
| Front Disc | Yes |
| Rear Disc | Yes |

| | |
|---------------------------|------|
| Anti-Lock Brakes | Yes |
| All Wheel Drive | No |
| Power Steering | Yes |
| Driver Front Airbag | Yes |
| Driver 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 | Yes |
| Power Windows | Yes |
| Power Seats | Yes |
| Other | None |

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

DATA FROM CERTIFICATION LABEL

| | |
|---------------------|----------------|
| Manufactured By | Ford Motor Co. |
| Date of Manufacture | Jun-08 |

| | |
|-----------------|------|
| GVWR (kg) | 2708 |
| GAWR Front (kg) | 1311 |
| GAWR Rear (kg) | 1420 |

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

| Measured Parameter | Front | Rear | Third | Total |
|----------------------------|--------|-------|-------|-------|
| Type of Seats | Bucket | Bench | Bench | |
| Number of Occupants | 2 | 3 | 2 | 7 |
| Capacity Weight (VCW) (kg) | | | | 526 |
| Cargo Weight (RCLW) (kg) | | | | 49.9 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

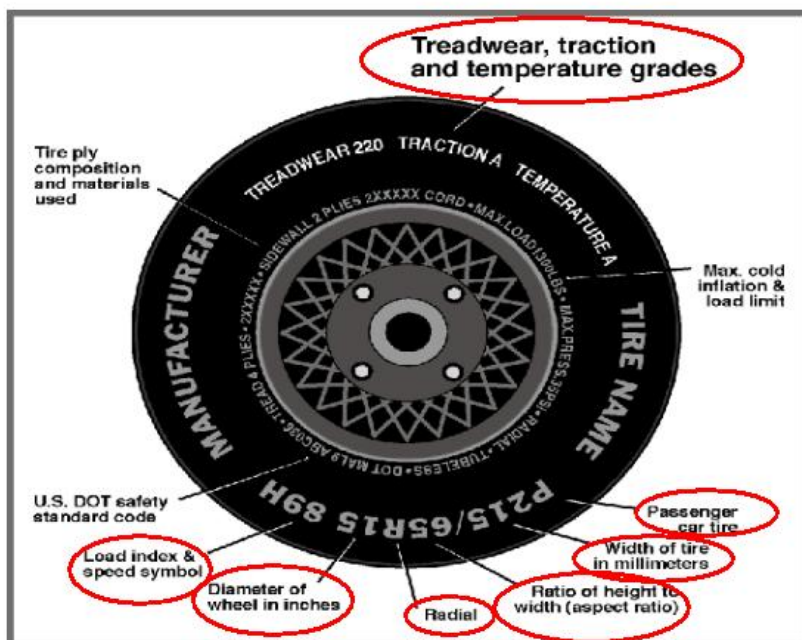
Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

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) | 357 | 357 |
| Cold Pressure (kpa) | 240 | 240 |
| Recommended Tire Size | 235/60R18 | 235/60R18 |
| Tire Size on Vehicle | 235/60R18 | 235/60R18 |
| Tire Manufacturer | Goodyear | Goodyear |
| Treadwear | 700 | 700 |
| Traction | A | A |
| Temperature Grades | B | B |
| Tire Plies Sidewall | 2 Polyester | 2 Polyester |
| Tire Plies Body | 2 Steel, 2 Polyester | 2 Steel, 2 Polyester |
| Load Index/Speed Symbol | 102T | 102T |
| Tire Material | Steel, Polyester | Steel, Polyester |
| DOT Safety Code Right | 4B7A 013R 2108 | 4B7A 013R 2108 |
| DOT Safety Code Left | 4B7A 013R 2108 | 4B7A 013R 2108 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV NHTSA No.: M90201
 Test Program: 55/28 km/h Side Impact NCAP Test Date: 07/15/08

TEST VEHICLE WEIGHTS

| | Units | As Delivered Weights (UVW) | | | As Tested Weights (ATW) | | |
|-------|-------|----------------------------|-----------|-------|-------------------------|-----------|-------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 561 | 445 | 1005 | 610 | 518 | 1128 |
| Right | kg | 570 | 442 | 1012 | 595 | 499 | 1094 |
| Ratio | % | 56.1 | 43.9 | 100.0 | 54.2 | 45.8 | 100.0 |
| Total | kg | 1130 | 886 | 2017 | 1205 | 1017 | 2222 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value |
|-------------------------------------|-------|-------|
| Total Delivered Weight (UVW) | kg | 2017 |
| Weight of 2 P572 ATDs | kg | 162 |
| Rated Cargo/Luggage Wt (RCLW) | kg | 50 |
| Calculated Vehicle Target Wt (TVTW) | kg | 2229 |

TEST VEHICLE ATTITUDES AND CG

| | Units | LF | RF | LR | RR | CG Aft of Front Axle |
|--------------|-------|-----|-----|-----|-----|----------------------|
| As Delivered | mm | 798 | 801 | 832 | 834 | 1314 |
| As Tested | mm | 790 | 785 | 808 | 815 | 1368 |
| Fully Loaded | mm | 789 | 784 | 808 | 813 | |

GENERAL TEST VEHICLE DATA

| Measurement Description | Units | Value |
|------------------------------------|-------|-------|
| Test Vehicle Wheel Base | mm | 2990 |
| Total Vehicle Length at Left Side | mm | 3586 |
| Total Vehicle Length at Centerline | mm | 5141 |
| Total Vehicle Length at Right Side | mm | 3586 |
| Weight of Ballast in Cargo Area | kg | 0 |
| Amount of Stoddard Solvent Added | L | 65.44 |

TEST VEHICLE VERTICAL IMPACT LINE DATA

| Measurement Description | Units | Value |
|---------------------------------------|-------|-------|
| Test Vehicle Wheel Base | mm | 2990 |
| Target Impact Point Aft of Front Axle | mm | 508 |
| Actual Impact Point Aft of Front Axle | mm | 522 |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

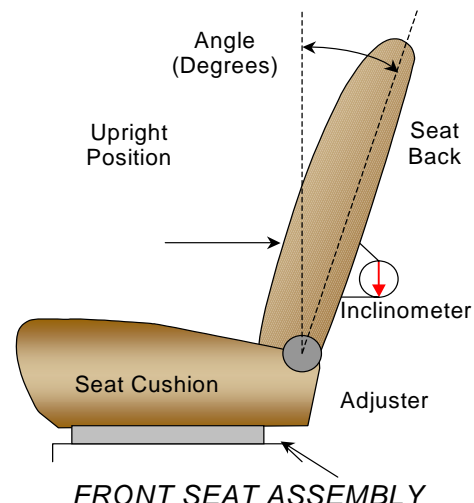
NHTSA No.: M90201

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

Test Date: 07/15/08

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 seat back using a digital inclinometer.



SEAT BACK ANGLES

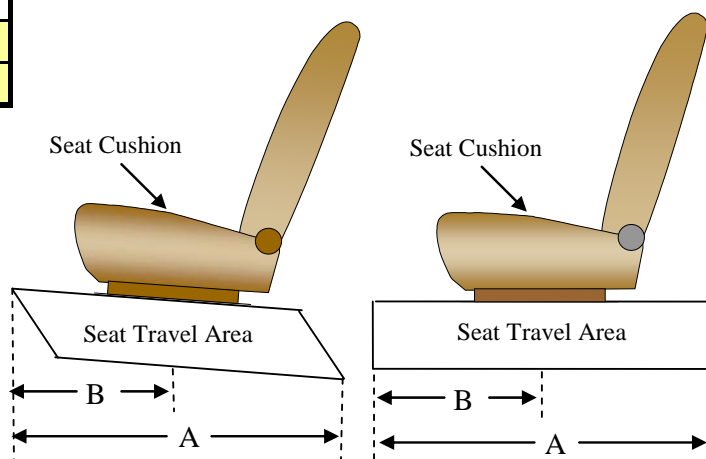
| | Deg. |
|--------------------------|------------------|
| Driver w/seated Dummy | 19.8 @ Seat Back |
| Passenger w/seated Dummy | 17.7 @ Seat Back |

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 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 | 335 mm | 168 mm |
| Rear Seat | Fixed | Fixed |



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 | 1 |
| Rear Seat | Fixed | Fixed |

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

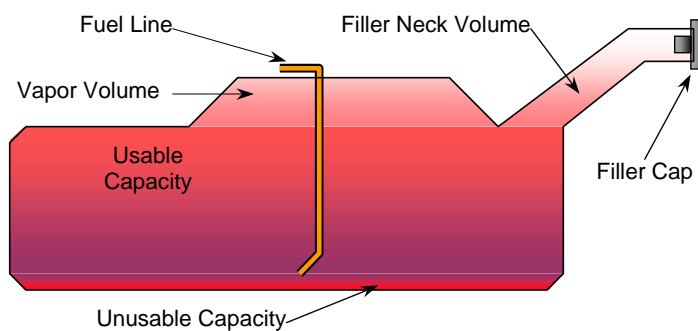
Test Program: 55/28 km/h Side Impact NCAP

Test Date: 07/15/08

FUEL TANK CAPACITY

| | Liters |
|------------------------------------|----------------|
| Usable Capacity of "Standard Tank" | 70.40 |
| Usable Capacity of "Optional" Tank | |
| Usable Capacity used for FMVSS 301 | 64.76 to 66.16 |
| Actual Amount of Solvent used | 65.44 |

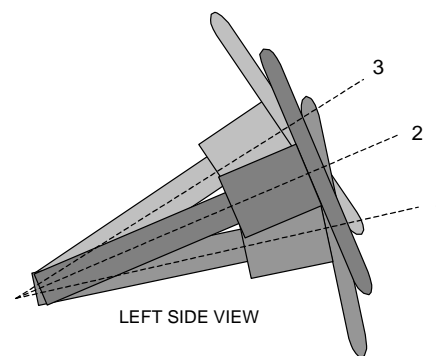
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately two (2) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the 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 | 21.8 | |
| Geometric center position No. 2 | 24.6 | |
| Uppermost position No. 3 | 27.3 | |

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**Test Vehicle: 2009 Ford Flex SE 5-Door MPVNHTSA No.: M90201Test Program: 55/28 km/h Side Impact NCAPTest Date: 07/15/08**TEST VEHICLE WEIGHTS**

| | Units | As Delivered Weights (UWV) | | | As Tested Weights (ATW) | | |
|-------|-------|----------------------------|-----------|-------|-------------------------|-----------|-------|
| | | Front Axle | Rear Axle | Total | Front Axle | Rear Axle | Total |
| Left | kg | 561 | 445 | 1005 | 610 | 518 | 1128 |
| Right | kg | 570 | 442 | 1012 | 595 | 499 | 1094 |
| Ratio | % | 56.1 | 43.9 | 100.0 | 54.2 | 45.8 | 100.0 |
| Total | kg | 1130 | 886 | 2017 | 1205 | 1017 | 2222 |

MAXIMUM EXTERIOR STATIC CRUSH

| Level | Measured Parameter | Units | Maximum Crush | Above Ground |
|---------|---------------------|-------|---------------|--------------|
| Level 1 | Sill Top Height | mm | 122 | 300 |
| Level 2 | Occupant H-Point | mm | 239 | 634 |
| Level 3 | Mid Door | mm | 265 | 703 |
| Level 4 | Window Sill | mm | 102 | 1066 |
| Level 5 | Window top | mm | 2 | 1495 |
| N/A | Maximum Penetration | mm | 265 | |

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: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

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 | 61.96 |
| Trap No. 2 Velocity (Redundant) | km/h | 61.1 to 62.7 | 61.97 |
| 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 | Left | 245 |
| B | Top of Bumper | 533 | 800 | Left | 151 |
| C | Mid Level | 686 | 800 | Right | 100 |
| D | Top of Stack | 813 | 800 | Right | 116 |

MDB INSTRUMENTATION AND CAMERAS

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

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

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 airbag, door panel | Curtain Airbag, door panel |
| Lower Torso Contact | Side airbag, door panel | Door panel |
| Left Knee Contact | Door panel, right knee | Door panel, right knee |
| Right Knee Contact | Left knee | Left knee |

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

| Description | Front | Rear |
|-------------------------|--|--|
| Left Side Door Opening | Remained closed and latched, jammed | Remained closed and latched, jammed |
| Right Side Door Opening | Remained closed and latched, operational | Remained closed and latched, operational |
| Seat Movement | None | None |
| Seatback Failure | None | None |

POST-TEST STRUCTURAL OBSERVATIONS

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Pillar Performance | No separation occurred. |
| Sill Separation | No separation occurred. |
| Windshield Damage | None |
| Window Damage | None |
| Other Notable Effects | None |

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

MDB LEFT EDGE IMPACT DATA

| Measured Parameter | Units | Requirement | Value |
|--------------------|-------|-------------|-------------|
| Horizontal Offset | mm | +/- 50 | +14 (right) |
| Vertical Offset | mm | +/-20 | +5 (above) |

DATA SHEET NO. 5

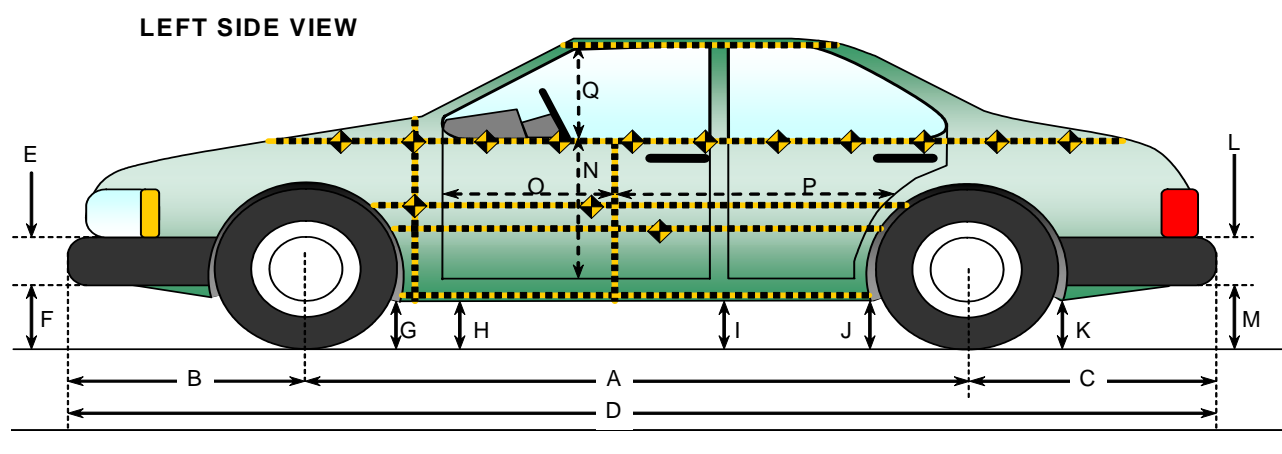
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

| Code | Measurement Description | Pre-Test | Post-Test | Difference |
|------|--|----------|-----------|------------|
| A | Wheelbase | 2990 | 2988 | -2 |
| B | Front Axle to FSOV | 989 | 998 | 9 |
| C | Rear Axle to RSOV | 1162 | 1158 | -4 |
| D | Total Length at Centerline | 5141 | 5144 | 3 |
| E | Front Bumper Thickness | 455 | 450 | -5 |
| F | Front Bumper Bottom to Ground | 226 | 241 | 15 |
| G | Sill Height at Front Wheel Well | 241 | 266 | 25 |
| H | Sill Height at Front Door Leading Edge | 254 | 316 | 62 |
| I | Sill Height at "B" Pillar | 271 | 371 | 100 |
| J1 | Sill Height at Rear Wheel Well | 234 | 261 | 27 |
| J2 | Pinch Weld Height at Rear Wheel Well | 284 | 319 | 35 |
| K | Sill Height aft of Rear Wheel Well | 316 | 341 | 25 |
| L | Rear Bumper Thickness | 325 | 355 | 30 |
| M | Rear Bumper Bottom to Ground | 322 | 354 | 32 |
| N | Sill Height to Window Bottom Sill | 835 | 830 | -5 |
| O | Front Door Leading Edge to Impact CL | 813 | 800 | -13 |
| P | Rear Door Trailing Edge to Impact CL | 1415 | 1370 | -45 |
| Q | Front Window Opening | 435 | 435 | 0 |
| R | Right Side Length | 3586 | 3600 | 14 |
| S | Left Side Length | 3586 | 3585 | -1 |
| T | Vehicle Width at "B" Post | 1885 | 1755 | -130 |

All Dimensions shown in millimeters

DATA SHEET NO. 6

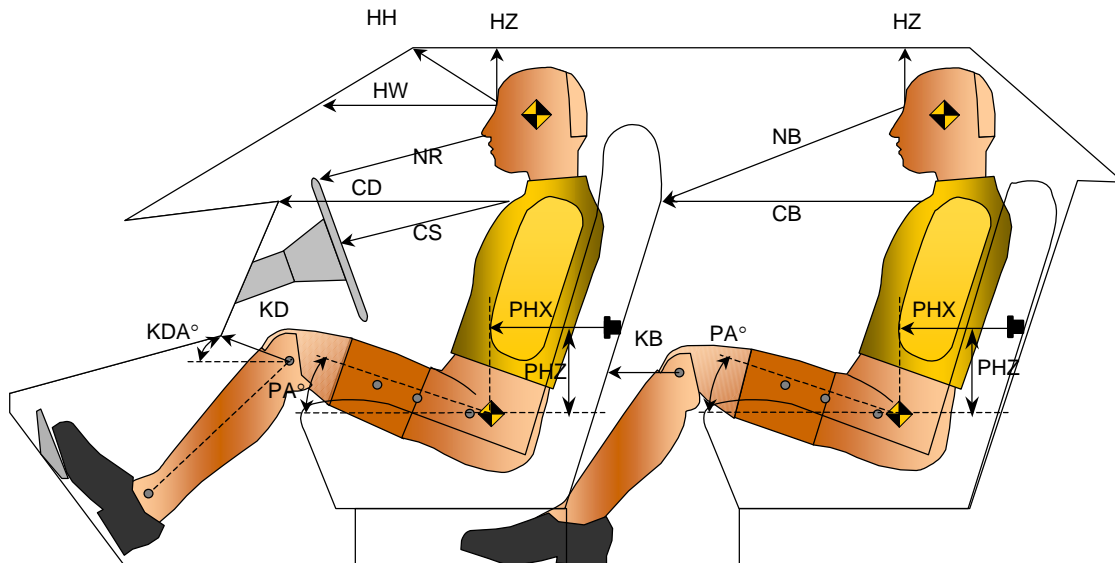
SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

| Driver Code | Pass. Code | Measurement Description | Driver | | Passenger | |
|-------------|------------|---------------------------------|------------|-------|------------|-------|
| | | | Length(mm) | Angle | Length(mm) | Angle |
| HH | | Head to Header | 545 | 16.7 | | |
| HW | | Head to Windshield | 712 | 0.0 | | |
| HZ | HZ | Head to Roof | 280 | 90.0 | 230 | 90.0 |
| NR | NB | Nose to Rim/Nose to Seat Back | 455 | 12.7 | 740 | 18.7 |
| CD | CB | Chest to Dash or Seat Back | 568 | 8.7 | 648 | 1.0 |
| CS | | Chest to Steering Wheel | 315 | 1.0 | | |
| KDL | KBL | Left Knee to Dash or Seat Back | 190 | 1.2 | 325 | 0.0 |
| KDR | KBR | Right Knee to Dash or Seat Back | 205 | | 345 | |
| PA | PA | Pelvic Angle | | 23.5 | | 23.3 |
| PHX | PHX | H-Point to Striker (X-Axis) | 252 | | 290 | |
| PHZ | PHZ | H-Point to Striker (Z-Axis) | 242 | | 235 | |

All Dimensions shown in millimeters

DATA SHEET NO. 7

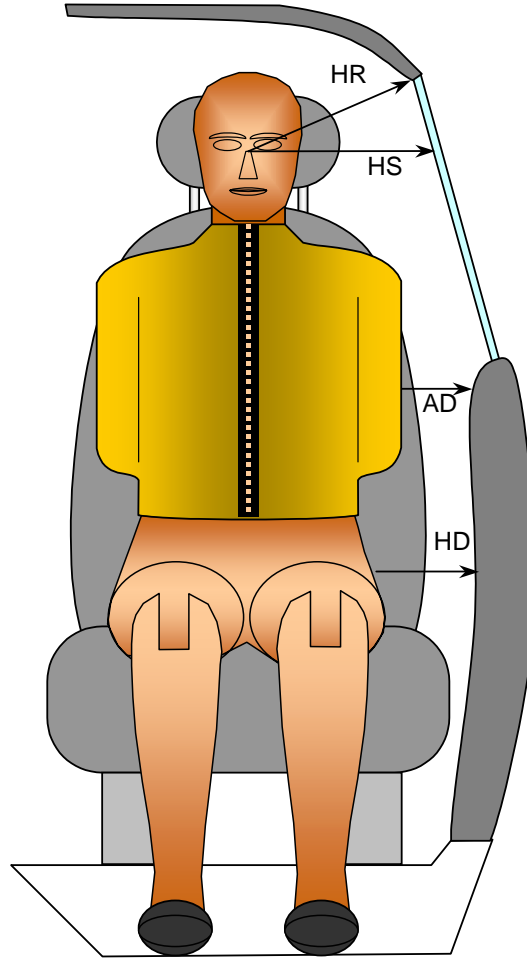
SID/HII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver | Passenger |
|------|-------------------------|-------|--------|-----------|
| HR | Head to Side Header | mm | 350 | 315 |
| HS | Head to Side Window | mm | 390 | 307 |
| AD | Arm to Door | mm | 120 | 103 |
| HD | H-Point to Door | mm | 178 | 125 |

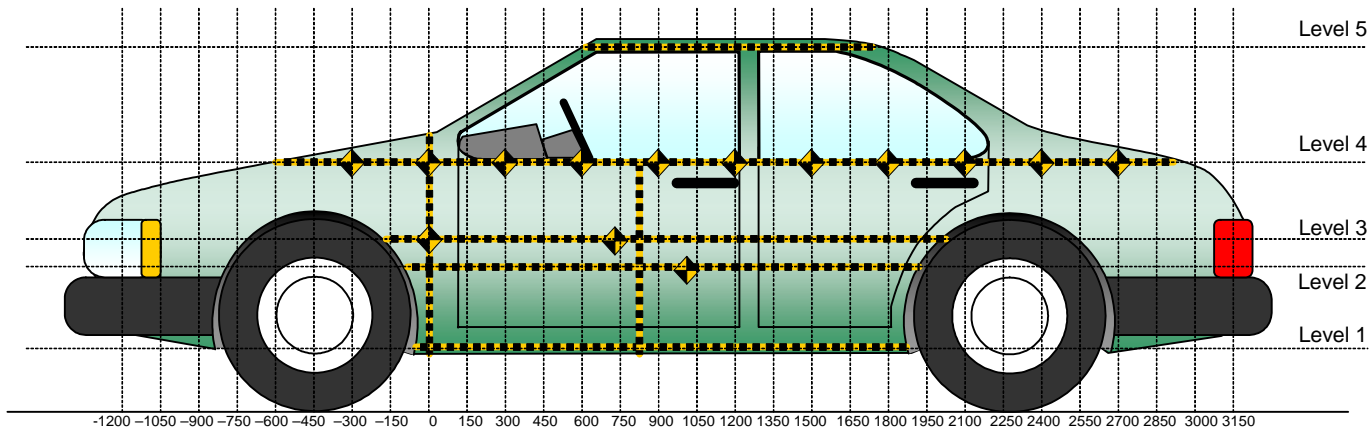
DATA SHEET NO. 8
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



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 | 300 |
| 2 | Occupant H-Point | 634 |
| 3 | Mid Door | 703 |
| 4 | Window Sill | 1066 |
| 5 | Window Top | 1495 |

All Dimensions shown in millimeters

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

| | 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 | | 538 | 539 | 651 | | | 530 | 541 | 646 | | | -8 | 2 | -5 | |
| 0 | 561 | 559 | 561 | 631 | | 564 | 562 | 565 | 623 | | 3 | 3 | 4 | -8 | |
| 150 | 561 | 558 | 559 | 626 | | 606 | 655 | 668 | 626 | | 45 | 97 | 109 | 0 | |
| 300 | 556 | 556 | 556 | 611 | | 621 | 731 | 741 | 635 | | 65 | 175 | 185 | 24 | |
| 450 | 555 | 553 | 552 | 606 | | 638 | 747 | 765 | 640 | | 83 | 194 | 213 | 34 | |
| 600 | 555 | 551 | 551 | 601 | 806 | 652 | 762 | 783 | 644 | 799 | 97 | 211 | 232 | 43 | -7 |
| 750 | 554 | 551 | 550 | 596 | 796 | 658 | 774 | 796 | 654 | 791 | 104 | 223 | 246 | 58 | -5 |
| 900 | 553 | 551 | 550 | 591 | 791 | 674 | 788 | 800 | 666 | 787 | 121 | 237 | 250 | 75 | -4 |
| 1050 | 554 | 550 | 549 | 591 | 786 | 676 | 779 | 775 | 677 | 785 | 122 | 229 | 226 | 86 | -1 |
| 1200 | 553 | 550 | 549 | 590 | 786 | 665 | 761 | 799 | 692 | 788 | 112 | 211 | 250 | 102 | 2 |
| 1350 | 555 | 551 | 551 | 590 | 786 | 657 | 783 | 816 | 688 | 783 | 102 | 232 | 265 | 98 | -3 |
| 1500 | 558 | 554 | 551 | 591 | 786 | 656 | 793 | 816 | 685 | 783 | 98 | 239 | 265 | 94 | -3 |
| 1650 | 561 | 556 | 555 | 586 | 786 | 641 | 793 | 803 | 661 | 781 | 80 | 237 | 248 | 75 | -5 |
| 1800 | 563 | 561 | 556 | 586 | 786 | 586 | 766 | 768 | 646 | 786 | 23 | 205 | 212 | 60 | 0 |
| 1950 | 566 | 551 | 559 | 591 | 791 | 558 | 639 | 661 | 621 | 781 | | 88 | 102 | 30 | -10 |
| 2100 | | | 543 | 586 | 791 | | | 651 | 581 | 781 | | | 108 | -5 | -10 |
| 2250 | | | | 591 | 811 | | | | 606 | 783 | | | | 15 | |
| 2400 | | | | 591 | | | | | 608 | | | | | 17 | |
| 2550 | | | | | | | | | | | | | | | |
| 2700 | | | | | | | | | | | | | | | |
| 2850 | | | | | | | | | | | | | | | |
| 3000 | | | | | | | | | | | | | | | |

All Dimensions shown in millimeters.

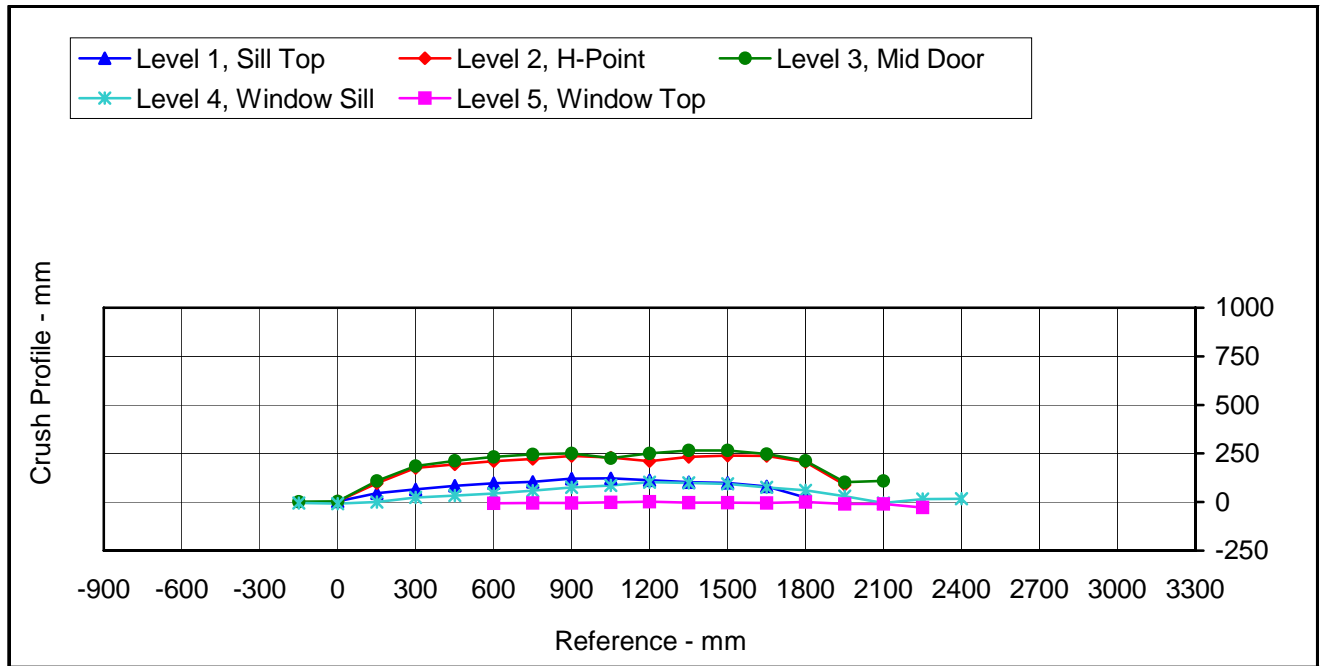
DATA SHEET NO. 9...(CONTINUED)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



| | Units | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|----------------------|-------|---------|---------|---------|---------|---------|
| Maximum Crush | mm | 122 | 239 | 265 | 102 | 2 |
| Distance from Impact | mm | 1050 | 1500 | 1350 | 1200 | 1200 |

DATA SHEET NO. 10

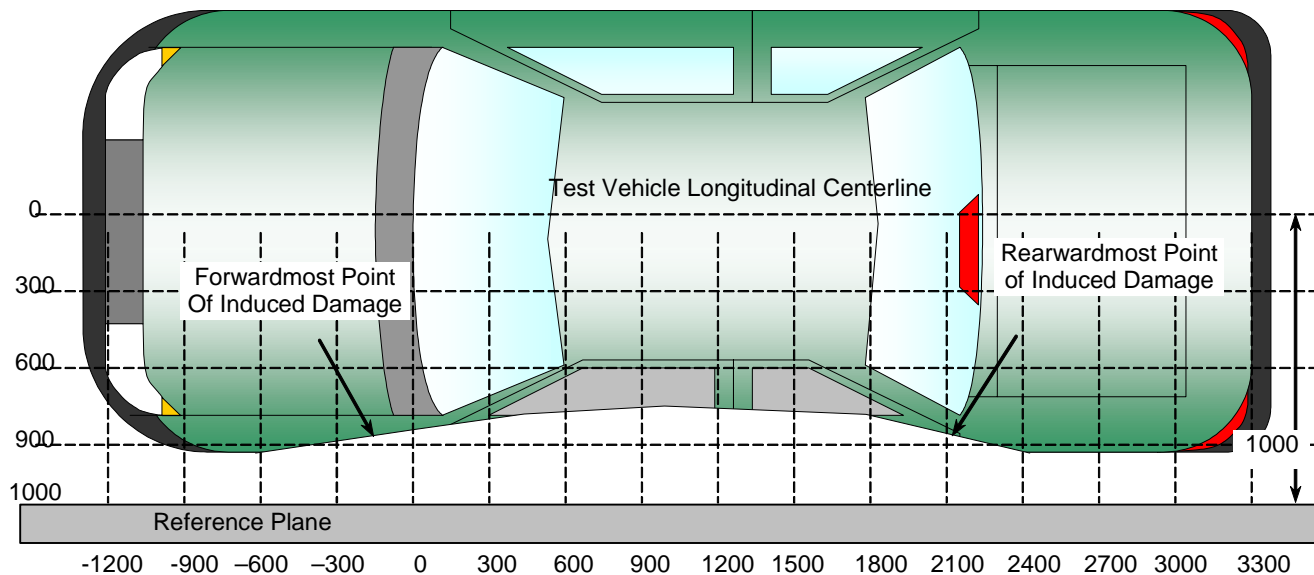
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



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 | 591 | 608 | 17 |
| 2 | 1800 | 2 | 556 | 768 | 212 |
| 3 | 1350 | 3 | 551 | 816 | 265 |
| 4 | 900 | 2 | 550 | 800 | 250 |
| 5 | 450 | 2 | 552 | 765 | 213 |
| 6 | 0 | 4 | 561 | 565 | 4 |

DATA SHEET NO. 11

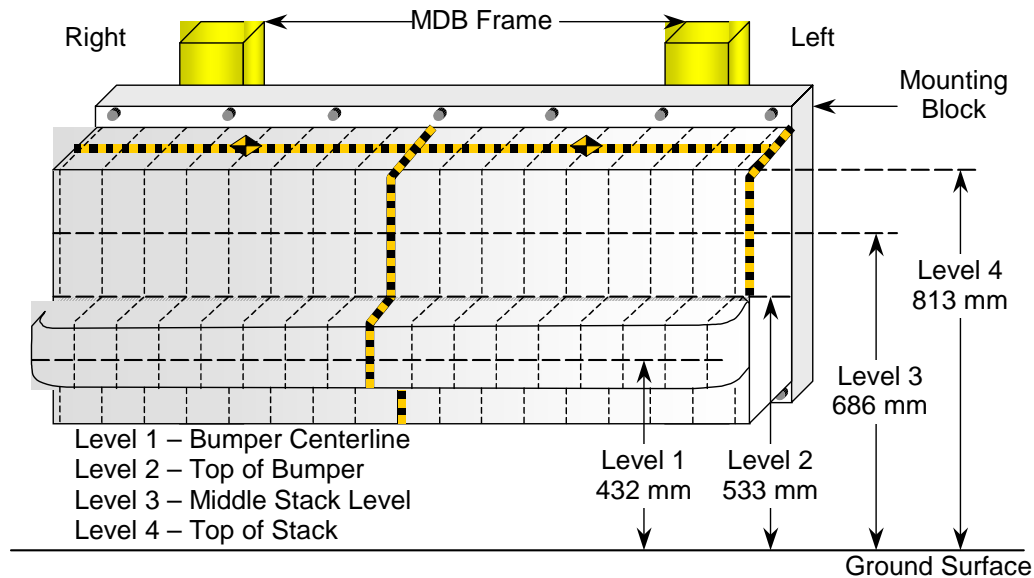
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



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 | 763 | 748 | 735 | 726 | 720 | 723 | 720 | 718 | 706 | 716 | 713 | 707 | 706 | 705 | 703 | 711 | 736 |
| 2 | 771 | 744 | 726 | 736 | 735 | 726 | 736 | 731 | 738 | 742 | 744 | 736 | 741 | 745 | 745 | 746 | 741 |
| 3 | 691 | 676 | 665 | 664 | 663 | 670 | 691 | 690 | 659 | 652 | 652 | 646 | 650 | 659 | 673 | 696 | 720 |
| 4 | 706 | 683 | 670 | 669 | 660 | 674 | 709 | 691 | 686 | 662 | 666 | 676 | 671 | 684 | 694 | 715 | 736 |

All Dimensions in mm

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

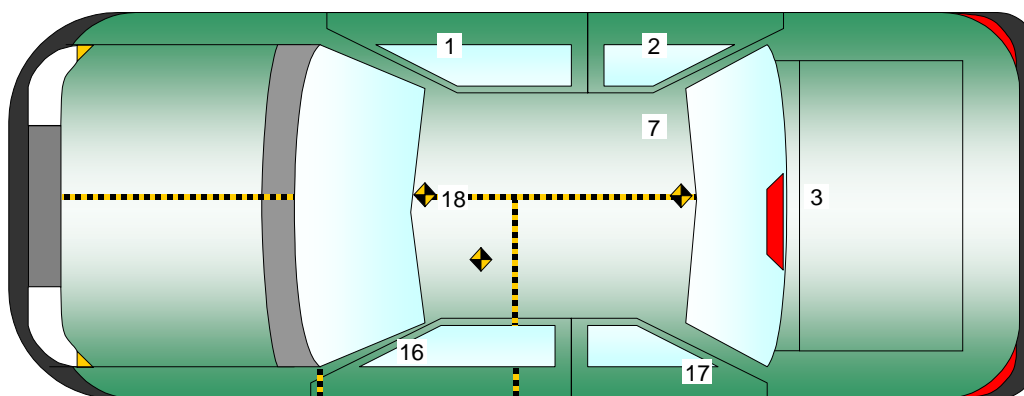
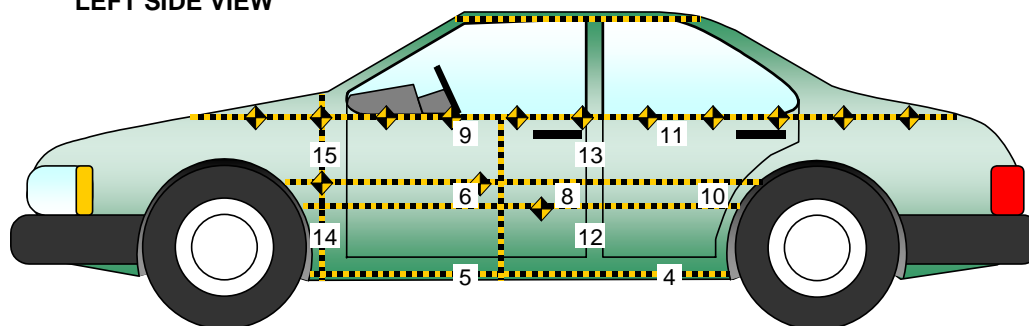
Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

LEFT SIDE VIEW



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

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

DATA SHEET NO. 12...(CONTINUED)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

VEHICLE ACCELEROMETER LOCATIONS

| Loc. No. | Accelerometer Location | Measurements (mm) | | |
|----------|-----------------------------|-------------------|------|-----|
| | | X | Y | Z |
| 1 | Right Sill at Front Seat | 3040 | 410 | 300 |
| 2 | Right Sill at Rear Seat | 2090 | 140 | 400 |
| 3 | Rear Floorpan Above Axle | 540 | 890 | 276 |
| 4 | Left Sill at Rear Door | 2160 | -400 | 263 |
| 5 | Left Sill at Front Door | 2880 | -290 | 261 |
| 6 | Front Door Centerline | | | |
| 7 | Rt. Rear Occ. Compartment | 2100 | 450 | 300 |
| 8 | Front Door Mid-Rear | | | |
| 9 | Front Door Upper Centerline | | | |
| 10 | Rear Door Mid-Rear | | | |
| 11 | Rear Door Upper Centerline | | | |
| 12 | B-Post Lower | 2480 | -90 | 600 |
| 13 | B-Post Middle | 2480 | -90 | 750 |
| 14 | A-Post Lower | 3570 | -97 | 432 |
| 15 | A-Post Middle | 3570 | -97 | 542 |
| 16 | Front Seat Track | | | |
| 17 | Rear Seat Structure | | | |
| 18 | Vehicle CG | 600 | 524 | 315 |

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: 2009 Ford Flex SE 5-Door MPV

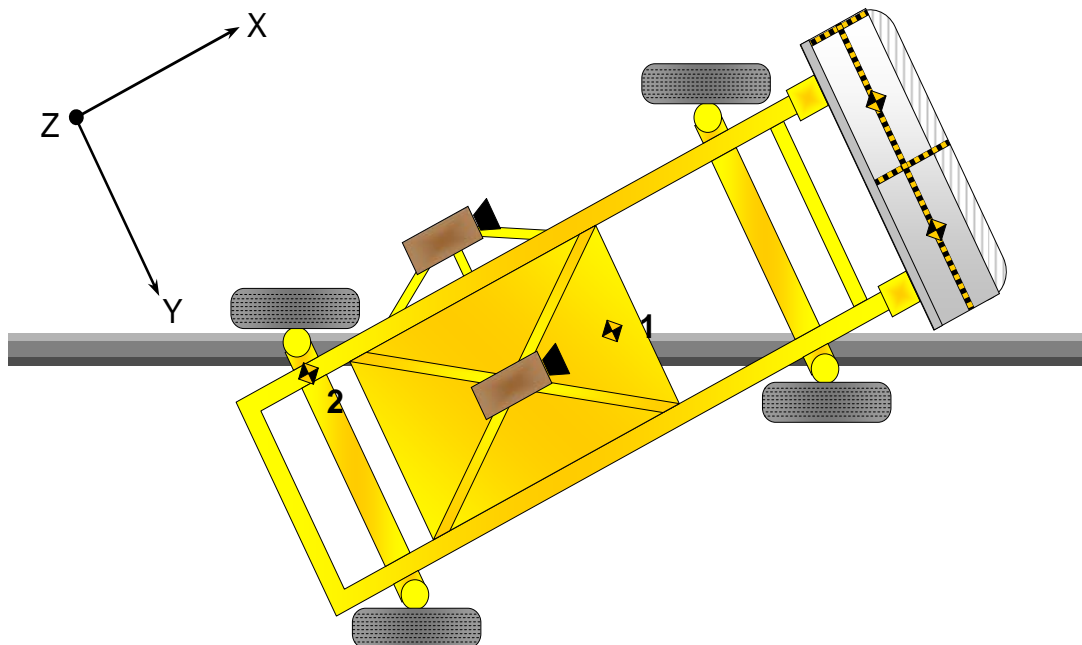
NHTSA No.: M90201

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

Test Date: 07/15/08

| 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

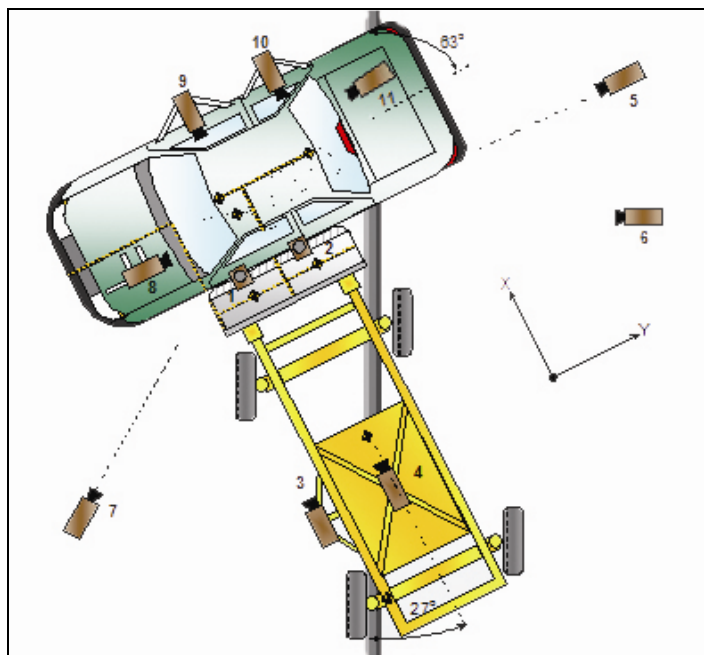
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08



| 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.) | 43 | -90 | -1420 | -7 | 35mm | 1000 |
| 9 | Driver Side (O.B.) | 1885 | 1568 | -1920 | -9 | 20mm | 1000 |
| 10 | Passenger Side (O.B.) | 1875 | 737 | -1207 | -7 | 20mm | 1000 |

All measurements are made relative to the point of impact.

DNR = Did not run

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV NHTSA No.: M90201

Test Program: 55/28 km/h Side Impact NCAP Test Date: 07/15/08

Test Time: 11:44 AM Temperature: 33.4 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

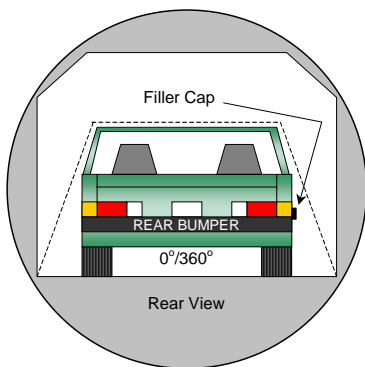
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2009 Ford Flex SE 5-Door MPV

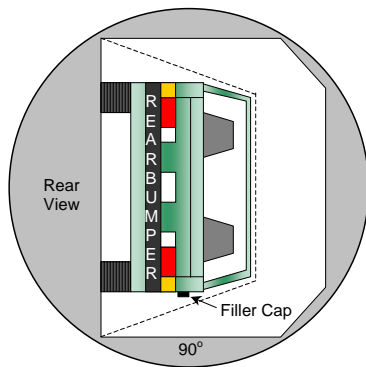
NHTSA No.: M90201

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

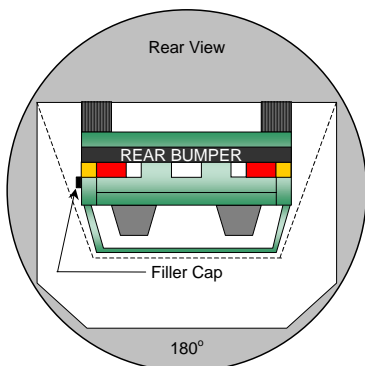
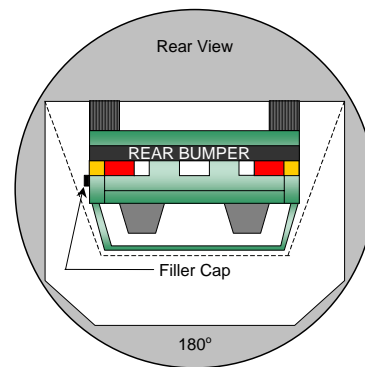
Test Date: 07/15/08



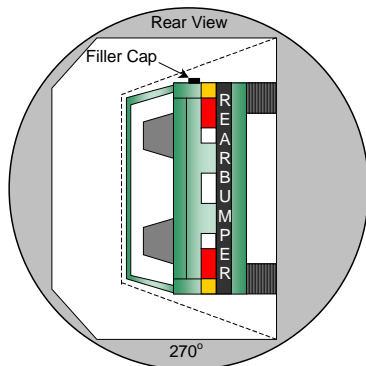
0° to 90°



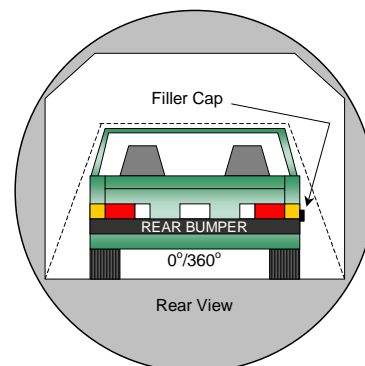
90° to 180°



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: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

SOLVENT COLLECTION TIME TABLE IN SECONDS

| Test Phase | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90° | 70 | 300 | 370 |
| 90° to 180° | 75 | 300 | 375 |
| 180° to 270° | 72 | 300 | 372 |
| 270° to 360° | 70 | 300 | 370 |

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 |

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION

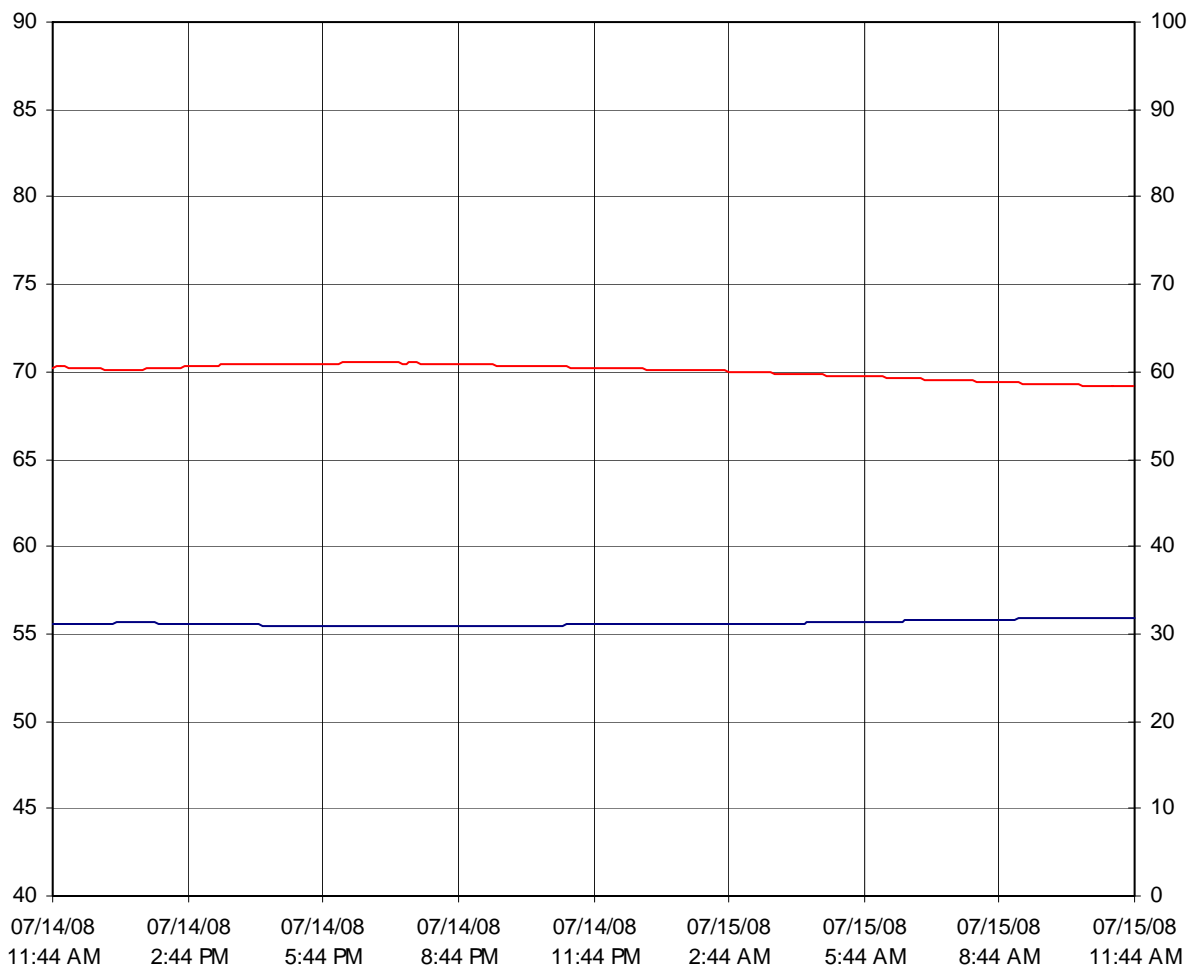
Test Vehicle: 2009 Ford Flex SE 5-Door MPV

NHTSA No.: M90201

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

Test Date: 07/15/08

— Temperature — Humidity



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



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

MFD. BY FORD MOTOR CO.

DATE: 06/08

GVWR: 2708KG/5970LB

FRONT GAWR: 1311KG/2890LB

REAR GAWR: 1420KG/3130LB

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

VIN: 2FMDK51C09BA07653 TYPE: MPV

MAXIMUM LOAD = OCCUPANTS + LUGGAGE = 526KG/1160LB
OCCUPANTS = 7 TOTAL; 2 FRONT, 5 REAR

TIRE (FR): P235/60R18
(RR): P235/60R18

RIMS (FR): 18X7.5J
(RR): 18X7.5J

PRESSURE (FR): 240 kPa/ 35 PSI COLD (RR): 240 kPa/ 35 PSI COLD



2FMDK51C09BA07653

TRAILER TOWING - SEE OWNER GUIDE

EXT PNT: WS

RC: 71 DSO:

F0110

INT TR

TP/PS

R

AXLE

TR

SPR

9P31D

R0211

CW

Z

3E

J

AFF

605

CBU

5U5A-5420472-AA

Figure A-3: Manufacturer's Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY TOTAL : 7 FRONT: 2 REAR: 5

The combined weight of occupants and cargo should never exceed : **526 kg or 1160 lbs.**

▽5U5A-1532-AA (TLU)

| TIRE | SIZE | COLD TIRE PRESSURE |
|-------|------------|--------------------|
| FRONT | P235/60R18 | 240 KPA, 35 PSI |
| REAR | P235/60R18 | 240 KPA, 35 PSI |
| SPARE | T155/70D17 | 415 KPA, 60 PSI |

**SEE OWNERS
MANUAL FOR
ADDITIONAL
INFORMATION**

2FMDK51G09BA07653



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 3/4 View



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



Figure A-9: Pre-Test Left Side View



Figure A-10: Post-Test Left Side View



A-11

TR-P28003-10-NC

Figure A-11: Pre-Test Left Rear 3/4 View



Figure A-12: Post-Test Left Rear ¾ View



A-13

TR-P28003-10-NC

Figure A-13: Pre-Test Rear View



Figure A-14: Post-Test Rear View



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



Figure A-16: Post-Test Right Rear ¾ View



Figure A-17: Pre-Test Right Side View



A-18

TR-P28003-10-NC

Figure A-18: Post-Test Right Side View



A-19

TR-P28003-10-NC

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



A-20

TR-P28003-10-NC

Figure A-20: Post-Test Right Front ¾ View



Figure A-22: Post-Test Overhead View



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



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



Figure A-25: Pre-Test Left Impact Point



Figure A-26: Post-Test Left Impact Point



Figure A-27: Pre-Test Front ¾ View of Left Side Door



A-28

TR-P28003-10-NC

Figure A-28: Post-Test Front ¾ View of Left Side Door



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



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



Figure A-31: Pre-Test Left Front Door



Figure A-32: Post-Test Left Front Door



Figure A-33: Pre-Test Left Rear Door



Figure A-34: Post-Test Left Rear Door



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

This Space 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)



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



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

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



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



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



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



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



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



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



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



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



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



A-55

TR-P28003-10-NC

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

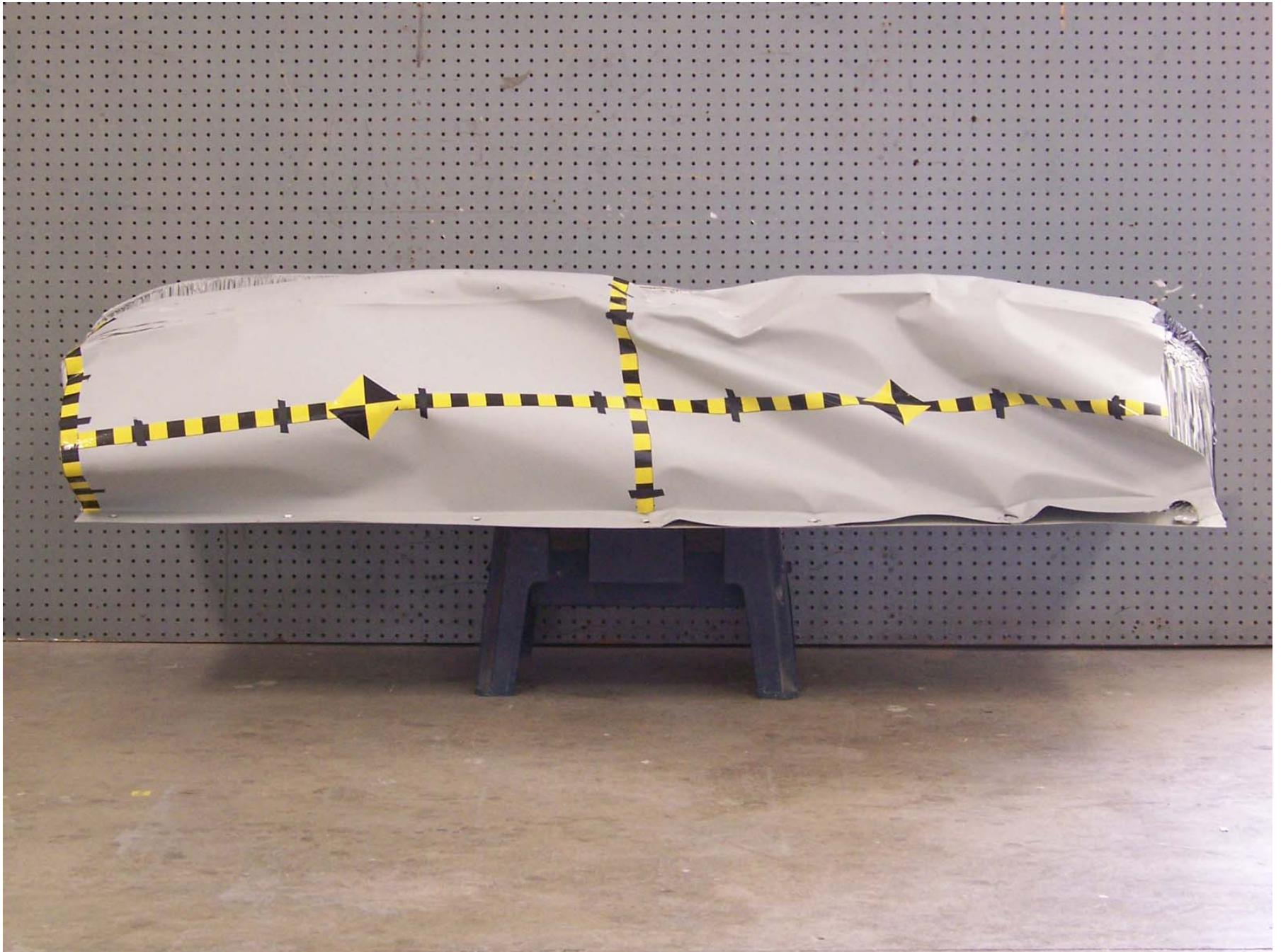


Figure A-56: Post-Test Top View of Deformable Barrier



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

A-58

TR-P28003-10-NC



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

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TR-P28003-10-NC



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

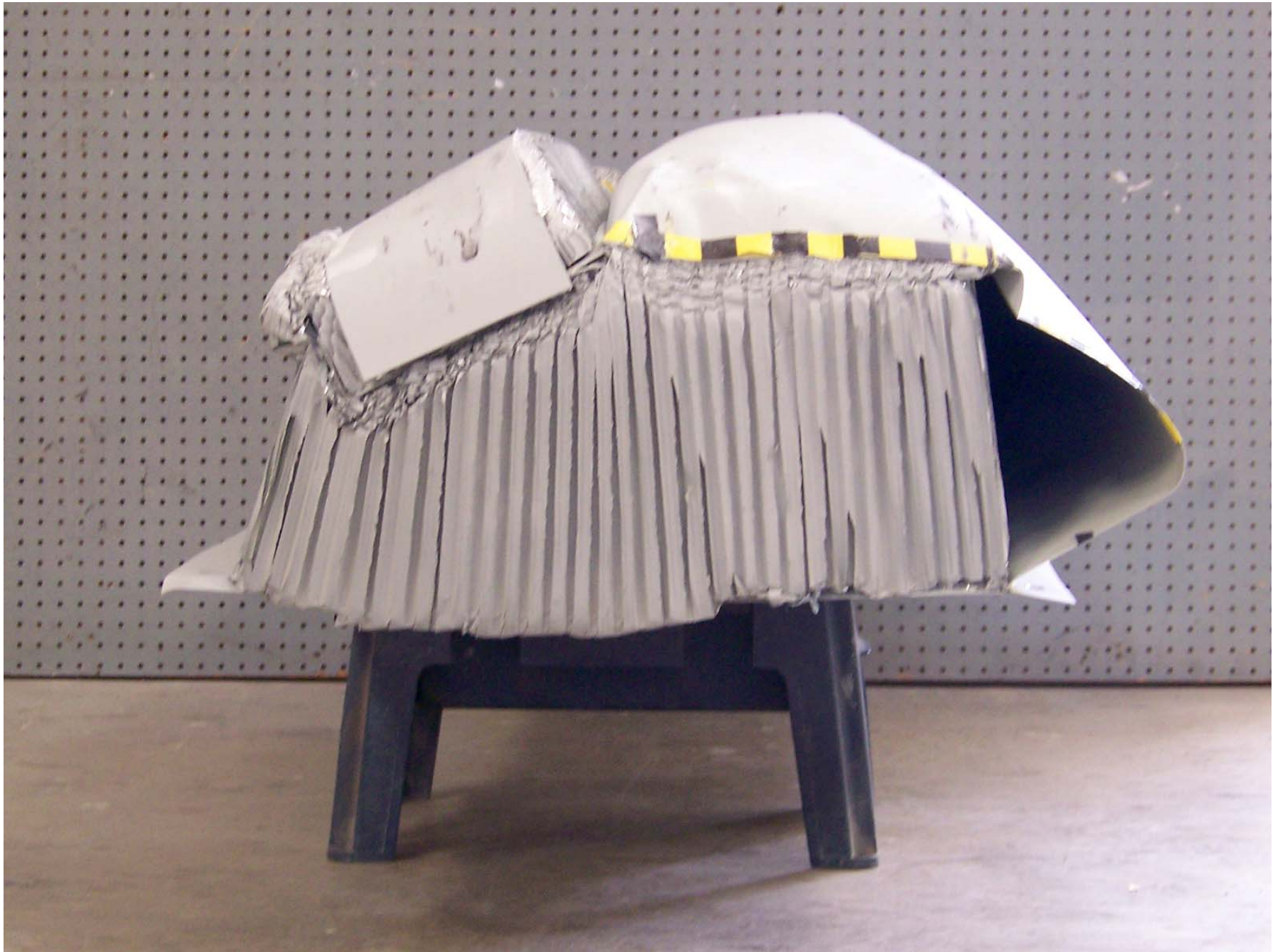


Figure A-60: Post-Test Left Side View of Deformable Barrier



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

A-61

TR-P28003-10-NC



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-64

TR-P28003-10-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)

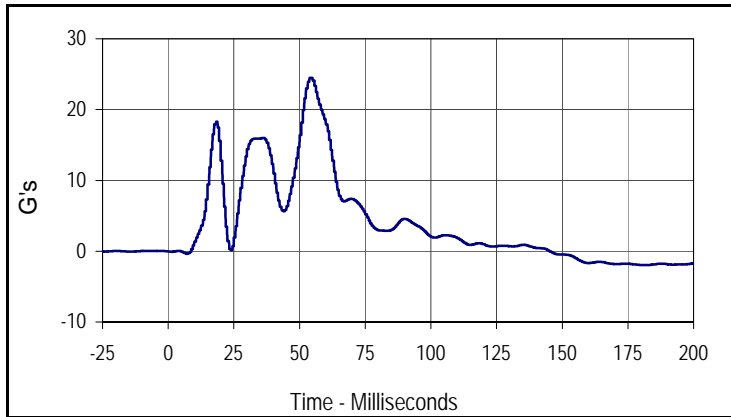
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Left Sill at Rear Door Y Velocity
Vehicle Left Sill at Front Door Y Velocity
Vehicle Left Front Door C/L Y
Vehicle Right Rear Occupant Compartment
Vehicle Left Front Door Mid Rear Y
Vehicle Left Front Door Upper CL Y
Vehicle Left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

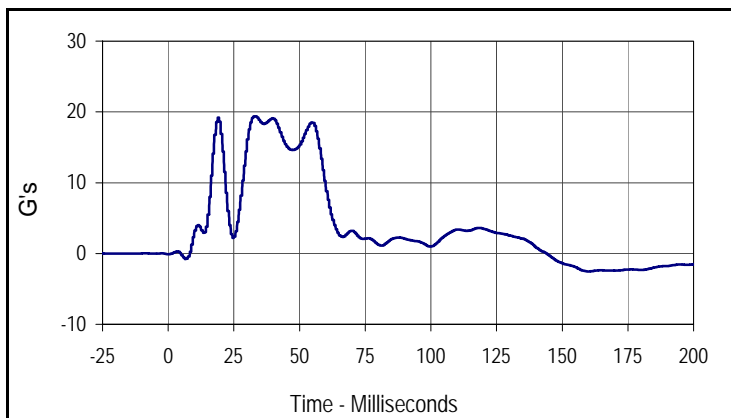
Driver Upper Rib Primary Y
Driver Lower Rib Primary Y
Driver Lower Spine Primary Y
Driver Pelvis Primary Y
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Passenger Upper Rib Primary Y
Passenger Lower Rib Primary Y
Passenger Lower Spine 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: 2009 Ford Flex SE 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

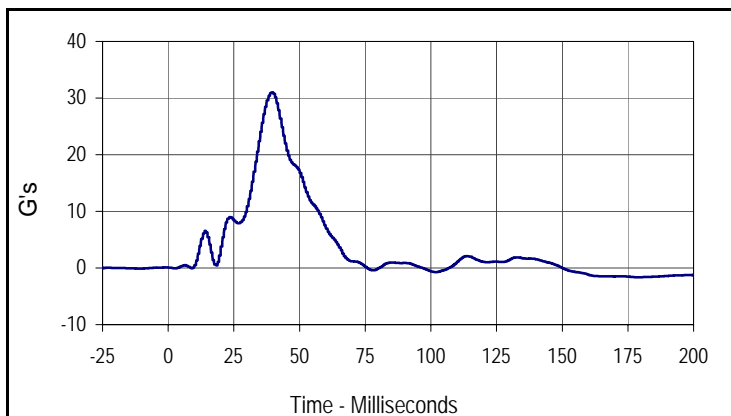
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 NHTSA No.: M90201



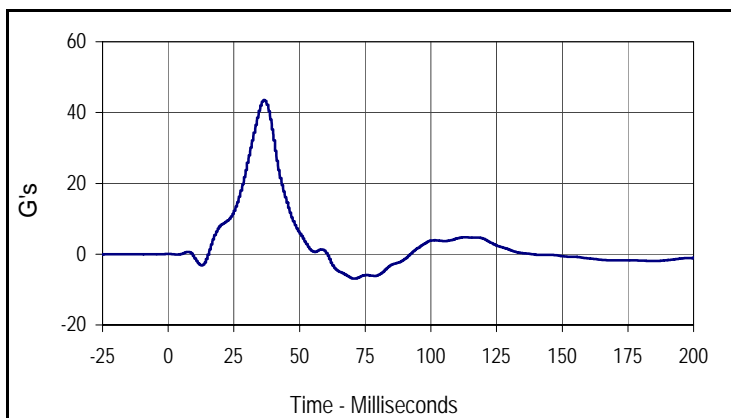
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|----------------------------|------|-----------|-------|
| Driver Upper Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 001 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 24.5 | 54.4 | -2.0 | 181.3 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Driver Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 002 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 19.4 | 32.5 | -2.5 | 159.4 |



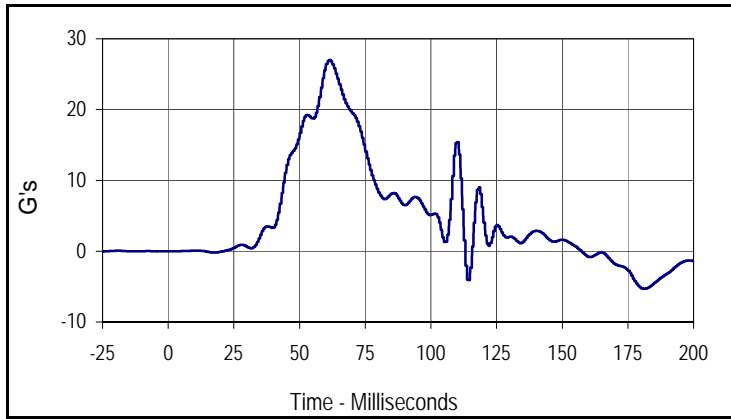
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|------------------------------|------|-----------|-------|
| Driver Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 003 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 31.0 | 39.4 | -1.6 | 178.8 |



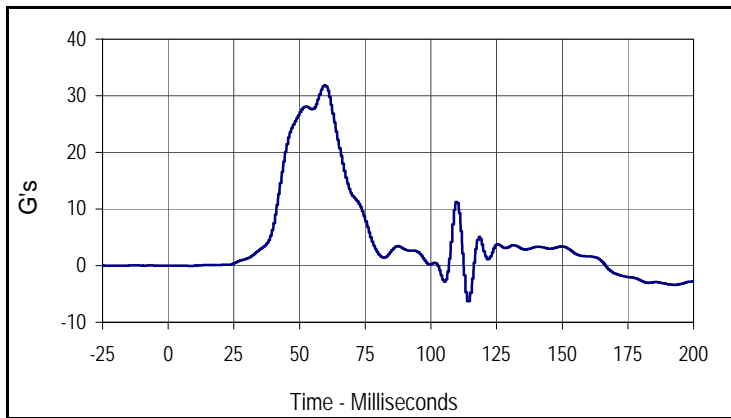
| Curve Description | | | |
|-------------------------|------|-----------|-------|
| Driver Pelvis Primary Y | | | |
| CURNO | Type | SAE Class | Units |
| 004 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 43.6 | 36.3 | -6.9 | 70.7 |

Test Vehicle: 2009 Ford Flex SE 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

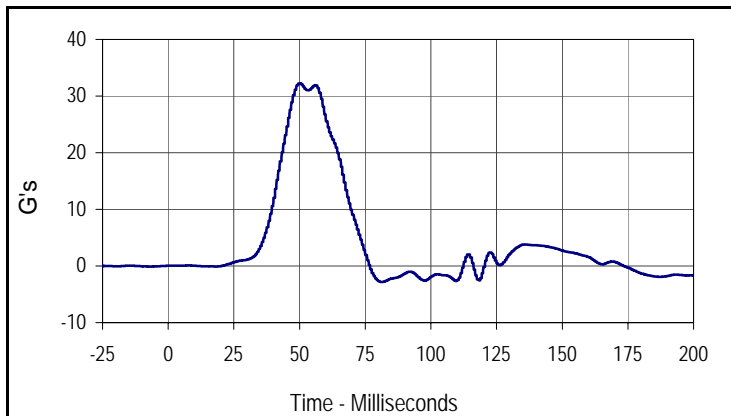
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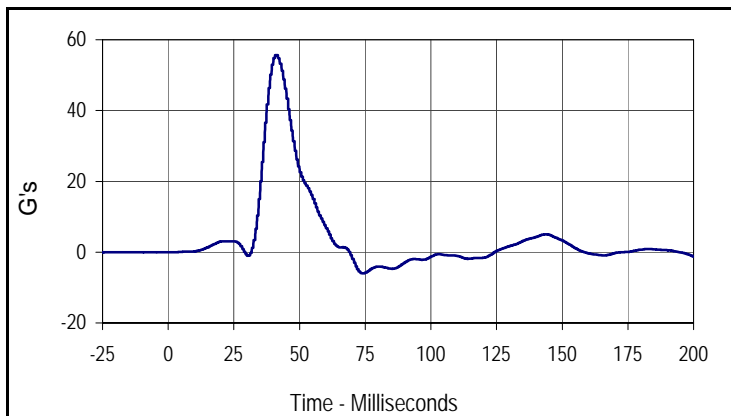
| Curve Description | | | |
|-------------------------------|------|-----------|-------|
| Passenger Upper Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 005 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 27.0 | 61.3 | -5.3 | 181.3 |



| Curve Description | | | |
|-------------------------------|------|-----------|-------|
| Passenger Lower Rib Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 006 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 31.9 | 59.4 | -6.3 | 113.8 |



| Curve Description | | | |
|---------------------------------|------|-----------|-------|
| Passenger Lower Spine Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 007 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 32.3 | 50.0 | -2.8 | 81.3 |



| Curve Description | | | |
|----------------------------|------|-----------|-------|
| Passenger Pelvis Y Primary | | | |
| CURNO | Type | SAE Class | Units |
| 008 | FIR | FIR100 | G's |
| Max | Time | Min | Time |
| 55.7 | 40.7 | -6.0 | 73.8 |

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA