REPORT NUMBER: CAL-09-08

**NEW CAR ASSESSMENT PROGRAM (NCAP)**
**FRONTAL BARRIER IMPACT TEST**

NISSAN MOTOR CO. LTD.
2009 NISSAN CUBE
4-DOOR VAN

NHTSA NUMBER: M95205

CALSPAN TEST NUMBER: 8865-NCAP-08

CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225


June 3, 2009

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave SE, Room W43-410
Washington, DC 20590

Prepared by:

James Czarnecki, Project Engineer

Approved by:

David J. Travale, Program Manager
Transportation Science Center

Approval Date: July 28, 2009

**TECHNICAL REPORT STANDARD TITLE PAGE**

| | | |
|---|---|---|
| 1. *Report No.*<br>CAL-09-08 | *2. Government Accession No.* | *3. Recipient's Catalog No.* |
| *4. Title and Subtitle*<br>Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 2009 Nissan Cube 4-door Van NHTSA No. M95205 | | *5. Report Date*<br>June 3, 2009<br>*6. Performing Organization Code*<br>CAL |
| *7. Author(s)*<br>David J. Travale, Program Manager<br>James Czarnecki, Project Engineer | | *8. Performing Organization Report No.*<br>8865-NCAP-08 |
| *9. Performing Organization Name and Address*<br>Calspan Corporation<br>4455 Genesee Street<br>Buffalo, New York 14225 | | *10. Work Unit No.*<br>*11. Contract or Grant No.*<br>DTNH22-06-D-00024 |
| *12. Sponsoring Agency Name and Address*<br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Crashworthiness Standards<br>Mail Code: NVS-111<br>1200 New Jersey Ave SE, Room W43-410<br>Washington, DC 20590 | | *13. Type of Report and Period Covered*<br>Final Report<br>June 2009<br>*14. Sponsoring Agency Code*<br>NVS-111 |

*15. Supplementary Notes*

Post-test analysis determined that the rear seat of this vehicle was not properly engaged in its track during test set-up procedures. This allowed the seat to move forward freely during the event and contact the front seats. As such, the rear seat movement observed in this test is not indicative of real world performance.

*16. Abstract*

A frontal load cell barrier test of a 2009 Nissan Cube 4-door Van was performed at Calspan Corporation's crash test facility in Buffalo, New York, on June 3, 2009.

The impact velocity was 57.0 kph and the temperature at the barrier face was 21.0°C. The maximum post-test vehicle crush was 502 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements. The occupant injury criteria summary is as follows:

| **Measurement Description** | **Units** | **Threshold** | **Driver (064)** | **Passenger (061)** |
|---|---|---|---|---|
| **Head Injury Criteria (HIC - 36 ms)** | - | 1000 | 568.4 | 756.9 |
| **Maximum Thorax Acceleration (3 ms Clip)** | g's | 60 g's | 54.0 | 48.8 |
| **Chest Displacement** | mm | -76 mm | 30.8 | 30.4 |
| **Left Femur Force** | Newtons | -10000 N | -4210.2 | -4136.6 |
| **Right Femur Force** | Newtons | -10000 N | -4711.3 | -3654.8 |

| | |
|---|---|
| *17. Key Words*<br>56 kph Frontal Barrier Impact test<br>New Car Assessment Program (NCAP) | *18. Distribution Statement*<br>Copies of this report are available from:<br>NHTSA Technical Reference Division<br>National Highway Traffic Safety Admin.<br>1200 New Jersey Ave SE<br>Washington, DC 20590 |

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|---|---|---|---|
| *19. Security Classif. (of this report)*<br>UNCLASSIFIED | *20. Security Classif. (of this page)*<br>UNCLASSIFIED | *21. No. of Pages*<br>105 | *22. Price* |

**Form DOT F1700.7** (8-69)

**TABLE OF CONTENTS**

## SECTION 1

PURPOSE AND SUMMARY OF TEST

### 1.1 PURPOSE

This 57.0 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 57.0 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

### 1.2 TEST PROCEDURE

This 57.0 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No.061) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

## 1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2009 Nissan Cube 4-door Van at a velocity of 57.0 kph. The test was performed at Calspan on June 3, 2009. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A. All photos say 2010 when the vehicle is a 2009.

The occupant data is summarized below.

| ATD | HIC | $T_1$ | $T_2$ | Clip (g) | $T_1$ | $T_2$ | Chest Disp. (mm) | Left Femur (N) | Right Femur (N) |
|---|---|---|---|---|---|---|---|---|---|
| **Driver** | 568.4 | 54.3 | 90.3 | 54.0 | 67.7 | 70.7 | 30.8 | -4210.2 | -4711.3 |
| **Passenger** | 756.9 | 70.0 | 106.0 | 48.8 | 64.9 | 67.9 | 30.4 | -4136.6 | -3654.8 |

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

| TEST NOTES | |
|---|---|
| Data Channel | Anomalies |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
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| | |

**SECTION 2**
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: M95205 Test Mode: 56.3 kph Frontal Barrier
Test Date: June 3, 2009 Time: 15:00 Temperature: 21.0 °C
Vehicle Make/Model/Body Style: 2009 Nissan Cube 4-door Van
Vehicle Test Weight: 1465.5 kg Impact Velocity: 57.0 kph (55.5 – 57.1 kph)
Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 502 mm

**ATD INFORMATION AND VISIBLE CONTACT POINTS**

| | DRIVER | PASSENGER |
|---|---|---|
| ATD Type: | Part 572E | Part 572E |
| Restraint System: | Seatbelt, Airbag, Knee Bolster | Seatbelt, Airbag, Knee Bolster |
| Head Contact: | Airbag / Back of head to head restraint | Airbag / Back of head to head restraint |
| Abdomen Contact: | - | - |
| Chest Contact: | Airbag | Airbag |
| Left Knee Contact: | Knee Bolster | Knee Bolster |
| Right Knee Contact: | Knee Bolster | Knee Bolster |

**DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION**

| Description | Driver Side | Passenger Side |
|---|---|---|
| Door Lock Status | Unlocked | Unlocked |
| Front Door Opening | Closed / Operable | Closed / Operable |
| Rear Door Opening | Closed / Operable | Closed / Operable |
| Hatch/Other Door Opening | Closed / Operable | |
| Front Seat Track Shift (mm) | 0 | 0 |
| Front Seat Back Failure | None | None |
| Glazing Damage | None | |

**VEHICLE REBOUND FROM BARRIER**

| Measured Parameter | Left Side (mm) | Center (mm) | Right Side (mm) | Average (mm) |
|---|---|---|---|---|
| Value | 619 | 634 | 661 | 638 |

**BELT LENGTH DATA**

| Measurement Description | Units | Driver | Passenger |
|---|---|---|---|
| Shoulder belt length as measured on ATD | mm | 750 | 750 |
| Lap belt length as measured on ATD | mm | 910 | 910 |
| Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems | mm | 227 | 227 |

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2009 Nissan Cube 4-door Van

NHTSA No. : M95205 ; VIN: JN8AZ28R79T101805 ; Color: Silver

Engine Data: 4 cylinders; - CID; 1.8 Liters; - cc

Placement: - Longitudinal or In-Line; x Transverse or Lateral

Transmission Data: 6 speeds; x Manual; - Automatic; - Overdrive

Final Drive: - Rear Wheel Drive; x Front Wheel Drive; - Four Wheel Drive

AUTOMATIC DOOR LOCKS:

Is test vehicle equipped with Automatic Door Locks (ADLs)? x Yes; - No;

Does vehicle owner's manual describe how to deactivate ADLs? x Yes; - No; - N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 5/28/09 ; Odometer Reading 40 km

Selling Dealer: Mike Barney

Dealer Address: 3876 Sheridan Dr. Amherst , NY 14226

TEST VEHICLE OPTIONS:

x AC; x Power Steering; x Power Brakes; x Power Locks; - Power Seats

x ABS; x Tilt Wheel; x Stability Control x Traction Control x Anti-Theft

SAFETY BELT FEATURES:

Driver: x Pretensioner (Shoulder); x Load Limiter; x Adjustable Anchorage

Passenger: x Pretensioner (Shoulder); x Load Limiter; x Adjustable Anchorage

AIRBAG FEATURES:

| Position | Frontal | Knee Bolster | Side Torso | Side Head/Torso Combination | Side Curtain |
|---|---|---|---|---|---|
| Driver: | x | - | x | - | x |
| Passenger: | x | - | x | - | x |
| Rear Passenger: | - | - | - | - | x |

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Nissan Motor Co. LTD.

Date of Manufacture 03/09

GVWR: 1735 kg; GAWR: 880 kg FRONT; 860 kg REAR

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 390 kg

No. of Occupants x 68.04 kg = 340 kg

Rated Cargo/Luggage Weight (RCLW) = 50 kg

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA ( cont. )

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

| | Left Side (kg) | Right Side (kg) | Ratio (%) | Total (kg) |
|---|---|---|---|---|
| **Front =** | 371.5 | 377.5 | 59.0 | 749.0 |
| **Rear =** | 266.0 | 255.5 | 41.0 | 521.5 |
| | | | **Total Delivered Weight (UDW) =** | 1270.5 |

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

| | | |
|---|---|---|
| Total Delivered Weight (UDW) = | 1270.5 | kg |
| Rated Cargo/Luggage Weight (RCLW) = | 50 | kg |
| Weight of 2 p.572 Dummies @ 76 each = | 152 | kg |
| TARGET TEST WEIGHT = | 1472.5 | kg |

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 43.0 KG OF CARGO WEIGHT:

| | Left Side (kg) | Right Side (kg) | Ratio (%) | Total (kg) |
|---|---|---|---|---|
| **Front =** | 411.5 | 397.5 | 55.2 | 809.0 |
| **Rear =** | 330.0 | 326.5 | 44.8 | 656.5 |
| | | | **Total Vehicle Test Weight (ATW) =** | 1465.5 |

Weight of Ballast Secured in Vehicle Trunk Area[1] = 0 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

| | Left Front | Right Front | Left Rear | Right Rear | CG[2] |
|---|---|---|---|---|---|
| AS DELIVERED: | 697 | 703 | 700 | 703 | 1039.3 |
| FULLY LOADED: | 685 | 693 | 670 | 673 | - |
| AS TESTED: | 687 | 695 | 671 | 675 | 1134.3 |

Vehicle's Wheel Base: 2532 mm

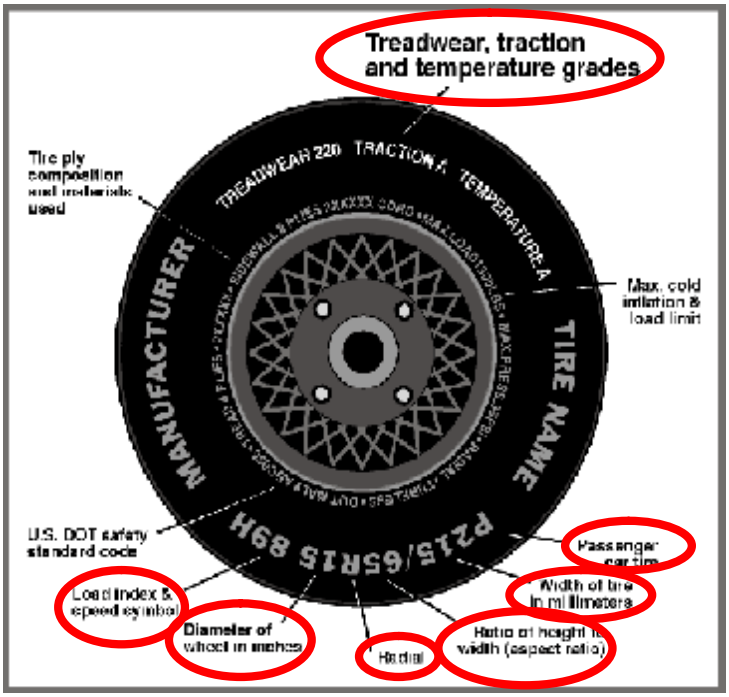
[1]Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

[2]Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2009 Nissan Cube 4-door Van

NHTSA Test No.: M95205 Test Date: June 3, 2009




| Measured Parameter | Front | Rear |
|---|---|---|
| Maximum Tire Pressure (from sidewall - kPa) | 350 | 350 |
| Cold Pressure (from tire placard - kPa)* | 230 | 230 |
| Recommended Tire Size (from tire placard) | P195/60R15 | P195/60R15 |
| Tire size on Vehicle | P195/60R15 | P195/60R15 |
| Tire Manufacturer | Toyo | Toyo |
| Tire Name | A20 | A20 |
| Tire Type | Passenger | Passenger |
| Tire Width (mm) | 195 | 195 |
| Ratio of Height to Width (aspect ratio) | 60 | 60 |
| Radial | Radial | Radial |
| Wheel Diameter | 15 | 15 |
| Load Index & Speed Symbol | 87H | 87H |
| Treadwear | 300 | 300 |
| Traction Grade | A | A |
| Temperature Grade | A | A |

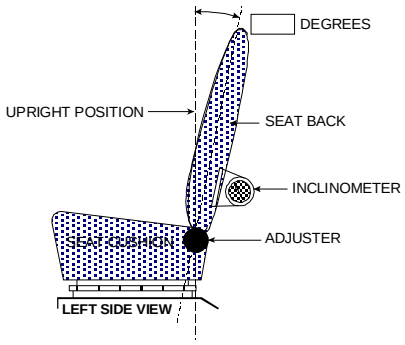
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2009 Vehicle Model: Nissan Cube Body Style : 4-door Van

1. NOMINAL DESIGN RIDING POSITION:
for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



**FRONT SEAT ASSEMBLY**

Seat back angle for driver's seat: -

Measurement instructions: Seat was set to detent 5 from 0 (forward most position)

Seat back angle for passenger's seat: -

Measurement instructions: Seat was set to detent 5 from 0 (forward most position)

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Full up full forward – full down full rear = 288 mm. Seat was set at 144 mm on the face of the cushion at full down. The seat was set at detent 10 from 0 (forward most position)

Positioning of the passenger's seat: Detent range was 0-24. Seat was positioned in detent 12 – middle.

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 50.0 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 46.0 to 47.0 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 46.6 liters

3.3 One-Third of Useable Capacity = 16.7 liters

3.4 Is vehicle equipped with electric fuel pump? Yes- x ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

With ignition turned “ON”

DATA SHEET NO. 4
TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Wheel was set ar geometric center of loci.

Face of wheel was positioned at 27.4 degrees.

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: Detent 0-3 : Set at detent 0 or uppermost

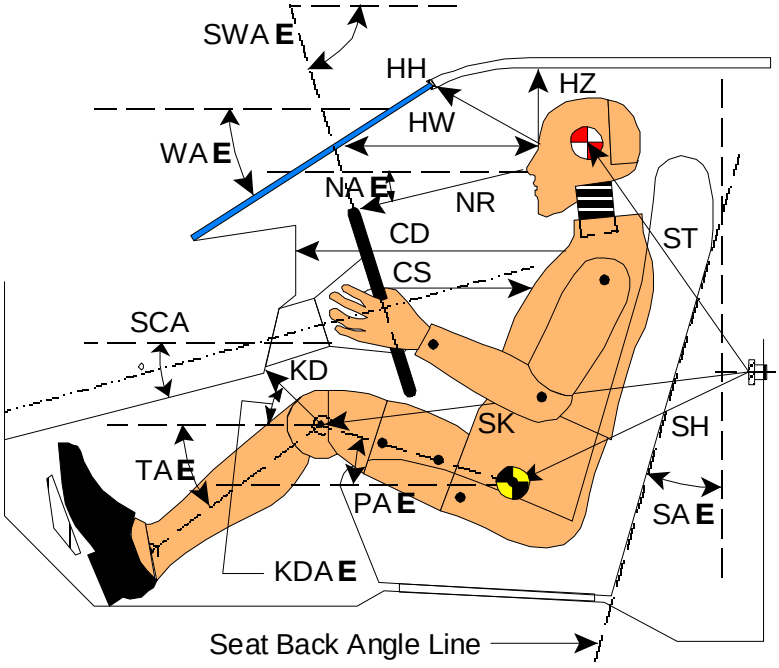
6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? x Yes; - No;

Does vehicle owner's manual describe how to deactivate ADLs? x Yes; - No; - N/A

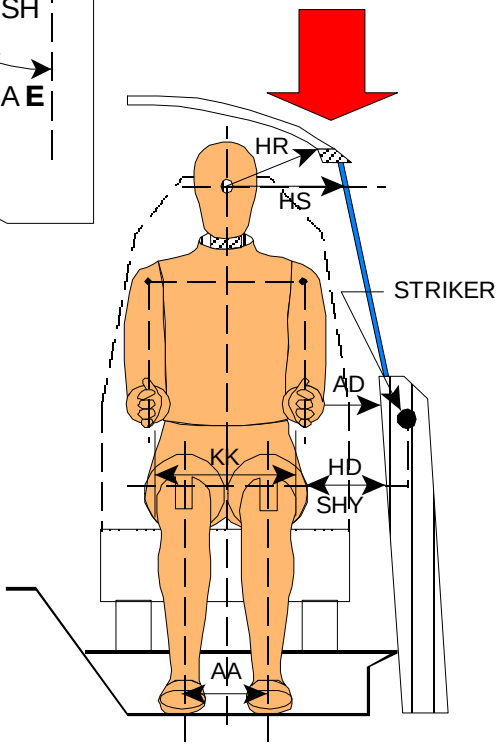
Comments: None

DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

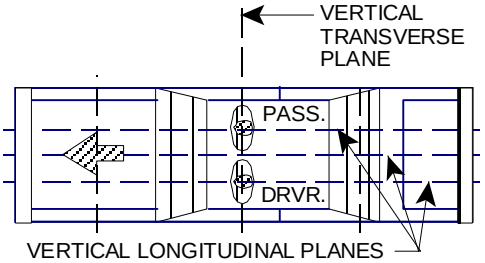
# DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS




AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
AA - Ankle to Ankle
SHY- Striker to H-Point (Y Direction)




CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



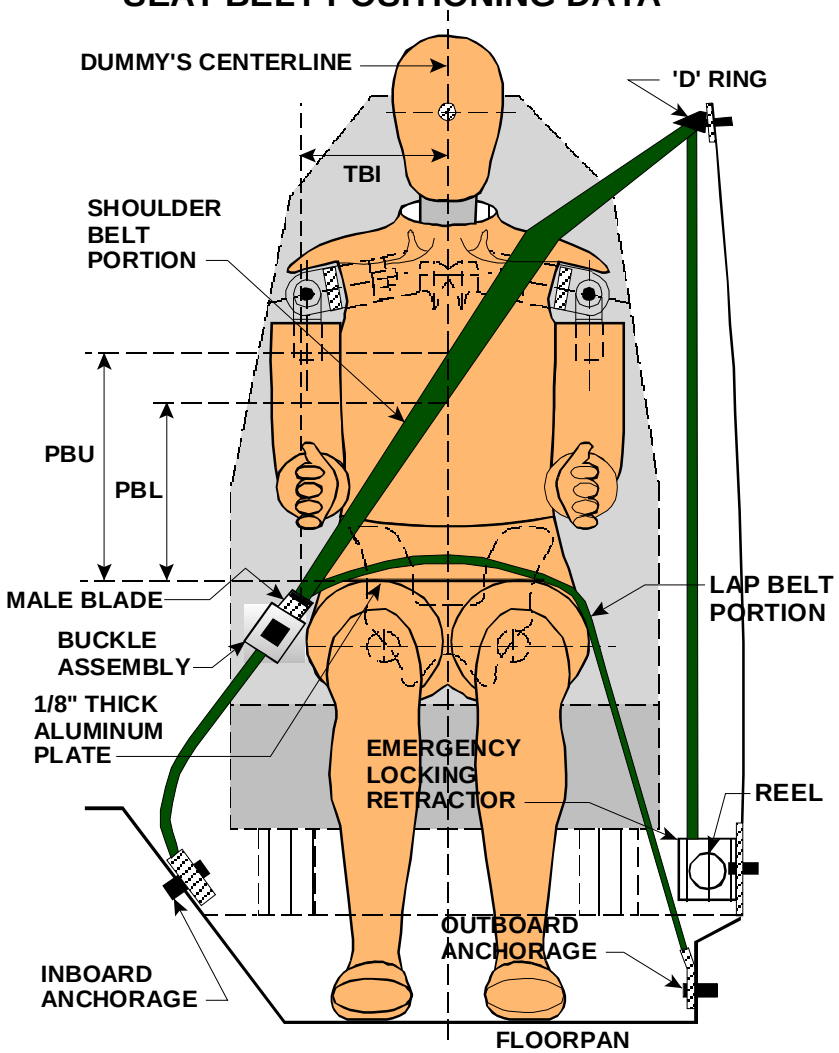
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

| | DRIVER (Serial #064) | | | PASS. (Serial #061) | | |
|---|---|---|---|---|---|---|
| $WA^O$ | 49 deg. | | | N/A | | |
| $SWA^O$ | 27.4 deg. | | | N/A | | |
| $SCA^O$ | 62.6 deg. | | | N/A | | |
| $SA^O$ | 4.0 on headrest deg. | | | 4.0 on headrest deg. | | |
| HZ | 304 | | | 302 | | |
| HH | 677 | | | 673 | | |
| HW | 834 | | | 829 | | |
| HR | 369 | | | 361 | | |
| NR | 379 | Angle | 15.7 deg. | N/A | | |
| CD | 516 | | | 524 | | |
| CS | 261 | | | N/A | | |
| RA | 183 | | | N/A | | |
| KDL | 125 | Angle (KDA) | 22 deg. | 85 | | |
| KDR | 125 | | | 125 | Angle (KDA) | 31 deg. |
| $PA^O$ | 23.9 deg. | | | 23.7 deg. | | |
| $TA^O$ | 55.2 deg. | | | 56.0 deg. | | |
| KK | 343 | | | 215 | | |
| AA | 343 | | | 250 | | |
| ST | 518 | Angle | 20 deg. | 516 | Angle | 18 deg. |
| SK | 641 | Angle | 96 deg. | 640 | Angle | 95 deg. |
| SH | 284 | Angle | 125 deg. | 284 | Angle | 125 deg. |
| SHY | 227 | | | 231 | | |
| HS | 397 | | | 393 | | |
| HD | 131 | | | 135 | | |
| AD | 91 | | | 101 | | |

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

## SEAT BELT POSITIONING DATA

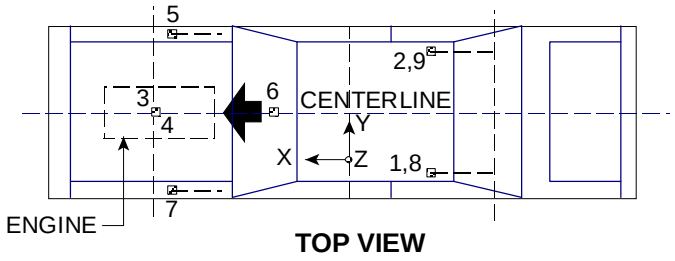



**FRONT VIEW OF DUMMY**

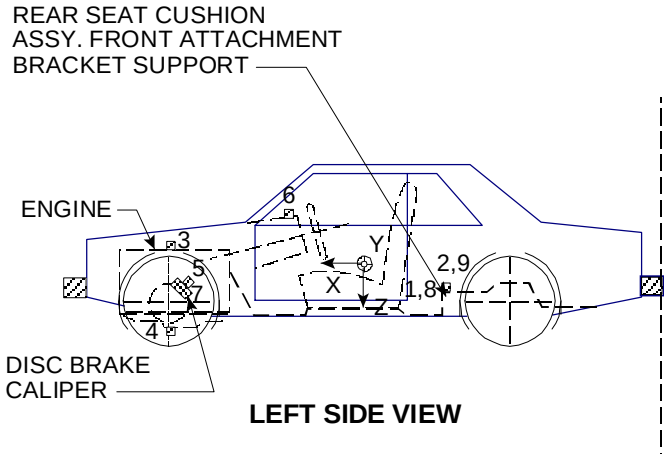
| | DRIVER DUMMY (mm) | PASSENGER DUMMY (mm) |
|---|---|---|
| PBU -- Top surface of alum. plate to upper edge | 340 | 325 |
| PBL-- Top surface of alum. plate to belt lower edge | 255 | 240 |
| LAP BELT TENSION | 10 N | 10 N |
| SHOULDER BELT TENSION | Retractor | Retractor |

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

## VEHICLE ACCELEROMETER LOCATIONS




**TOP VIEW**




**LEFT SIDE VIEW**

| | | PRE-TEST LENGTH (mm) | | |
|---|---|---|---|---|
| No. | LOCATION | X | Y | Z |
| 1 | Left Rear Seat Cross Member X | 1363 | -357 | -432 |
| 2 | Right Rear Seat Cross Member X | 1355 | 309 | -431 |
| 3 | Top of Engine Block | 3459 | 442 | -769 |
| 4 | Bottom of Engine | 2894 | 523 | -176 |
| 5 | Disc Brake Caliper @ Right Side | 3124 | 590 | -583 |
| 6 | Instrument Panel** | - | - | - |
| 7 | Disc Brake Caliper @Left Side | 3104 | -582 | -572 |
| 8 | Left Rear Seat Cross Member Z | 1363 | -357 | -432 |
| 9 | Right Rear Seat Cross Member Z | 1355 | 309 | -431 |

X – From rear surface of vehicle (+ forward)
Y – From vehicle centerline (+ right)
Z – From ground plane (+ up)
** Accelerometer was not requested by the COTR

DATA SHEET NO.8
SUMMARY OF FMVSS 212 and FMVSS 219 (Partial) DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 15 mm molding.

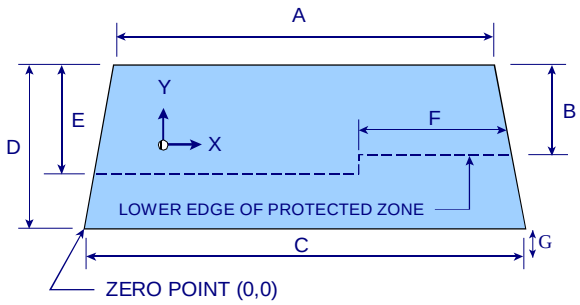
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

Temperature of windshield molding during test: 21.0ºC.

FMVSS 212 TEST DATA

| | WINDSHIELD PERIPHERY | | % OF RETENTION |
|---|---|---|---|
| | PRE-TEST (mm) | POST-TEST (mm) | |
| RIGHT SIDE | 1956.5 | 1956.5 | 100.0% |
| LEFT SIDE | 1956.5 | 1956.5 | 100.0% |
| TOTAL | 3913 | 3913 | 100.0% |




FRONT VIEW OF WINDSHIELD

| DIMENSIONS (mm) | |
|---|---|
| A | 1343 |
| B | 382 |
| C | 1450 |
| D | 560 |
| E | 370 |
| F | 590 |
| G | 15 |

FAILURE DETAILS:

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

| | COORDINATES | |
|---|---|---|
| | X | Y |
| 1. | - | - |
| 2. | - | - |
| 3. | - | - |
| 4. | - | - |

DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: M95205 TEST DATE: June 3, 2009

VEHICLE MAKE/MODEL: 2009 Nissan Cube 4-door Van

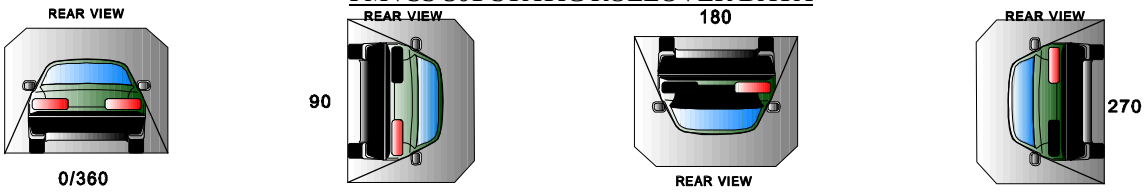
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

FUEL SPILLAGE MEASUREMENT:

| Time Interval | Amount | Maximum Allowable Spillage |
|---|---|---|
| **Impact Until Motion Ceases** | 0 | **28 g** |
| **First Five Minutes Following Impact** | 0 | **142 g** |
| **Next 25 Minutes** | 0 | **28 g / 1 minute** |

SOLVENT SPILLAGE DETAILS: None

FMVSS 301 STATIC ROLLOVER DATA




I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

| Rollover Stage | Rotation Time (spec. 1 -3 min) | | | | FMVSS 301 Hold Time | | Total Time | | | | Next Whole Minute Interval | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0º - 90º | 1 | minutes | 09 | seconds | 5 | minutes | 6 | minutes | 9 | seconds | 7 | minutes |
| 90º - 180º | 1 | minutes | 12 | seconds | 5 | minutes | 6 | minutes | 12 | seconds | 7 | minutes |
| 180º-270º | 1 | minutes | 12 | seconds | 5 | minutes | 6 | minutes | 12 | seconds | 7 | minutes |
| 270º-360º | 1 | minutes | 05 | seconds | 5 | minutes | 6 | minutes | 5 | seconds | 7 | minutes |

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

| First 5 minutes from onset of rotation | 6th min. | 7th min. | 8th min. (if required) |
|---|---|---|---|
| 142 g | 28 g | 28 g | 28 g |

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

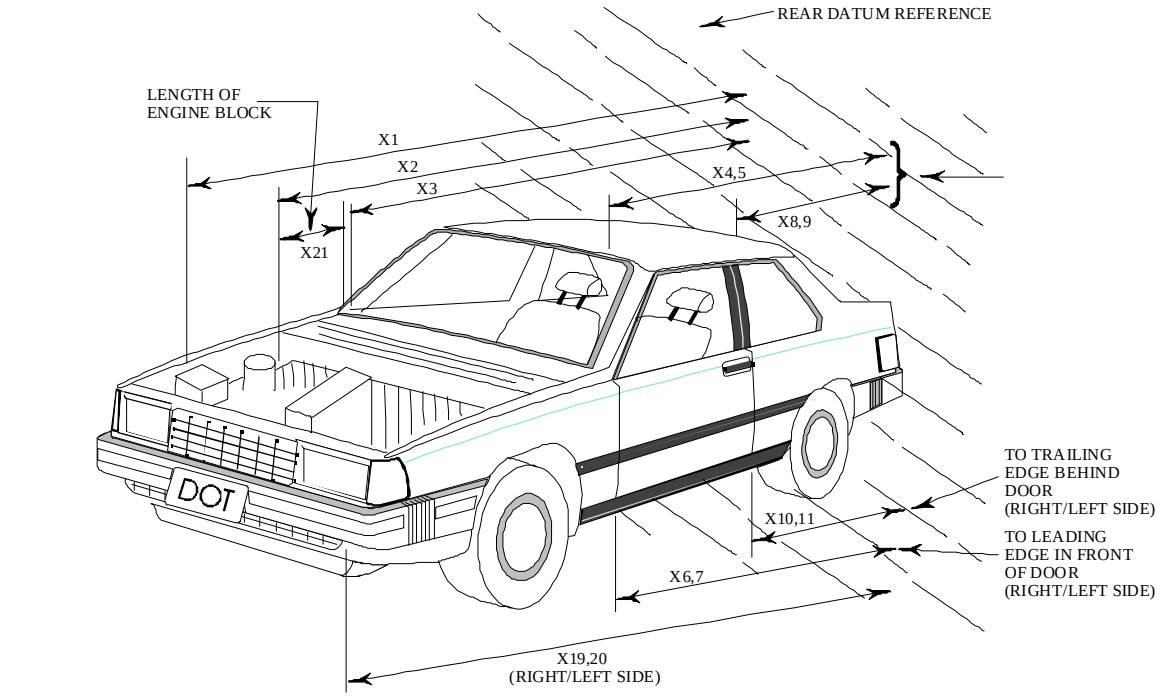
| Rollover Stage | First 5 minutes from onset of rotation (g) | 6th min. (g) | 7th min. (g) | 8th min. (if required) (g) |
|---|---|---|---|---|
| 0º - 90º | 0 | 0 | 0 | N/A |
| 90º - 180º | 0 | 0 | 0 | N/A |
| 180º-270º | 0 | 0 | 0 | N/A |
| 270º-360º | 0 | 0 | 0 | N/A |

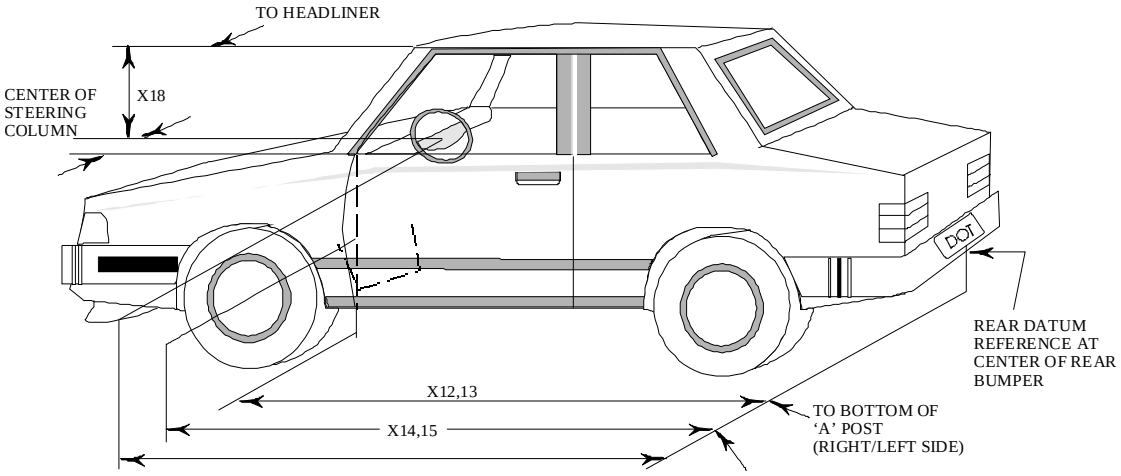
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

| Rollover Stage | Spillage Location |
|---|---|
| 0º - 90º | None |
| 90º - 180º | None |
| 180º-270º | None |
| 270º-360º | None |

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS



DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: M95205 TEST DATE: June 3, 2009

VEHICLE MAKE/MODEL: 2009 Nissan Cube 4-door Van

| No. | | Pre-Test | Post-Test | Difference |
|---|---|---|---|---|
| X1 | Total Length of Vehicle at Centerline | 3978 | 3510 | 468 |
| X2 | Rear Surface of Vehicle to Front of Engine | 3541 | 3250 | 291 |
| X3 | Rear Surface of Vehicle to Firewall | 3200 | 3066 | 134 |
| X4 | Rear Surface of Vehicle to Upper Leading Edge of Right Door | 2790 | 2780 | 10 |
| X5 | Rear Surface of Vehicle to Upper Leading Edge of Left Door | 2789 | 2785 | 4 |
| X6 | Rear Surface of Vehicle to Lower Leading Edge of Right Door | 2737 | 2729 | 8 |
| X7 | Rear Surface of Vehicle to Lower Leading Edge of Left Door | 2745 | 2743 | 2 |
| X8 | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 1677 | 1667 | 10 |
| X9 | Rear Surface of Vehicle to Upper Trailing Edge of Left Door | 1677 | 1672 | 5 |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 1653 | 1647 | 6 |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door | 1652 | 1650 | 2 |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side | 2859 | 2849 | 10 |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side | 2859 | 2858 | 1 |
| X14 | Rear Surface of Vehicle to Firewall, Right Side | 3103 | 2977 | 126 |
| X15 | Rear Surface of Vehicle to Firewall, Left Side | 3100 | 3046 | 54 |
| X16 | Rear Surface of Vehicle to Steering Column | 2303 | 2359 | -56 |
| X17 | Center of Steering Column to "A" Post | 304 | 304 | 0 |
| X18 | Center of Steering Column to Headliner | 553 | 602 | -49 |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper | 3940 | 3471 | 469 |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper | 3938 | 3548 | 390 |
| X21 | Length of Engine Block | 295 | 295 | 0 |
| RD | Rear Surface of Vehicle to Right Side of Dash Panel | 2490 | 2475 | 15 |
| CD | Rear Surface of Vehicle to Center of Dash Panel | 2501 | 2490 | 11 |
| LD | Rear Surface of Vehicle to Left Side of Dash Panel | 2467 | 2475 | -8 |

All Dimensions in mm

DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

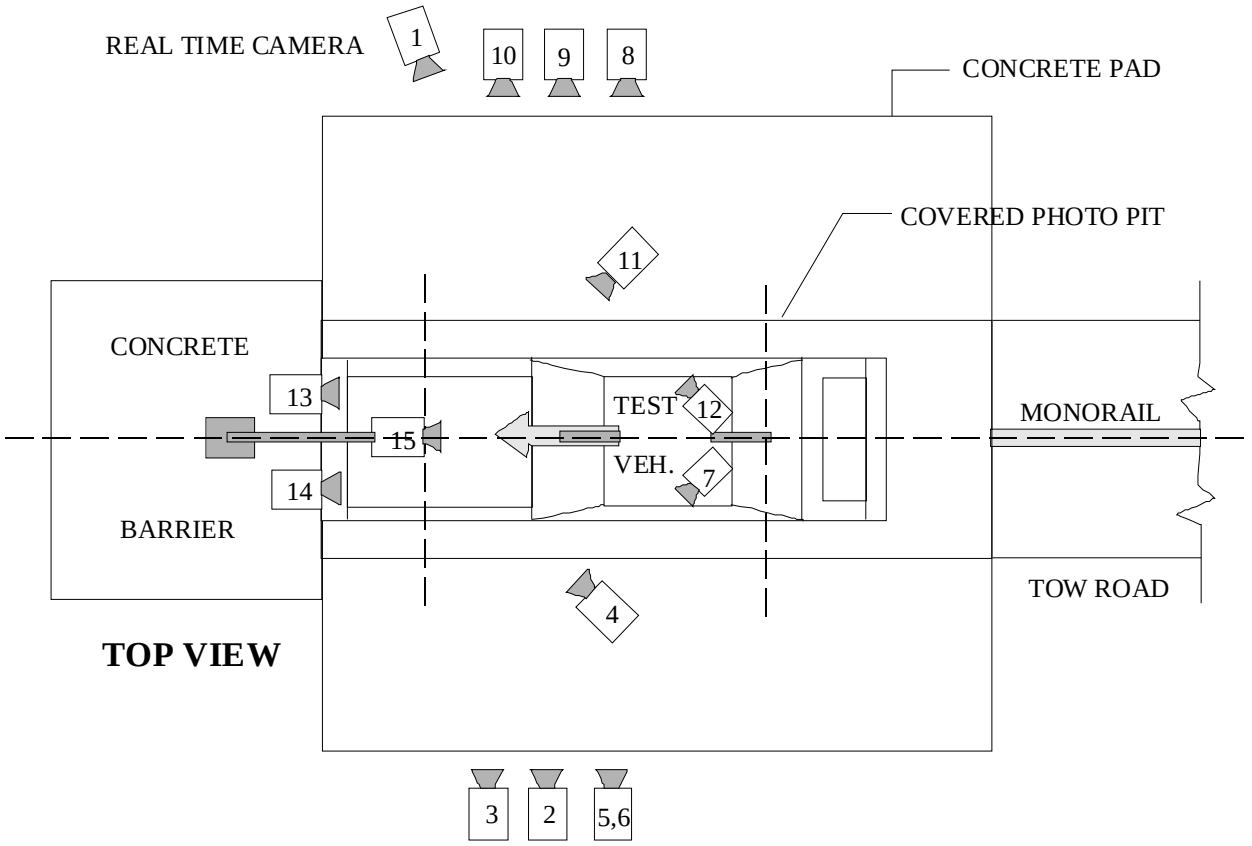
NHTSA TEST No.: M95205 TEST DATE: June 3, 2009

VEHICLE MAKE/MODEL: 2009 Nissan Cube 4-door Van

TARGET VEHICLE STRUCTURAL MEASUREMENTS

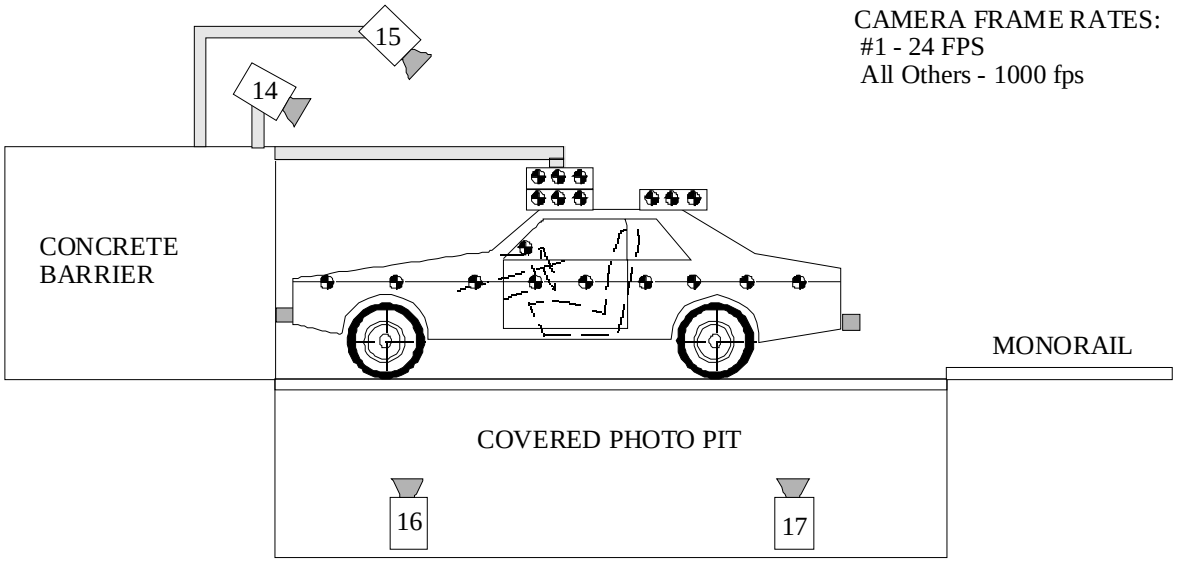
| | Elements | Pre-Test (mm) |
|---|---|---|
| 1 | Total length | 3978 |
| 2 | Total Width | 1692 |
| 3 | Bumper Top Height | 575 |
| 4 | Bumper Bottom Height | 449 |
| 5 | Longitudinal Member Top Height | 597 |
| 6 | Distance Between Longitudinal Members | 938 |
| 7 | Longitudinal Member Width | 41 |
| 8 | Engine top height | 891 |
| 9 | Engine bottom height | 198 |
| 10 | Engine and gearbox width | 574 |
| 11 | Front bumper-engine distance | 437 |
| 12 | Front shock absorber fixing height | 857 |
| 13 | Bonnet leading edge height | 854 |
| 14 | Front shock absorber fixing width | 1166 |
| 15 | Front bumper – front axle distance | 782 |
| 16 | Front axle – A pillar distance | 3195 |
| 17 | A-pillar – B pillar distance | 0 |
| 18 | B-pillar – rear axle distance | -666 |
| 19 | B-pillar – C Pillar distance | 0 |
| 20 | Roof sill bottom height | 1491 |
| 21 | Roof sill top height | 1597 |
| 22 | Floor sill bottom height | 283 |
| 23 | Floor sill top height | 345 |

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS




**TOP VIEW**

CAMERA FRAME RATES:
#1 - 24 FPS
All Others - 1000 fps




**LEFT SIDE VIEW**

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

| CAMERA NO. | VIEW | CAMERA POSITIONS (mm)* X | Y | Z | ANGLE (deg)** | FILM PLANE TO HEAD TARGET | LENS (mm) | SPEED (fps) |
|---|---|---|---|---|---|---|---|---|
| 1 | Real-Time Camera | - | - | - | - | - | - | 30 |
| 2 | Overall Left Side | 7077 | 2205 | 917 | -2.8 | 6672 | 28 | 1000 |
| 3 | Left Side View | 9417 | 1475 | 951 | -1.8 | 9012 | 50 | 1000 |
| 4 | Driver and Interior View | 6371 | 2306 | 2061 | -8.9 | - | 35 | 1000 |
| 5 | Steering Column (Bottom) | 8099 | 2507 | 1204 | -4.0 | 7694 | 25 | 1000 |
| 6 | Steering Column (Top) | 8099 | 2507 | 1798 | -8.4 | 7694 | 28-70 | 1000 |
| 7 | Left CRS Lateral View | - | - | - | - | - | - | - |
| 8 | Overall Right Side | 7075 | 2222 | 914 | -2.0 | 6670 | 28 | 1000 |
| 9 | Right Side View | 9199 | 1735 | 1036 | -1.6 | 8794 | 50 | 1000 |
| 10 | Right Passenger View | 7637 | 2109 | 1148 | -2.1 | 7232 | 35 | 1000 |
| 11 | Passenger and Interior View | 6835 | 3146 | 1886 | -7.8 | - | 35 | 1000 |
| 12 | Right CRS Lateral View | - | - | - | - | - | - | - |
| 13 | Passenger Front View | 620 | -92 | 1987 | -38 | - | 13 | 500 |
| 14 | Driver Front View | 620 | -92 | 1987 | -37 | - | 13 | 500 |
| 15 | Windshield View | 0 | -530 | 3374 | -55 | - | 20 | 500 |
| 16 | Pit View of Engine | 0 | 615 | -3048 | 90 | - | 13 | 500 |
| 17 | Pit View of Fuel Tank | 0 | 2941 | -3048 | 90 | - | 13 | 500 |

*X = film plane to monorail centerline ** = referenced to horizontal plane

Y = film plane to impact location N.T. indicates No Timing

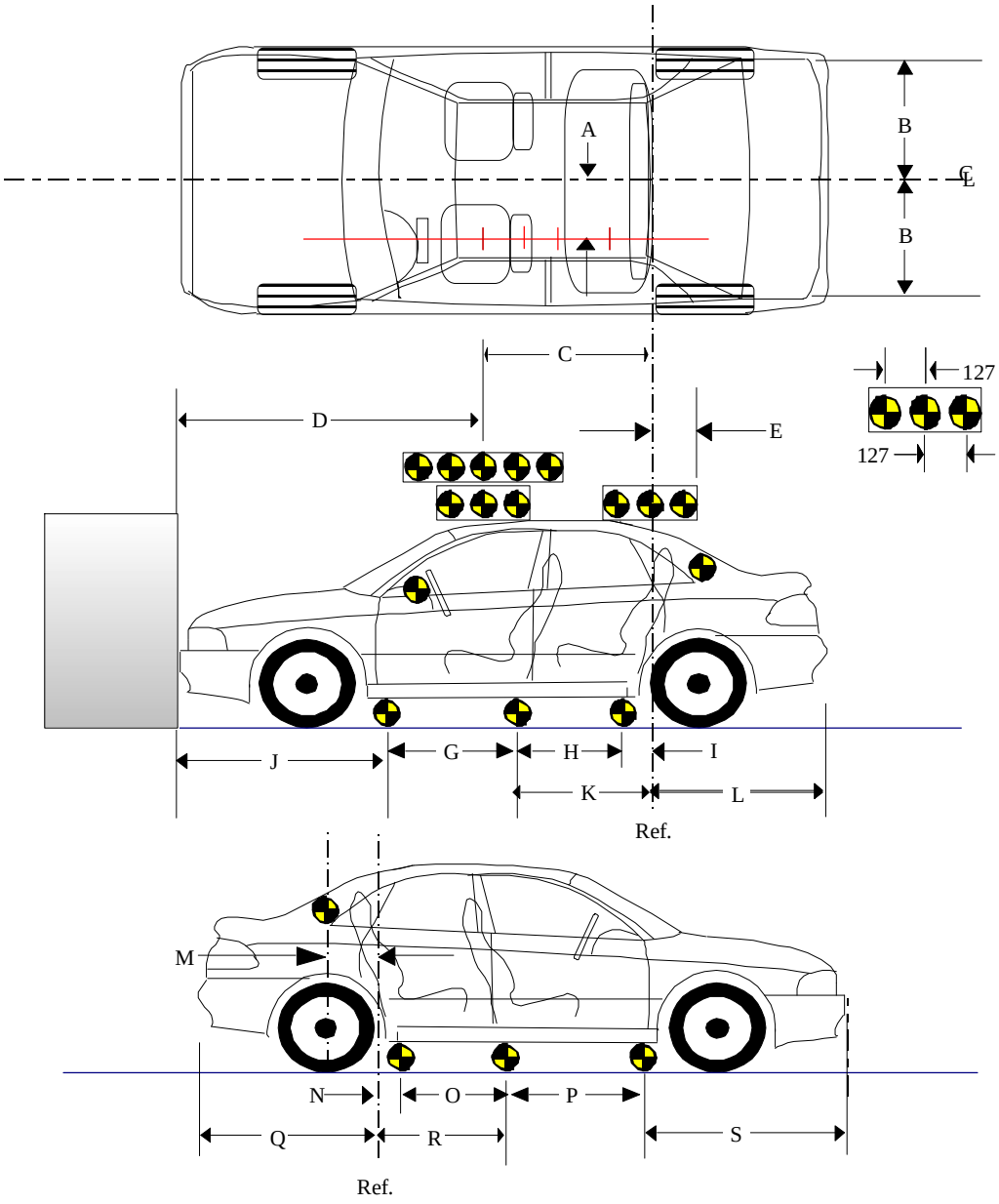
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

(Dimensions in millimeters)

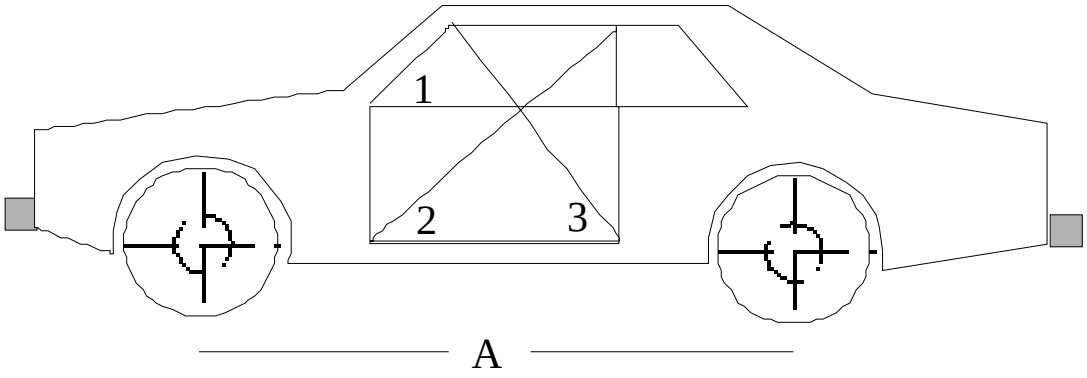
| | |
|---|---|
| A | 329 |
| B | 707 |
| C | 1220 |
| D | 1785 |
| E | 261 |
| F | 1500 |
| G | 835 |
| H | 832 |
| I | 102 |
| J | 1232 |
| K | 934 |
| L | 976 |
| M | 261 |
| N | 101 |
| O | 837 |
| P | 829 |
| Q | 973 |
| R | 938 |
| S | 1238 |



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



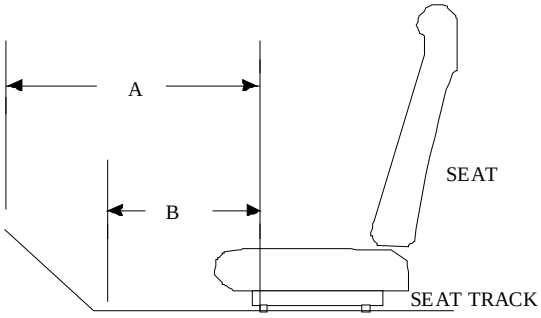

| UNITS (mm) | LEFT | | | RIGHT | | |
|---|---|---|---|---|---|---|
| MEASUREMENT | 1 | 2 | 3 | 1 | 2 | 3 |
| BEFORE TEST | 1011 | 1411 | 1239 | 1012 | 1411 | 1236 |
| AFTER TEST | 1007 | 1408 | 1246 | 999 | 1406 | 1250 |
| DIFFERENCE | 4 | 3 | -7 | 13 | 5 | -14 |

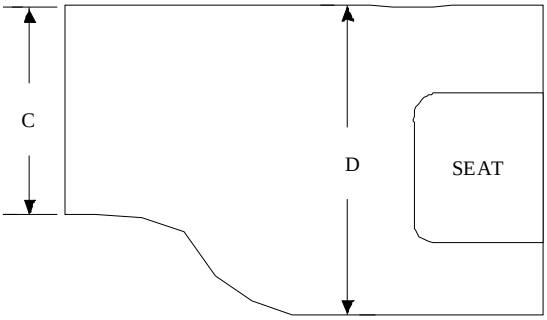
| UNITS (mm) | A = WHEELBASE LEFT | A = WHEELBASE RIGHT |
|---|---|---|
| BEFORE TEST | 2530 | 2532 |
| AFTER TEST | 2476 | 2439 |
| DIFFERENCE | 54 | 93 |

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

STATIC FOOTWELL DEFORMATION




DRIVER

| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 667 | 608 | 59 |
| B | 543 | 539 | 4 |
| C | 454 | 441 | 13 |
| D | 516 | 516 | 0 |

PASSENGER

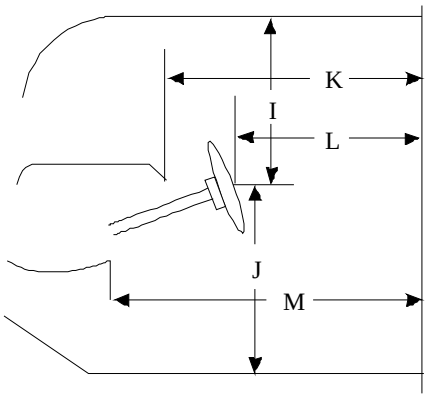
| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 580 | 561 | 19 |
| B | 445 | 444 | 1 |
| C | 427 | 424 | 3 |
| D | 513 | 514 | -1 |

Units = mm

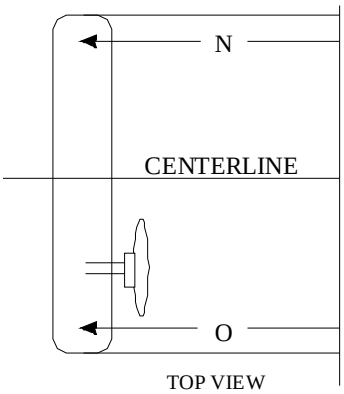
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

STATIC PASSENGER COMPARTMENT INTRUSION

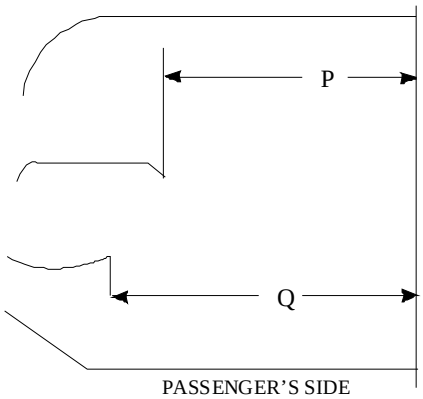


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



PASSENGER'S SIDE

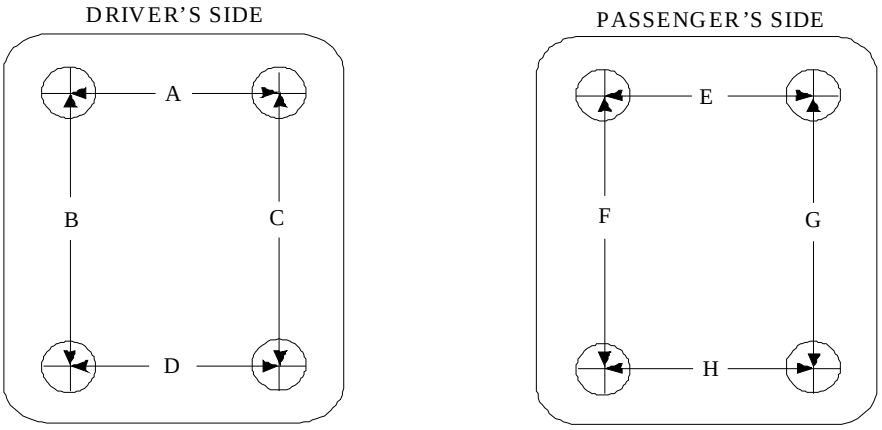
| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| I | 553 | 602 | -49 |
| J | 706 | 673 | 33 |
| K | 785 | 760 | 25 |
| L | 576 | 633 | -57 |
| M | 781 | 781 | 0 |
| N | 763 | 750 | 13 |
| O | 740 | 749 | -9 |
| P = K (PASS.) | 1074 | 1070 | 4 |
| Q = M (PASS.) | 802 | 788 | 14 |

Units = mm

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van

FLOORBOARD DEFORMATION



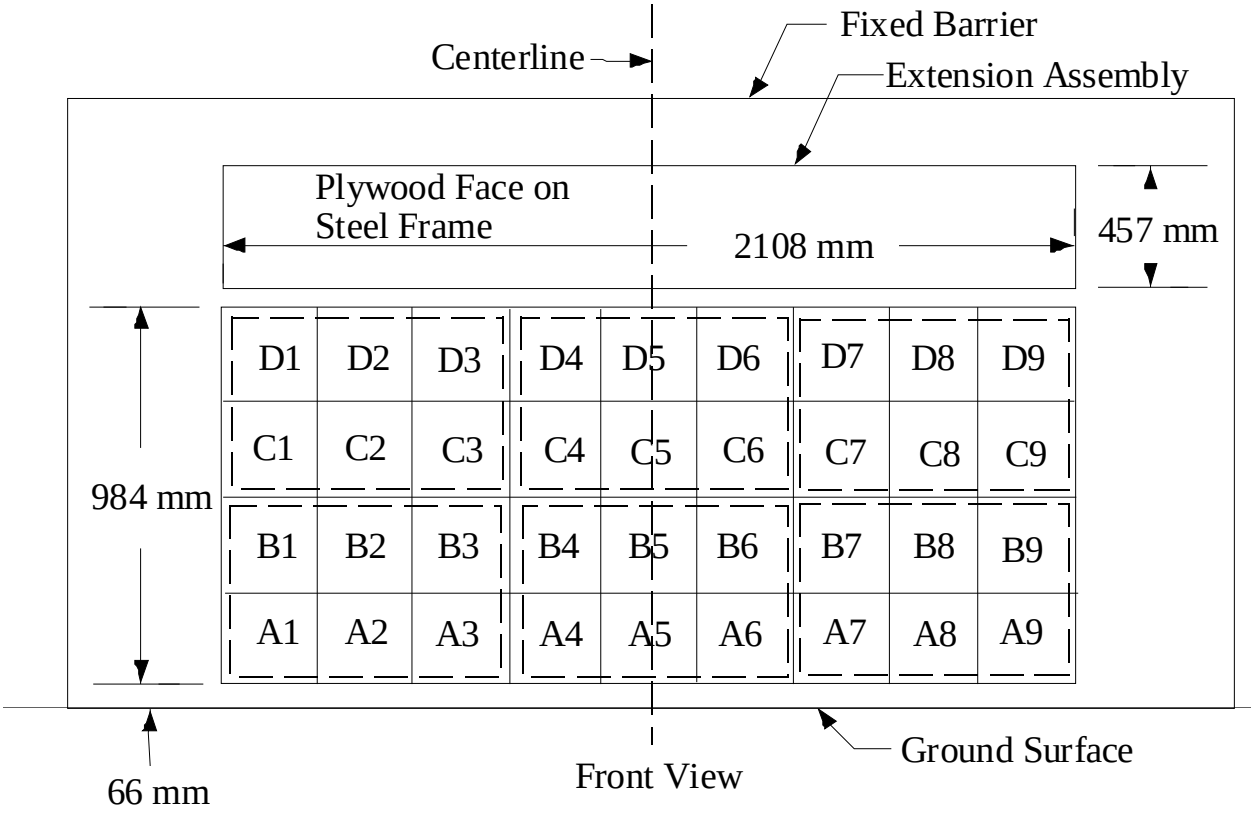

TOP VIEW THROUGH FLOOR PAN

| Measurement | Pre-Test | Post-Test | Difference |
|---|---|---|---|
| A | 454 | 441 | 13 |
| B | 388 | 388 | 0 |
| C | 382 | 377 | 5 |
| D | 516 | 516 | 0 |
| E | 427 | 424 | 3 |
| F | 361 | 359 | 2 |
| G | 352 | 353 | -1 |
| H | 513 | 514 | -1 |

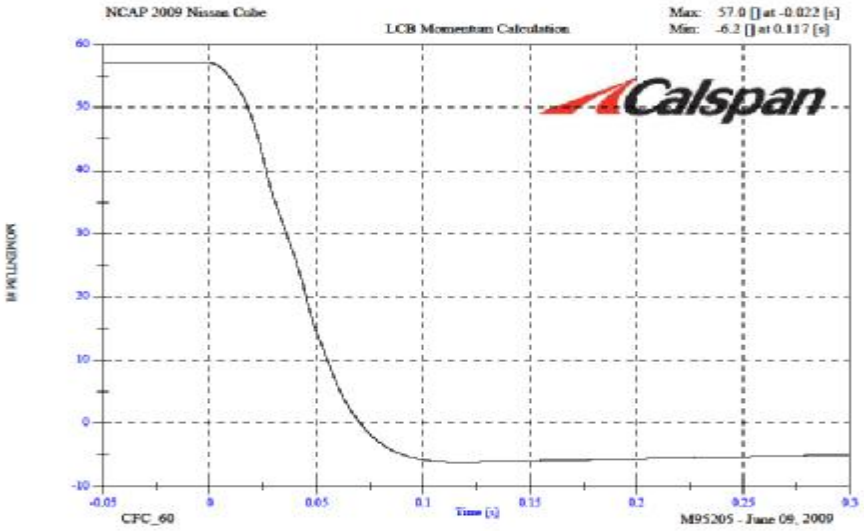
Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns




Momentum Plot



DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Nissan Cube 4-door Van

NHTSA Test No.: M95205 VIN: JN8AZ28R79T101805

Model Year: 2009 Build Date: 03/09 Test Date: June 3, 2009

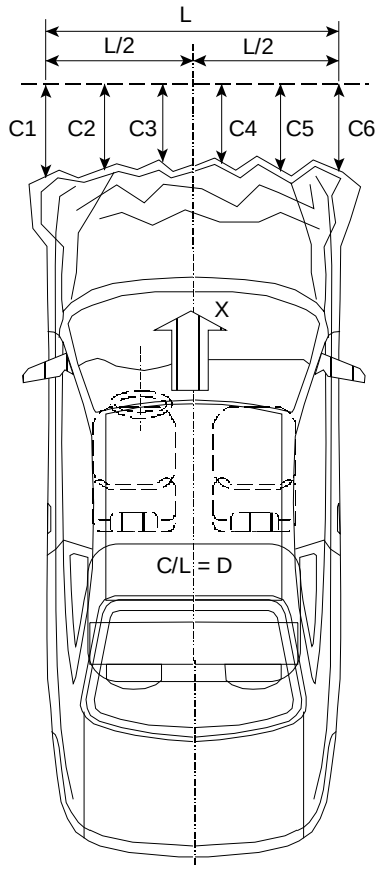
Vehicle Size Category: Van Test Weight: 1465.5 kg

Vehicle Wheelbase: 2532 mm; Front Overhang: 783 mm; Overall Width: 1692 mm

Collision Deformation Classification (CDC) Code: 12FDEW4

Crush Depth Dimensions

| | PRE (mm) | POST (mm) | DIFF (mm) |
|---|---|---|---|
| C1 = | 3846 | 3465 | 381 |
| C2 = | 3950 | 3544 | 406 |
| C3 = | 3975 | 3528 | 447 |
| C4 = | 3976 | 3492 | 484 |
| C5 = | 3952 | 3450 | 502 |
| C6 = | 3851 | 3489 | 362 |




Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

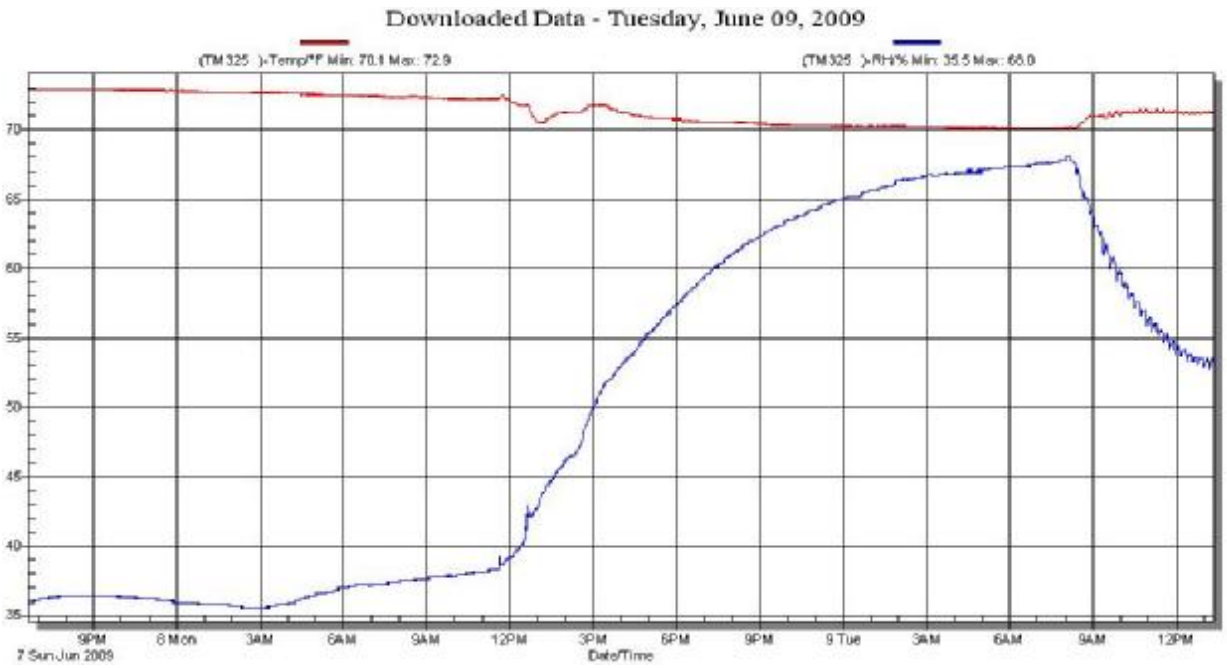
Length of Damaged Region: L1= 1346 mm

L2= 673.0 mm

L5= 269.2 mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: M95205 Vehicle: 2009 Nissan Cube 4-door Van



**APPENDIX A**

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)


**Figure A-1: Load Cell Locations**


**Figure A-2: Vehicle Certification Placard**


**Figure A-3: Vehicle Tire Placard**

**Figure A-4: Right Front, As Received**

**Figure A-5: Left Rear, As Received**

**Figure A-6: Pre-Test Front View**


**Figure A-7: Post-Test Front View**


**Figure A-8: Pre-Test Left Side View**


**Figure A-9: Post-Test Left Side View**


**Figure A-10: Pre-Test Right Side View**


**Figure A-11: Post-Test Right Side View**

**Figure A-12: Pre-Test Right Front Three-Quarter View**


**Figure A-13: Post-Test Right Front Three-Quarter View**


**Figure A-14: Pre-Test Left Rear Three-Quarter View**


**Figure A-15: Post-Test Left Rear Three-Quarter View**


**Figure A-16: Left Rear Three-Quarter View of Doors After Impact**


**Figure A-17: Right Rear Three-Quarter View of Doors After Impact**


**Figure A-18: Pre-Test Windshield View**

Photo not available

**Figure A-19: Post-Test Windshield View**

**Figure A-20: Pre-Test Engine Compartment View**

**Figure A-21: Post-Test Engine Compartment View**


**Figure A-22: Pre-Test Fuel Cap View**


**Figure A-23: Post-Test Fuel Cap View**

**Figure A-24: Pre-Test Front Underbody View**

**Figure A-25: Post-Test Front Underbody View**


**Figure A-26: Pre-Test Mid Underbody View**


**Figure A-27: Post-Test Mid Underbody View**

**Figure A-28: Pre-Test Rear Underbody View**

**Figure A-29: Post-Test Rear Underbody View**


**Figure A-30: Pre-Test Driver Head Location**


**Figure A-31: Post-Test Driver Head Location**


**Figure A-32: Pre-Test Driver Position View**


**Figure A-33: Post-Test Driver Position View**


**Figure A-34: Pre-Test Driver and Interior View**


**Figure A-35: Post-Test Driver and Interior View**

**Figure A-36: Pre-Test Driver Feet View**

**Figure A-37: Post-Test Driver Feet View**


**Figure A-38: Pre-Test Driver Knee Bolster View**


**Figure A-39: Post-Test Driver Knee Bolster View**


**Figure A-40: Pre-Test Driver Floor Pan View**


**Figure A-41: Post-Test Driver Floor Pan View**

**Figure A-42: Post-Test Driver Head View**


**Figure A-43: Post-Test Driver Contact to Airbag**


**Figure A-44: Pre-Test Passenger Head Location**


**Figure A-45: Post-Test Passenger Head Location**


**Figure A-46: Pre-Test Passenger Position View**


**Figure A-47: Post-Test Passenger Position View**


**Figure A-48: Pre-Test Passenger and Interior View**


**Figure A-49: Post-Test Passenger and Interior View**


**Figure A-50: Pre-Test Passenger Feet View**

**Figure A-51: Post-Test Passenger Feet View**


**Figure A-52: Pre-Test Passenger Knee Bolster View**


**Figure A-53: Post-Test Passenger Knee Bolster View**

**Figure A-54: Pre-Test Passenger Floor Pan View**


**Figure A-55: Post-Test Passenger Floor Pan View**

**Figure A-56: Post-Test Passenger Head View**

**Figure A-57: Post-Test Passenger Contact to Airbag**

**Figure A-58: Rollover View - 90°**

**Figure A-59: Rollover View - 180°**

**Figure A-60: Rollover View - 270°**


**Figure A-61: Rollover View - 360°**

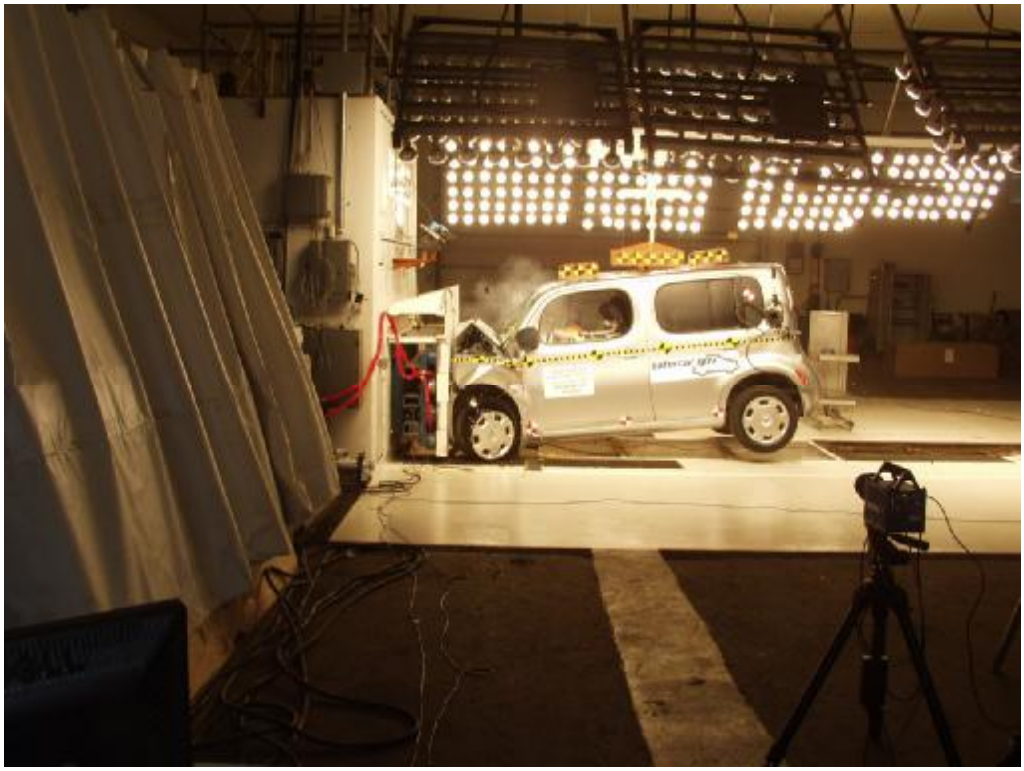


**Figure A-62: Impact View**

**APPENDIX B**

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

**Hybrid III Dummy Sign Conventions**
**Load Cells and Special Transducers**

| **Transducer** | **SAE Sign Convention (positive unless noted)** |
|---|---|
| Upper Neck Load Cell | Fx Head rearward<br>Fy Head left<br>Fz Neck in tension<br>Mx Left ear to left shoulder<br>My Chin to chest (flexion)<br>Mz Chin to left shoulder (look left) |
| Chest Displacement Potentiometer | Compression is negative |
| Pelvic Load Cell (Lower Lumbar) | Fx Chest rearward<br>Fy Chest left<br>Fz Spine in tension |
| Femur Load Cell | Compression is negative |
| Upper Tibia Load Cell<br>(right and left leg) | Mx Support tibia at ends, load left side center<br>My Support tibia at ends, load front (shin) center |
| Lower Tibia Load Cell<br>(right and left leg) | Fz Tibia in tension<br>Mx Support tibia at ends, load left side center<br>My Support tibia at ends, load front (shin) center |

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.: M95205

| **DATA TYPE** | **SAE FILTER CLASS (Hz)** |
|---|---|
| Dummy Head Accelerations | 1000 |
| Dummy Chest Accelerations | 180 |
| Dummy Chest Displacements | 600 |
| Dummy Femur Forces | 600 |
| Dummy Belt Loads | 60 |
| Dummy Belt Displacements | 180 |
| Dummy Neck Forces | 1000 |
| Dummy Neck Moments | 600 |
| Vehicle Accelerations | 60 |
| Vehicle Velocity Integrations | 180 |
| Vehicle Displacement Integrations | 180 |
| Load Cell Barrier Forces | 60 |

## Table of Data Plots

**The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: www.nhtsa.dot.gov**

| | |
|---|---|
| V1P1 Head 9 Array X Arm Ay | V1P1 Lap Belt Load |
| V1P1 Head 9 Array X Arm Az | V1P1 Shoulder Belt Load |
| V1P1 Head 9 Array Y Arm Ax | V1P2 Lap Belt Load |
| V1P1 Head 9 Array Y Arm Az | V1P2 Shoulder Belt Load |
| V1P1 Head 9 Array Z Arm Ax | V1 Left Rear #1x |
| V1P1 Head 9 Array Z Arm Ay | V1 Right Rear #2x |
| V1P1 Head CG Ax | V1 Engine Top #3x |
| V1P1 Head CG Ay | V1 Engine Bottom #4x |
| V1P1 Head CG Az | V1 Right Caliper #5x |
| V1P1 Head CG Red Ax | V1 Left Caliper #7x |
| V1P1 Head CG Red Ay | V1 Left Rear #8z |
| V1P1 Head CG Red Az | V1 Right Rear #9z |
| V1P1 Upper Neck Fx | |
| V1P1 Upper Neck Fy | |
| V1P1 Upper Neck Fz | |
| V1P1 Upper Neck Mx | |
| V1P1 Upper Neck My | |
| V1P1 Upper Neck Mz | |
| V1P1 Chest Ax | |
| V1P1 Chest Ay | |
| V1P1 Chest Az | |
| V1P1 Chest Red Ax | |
| V1P1 Chest Red Ay | |
| V1P1 Chest Red Az | |
| V1P1 Chest Compression | |
| V1P1 Pelvic Ax | |
| V1P1 Pelvic Ay | |
| V1P1 Pelvic Az | |
| V1P1 Left Femur Fz | |
| V1P1 Right Femur Fz | |
| V1P1 Left Upper Tibia Mx | |
| V1P1 Left Upper Tibia My | |
| V1P1 Left Lower Tibia Fz | |
| V1P1 Left Lower Tibia Mx | |
| V1P1 Left Lower Tibia My | |
| V1P1 Right Upper Tibia Fz | |
| V1P1 Right Upper Tibia Mx | |
| V1P1 Right Upper Tibia My | |
| V1P1 Right Lower Tibia Mx | |
| V1P1 Right Lower Tibia My | |
| V1P1 Left Foot Aft Ax | |
| V1P1 Left Foot Aft Az | |
| V1P1 Left Foot Fore Az | |
| V1P1 Right Foot Aft Ax | |
| V1P1 Right Foot Aft Az | |
| V1P1 Right Foot Fore z | |
| V1P2 Head 9 Array X Arm Ay | |

| | |
|---|---|
| V1P2 Head 9 Array X Arm Az | |
| V1P2 Head 9 Array Y Arm Ax | |
| V1P2 Head 9 Array Y Arm Az | |
| V1P2 Head 9 Array Z Arm Ax | |
| V1P2 Head 9 Array Z Arm Ay | |
| V1P2 Head CG Ax | |
| V1P2 Head CG Ay | |
| V1P2 Head CG Az | |
| V1P2 Head CG Red Ax | |
| V1P2 Head CG Red Ay | |
| V1P2 Head CG Red Az | |
| V1P2 Upper Neck Fx | |
| V1P2 Upper Neck Fy | |
| V1P2 Upper Neck Fz | |
| V1P2 Upper Neck Mx | |
| V1P2 Upper Neck My | |
| V1P2 Upper Neck Mz | |
| V1P2 Chest Ax | |
| V1P2 Chest Ay | |
| V1P2 Chest Az | |
| V1P2 Chest Red Ax | |
| V1P2 Chest Red Ay | |
| V1P2 Chest Red Az | |
| V1P2 Chest Compression | |
| V1P2 Pelvic Ax | |
| V1P2 Pelvic Ay | |
| V1P2 Pelvic Az | |
| V1P2 Left Femur Fz | |
| V1P2 Right Femur Fz | |
| V1P2 Left Upper Tibia Fz | |
| V1P2 Left Upper Tibia Mx | |
| V1P2 Left Upper Tibia My | |
| V1P2 Left Lower Tibia Mx | |
| V1P2 Left Lower Tibia My | |
| V1P2 Right Upper Tibia Mx | |
| V1P2 Right Upper Tibia My | |
| V1P2 Right Lower Tibia Fz | |
| V1P2 Right Lower Tibia Mx | |
| V1P2 Right Lower Tibia My | |
| V1P2 Left Foot Aft Ax | |
| V1P2 Left Foot Aft Az | |
| V1P2 Left Foot Fore Az | |
| V1P2 Right Foot Aft Ax | |
| V1P2 Right Foot Aft Az | |
| V1P2 Right Foot Fore Az | |
| Barrier Load Cell A1 Fx | |
| Barrier Load Cell A2 Fx | |
| Barrier Load Cell A3 Fx | |
| Barrier Load Cell A4 Fx | |

| | |
|---|---|
| Barrier Load Cell A5 Fx | |
| Barrier Load Cell A6 Fx | |
| Barrier Load Cell A7 Fx | |
| Barrier Load Cell A8 Fx | |
| Barrier Load Cell A9 Fx | |
| Barrier Load Cell B1 Fx | |
| Barrier Load Cell B2 Fx | |
| Barrier Load Cell B3 Fx | |
| Barrier Load Cell B4 Fx | |
| Barrier Load Cell B5 Fx | |
| Barrier Load Cell B6 Fx | |
| Barrier Load Cell B7 Fx | |
| Barrier Load Cell B8 Fx | |
| Barrier Load Cell B9 Fx | |
| Barrier Load Cell C1 Fx | |
| Barrier Load Cell C2 Fx | |
| Barrier Load Cell C3 Fx | |
| Barrier Load Cell C4 Fx | |
| Barrier Load Cell C5 Fx | |
| Barrier Load Cell C6 Fx | |
| Barrier Load Cell C7 Fx | |
| Barrier Load Cell C8 Fx | |
| Barrier Load Cell C9 Fx | |
| Barrier Load Cell D1 Fx | |
| Barrier Load Cell D2 Fx | |
| Barrier Load Cell D3 Fx | |
| Barrier Load Cell D4 Fx | |
| Barrier Load Cell D5 Fx | |
| Barrier Load Cell D6 Fx | |
| Barrier Load Cell D7 Fx | |
| Barrier Load Cell D8 Fx | |
| Barrier Load Cell D9 Fx | |

| **TEST NOTES** | |
|---|---|
| Data Channel | Anomalies |
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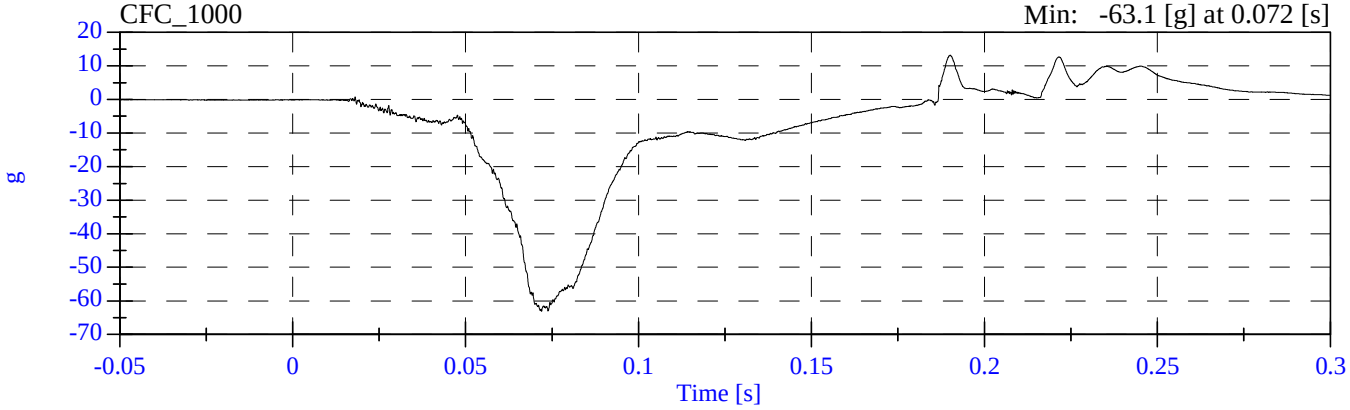
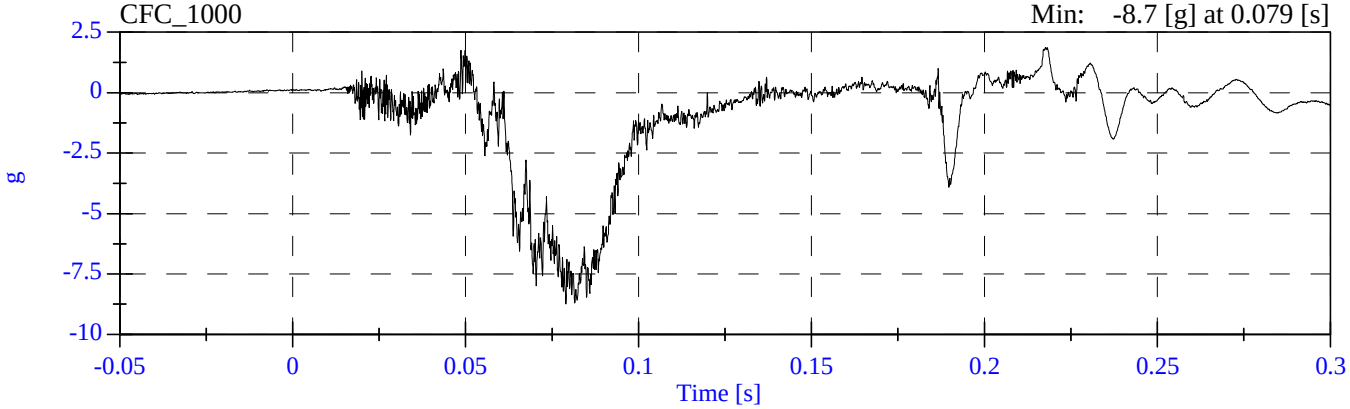
# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

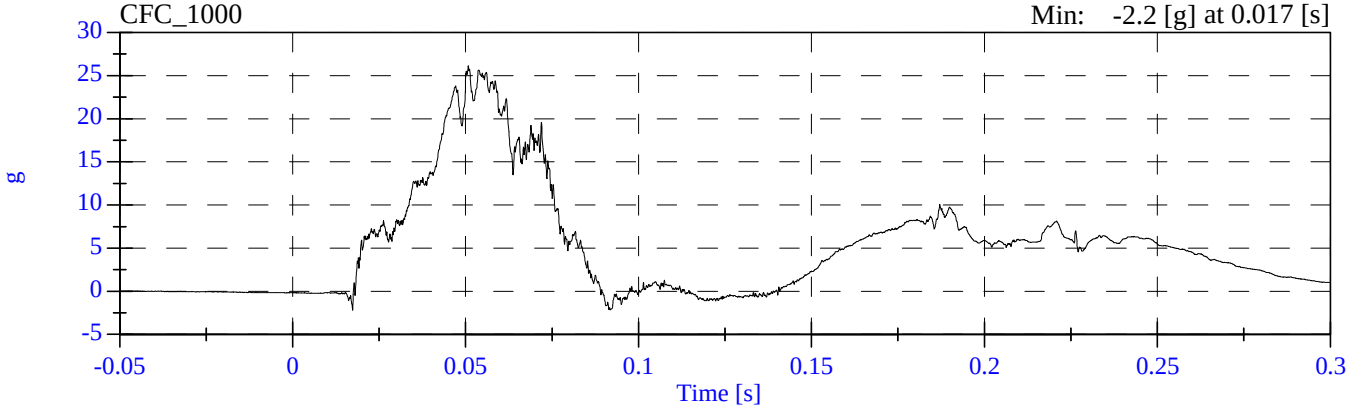
**V1P1 Head CG x**
CFC_1000
Max: 13.2 [g] at 0.190 [s]
Min: -63.1 [g] at 0.072 [s]



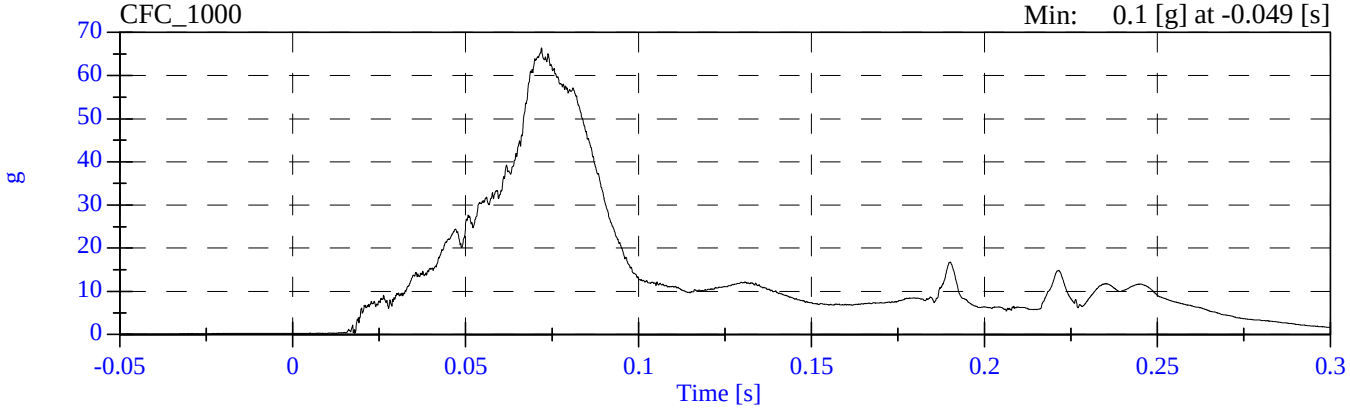

**V1P1 Head CG y**
CFC_1000
Max: 1.9 [g] at 0.218 [s]
Min: -8.7 [g] at 0.079 [s]




**V1P1 Head CG z**
CFC_1000
Max: 26.1 [g] at 0.051 [s]
Min: -2.2 [g] at 0.017 [s]

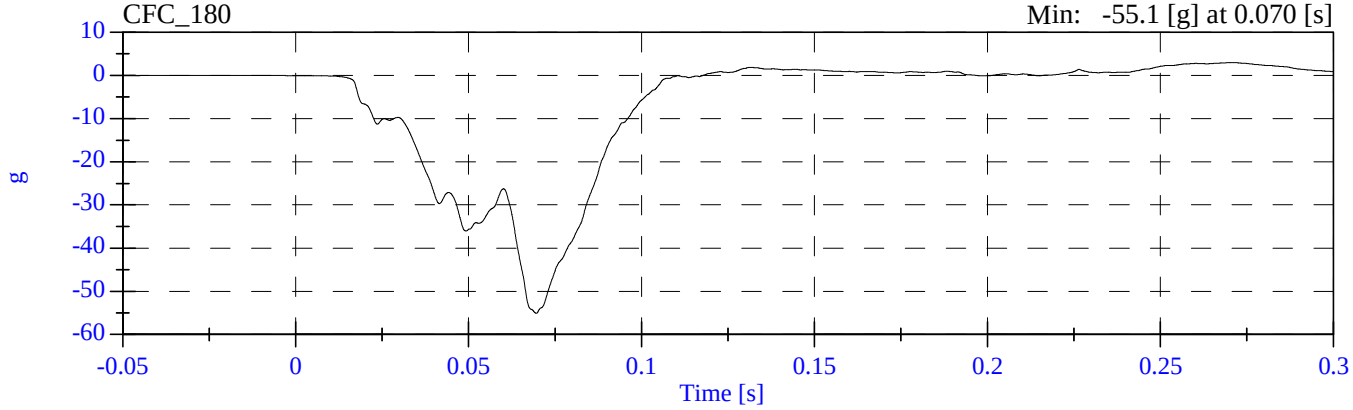



**V1P1 Head CG Resultant**
CFC_1000
Max: 66.4 [g] at 0.072 [s]
Min: 0.1 [g] at -0.049 [s]

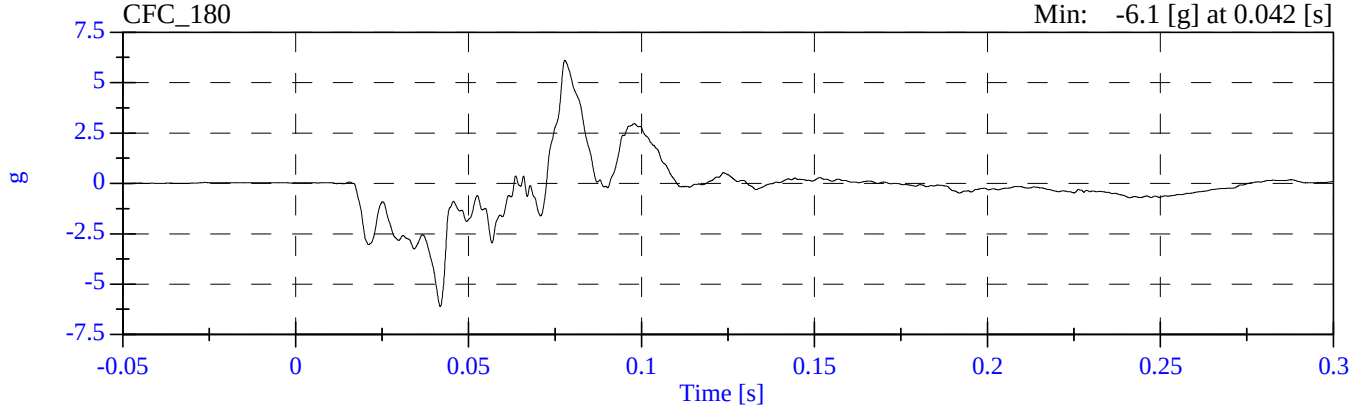


# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

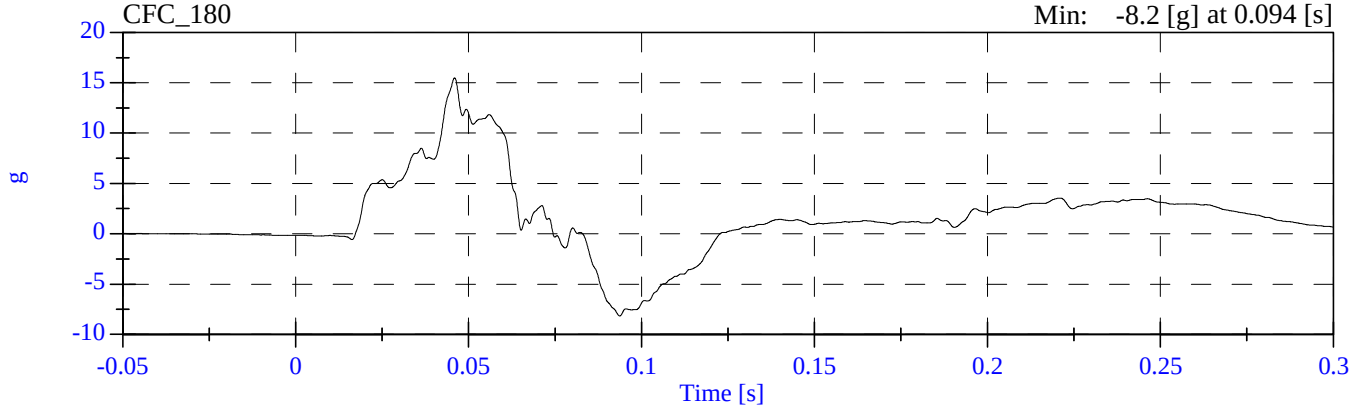
**V1P1 Chest x**
CFC_180
Max: 3.0 [g] at 0.271 [s]
Min: -55.1 [g] at 0.070 [s]



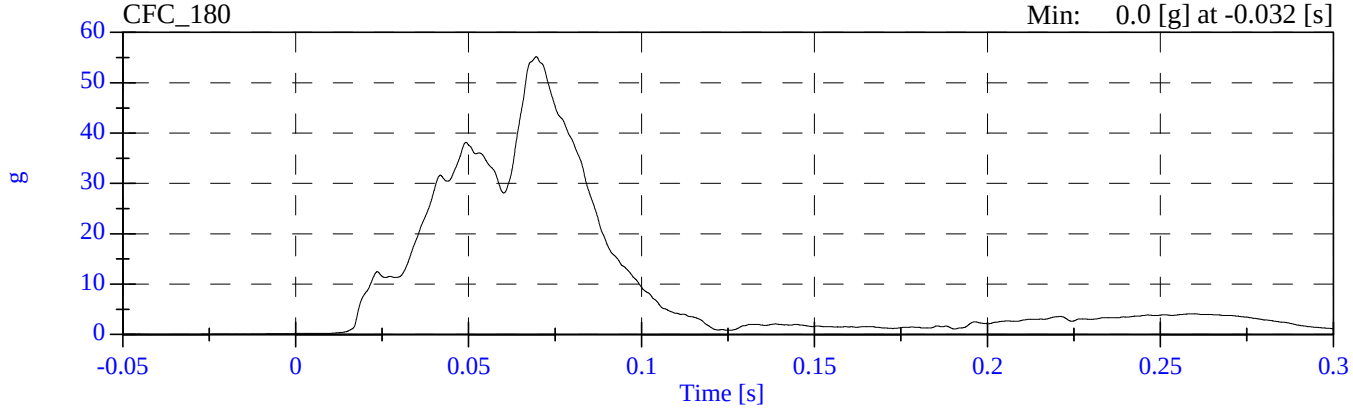

**V1P1 Chest y**
CFC_180
Max: 6.1 [g] at 0.078 [s]
Min: -6.1 [g] at 0.042 [s]



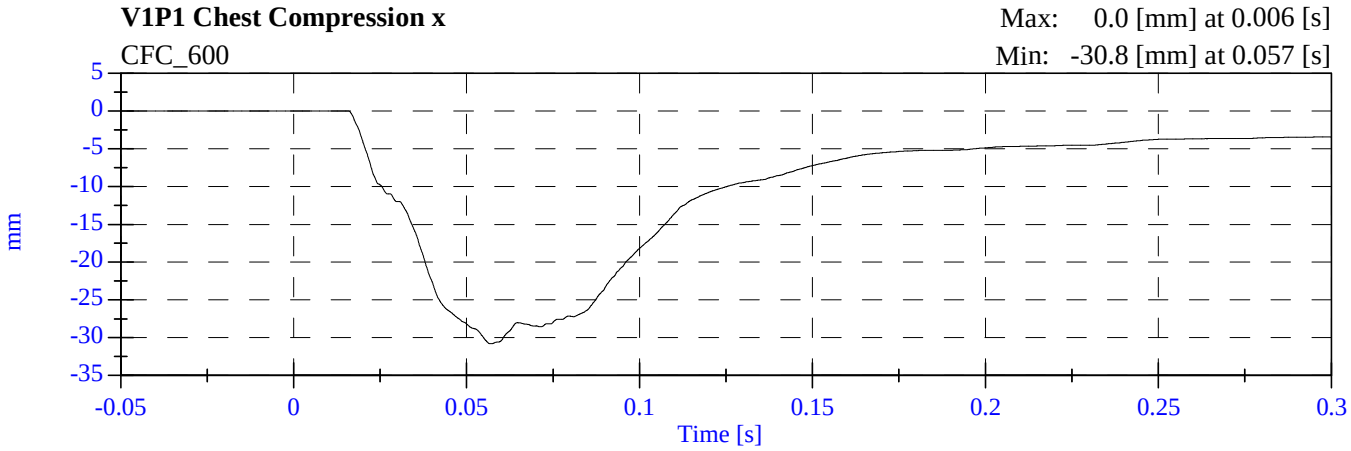

**V1P1 Chest z**
CFC_180
Max: 15.5 [g] at 0.046 [s]
Min: -8.2 [g] at 0.094 [s]




**V1P1 Chest Resultant**
CFC_180
Max: 55.2 [g] at 0.070 [s]
Min: 0.0 [g] at -0.032 [s]



# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009



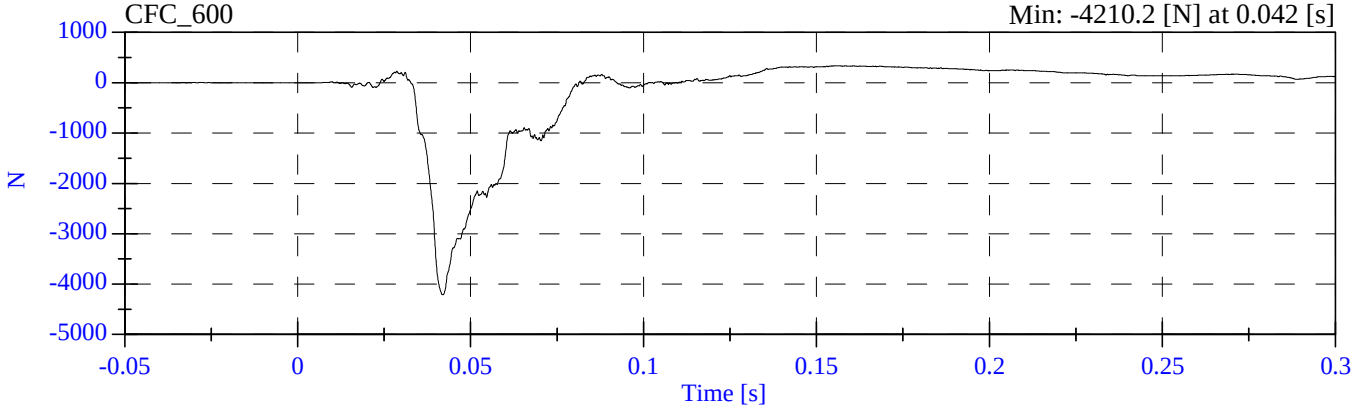
# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

**V1P1 Left Femur z**

Max: 336.0 [N] at 0.157 [s]

CFC_600

Min: -4210.2 [N] at 0.042 [s]

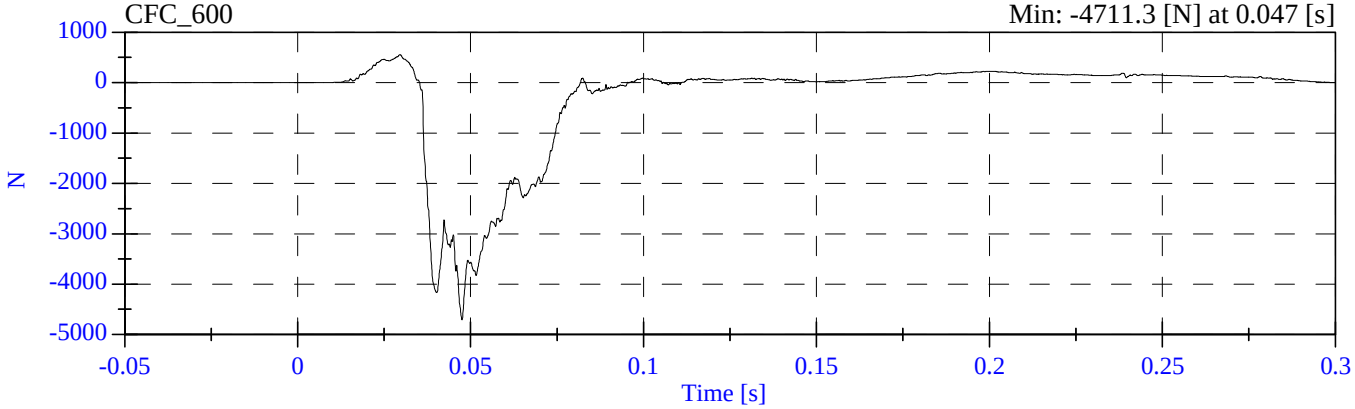



**V1P1 Right Femur z**

Max: 557.9 [N] at 0.029 [s]

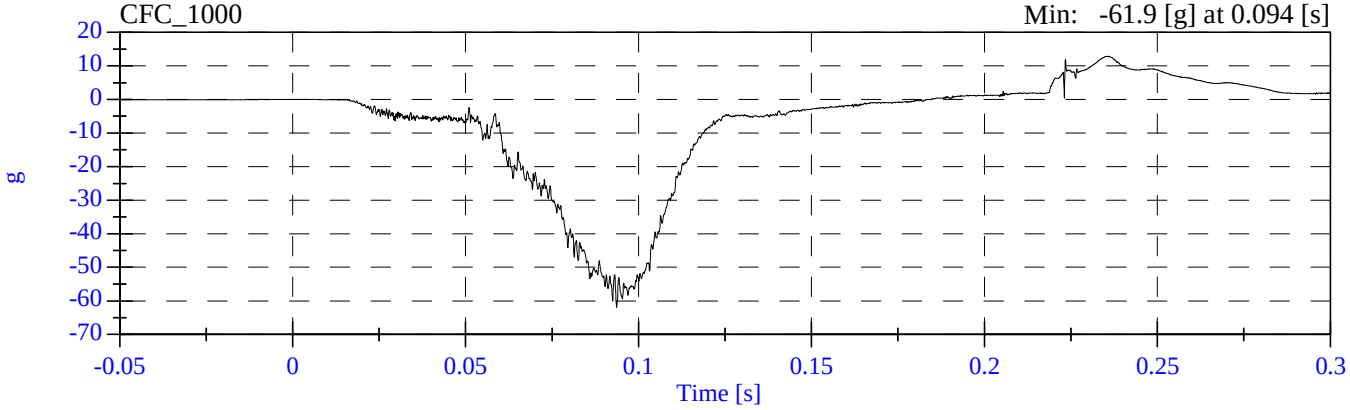
CFC_600

Min: -4711.3 [N] at 0.047 [s]

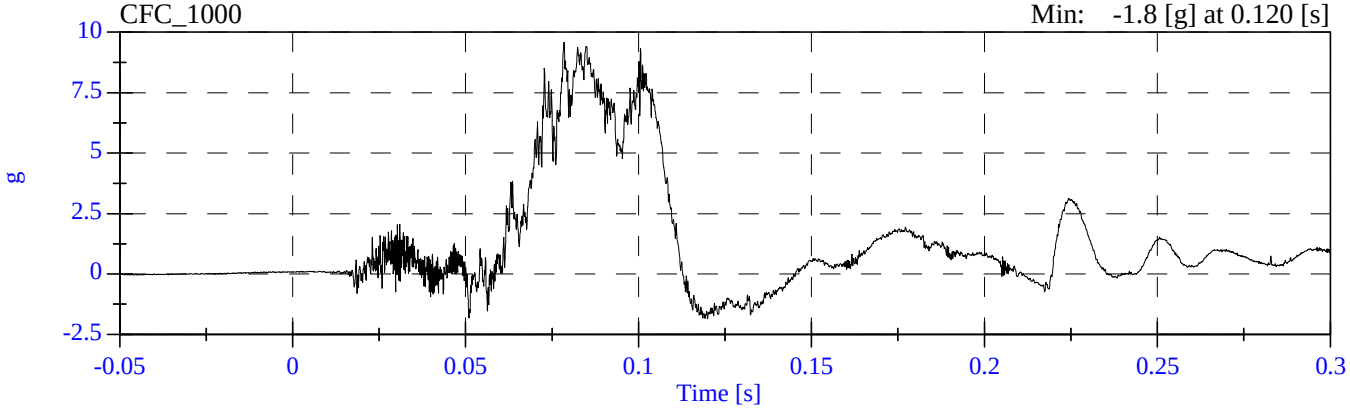


# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

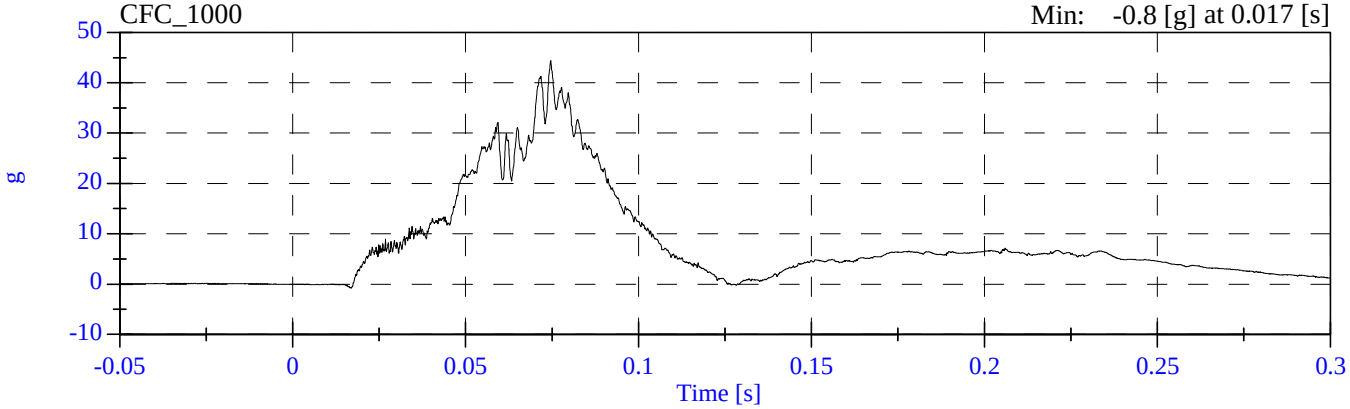
**V1P2 Head CG x**
CFC_1000
Max: 12.9 [g] at 0.236 [s]
Min: -61.9 [g] at 0.094 [s]



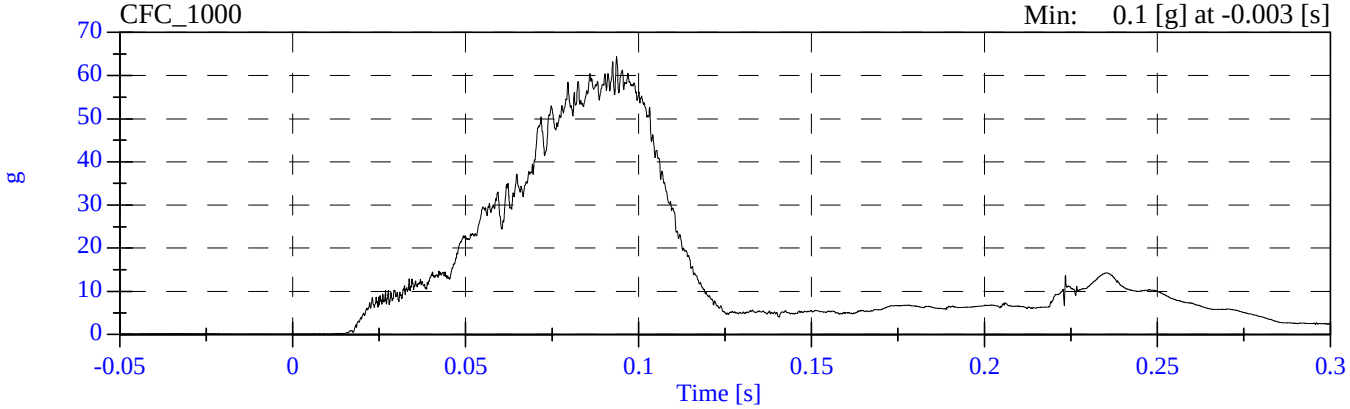

**V1P2 Head CG y**
CFC_1000
Max: 9.6 [g] at 0.078 [s]
Min: -1.8 [g] at 0.120 [s]




**V1P2 Head CG z**
CFC_1000
Max: 44.4 [g] at 0.075 [s]
Min: -0.8 [g] at 0.017 [s]

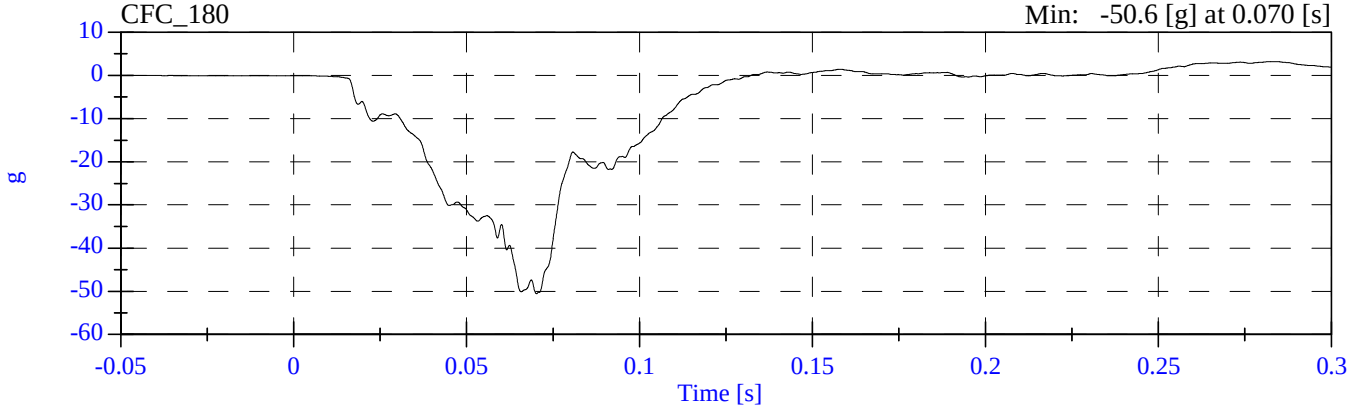



**V1P2 Head CG Resultant**
CFC_1000
Max: 64.4 [g] at 0.094 [s]
Min: 0.1 [g] at -0.003 [s]

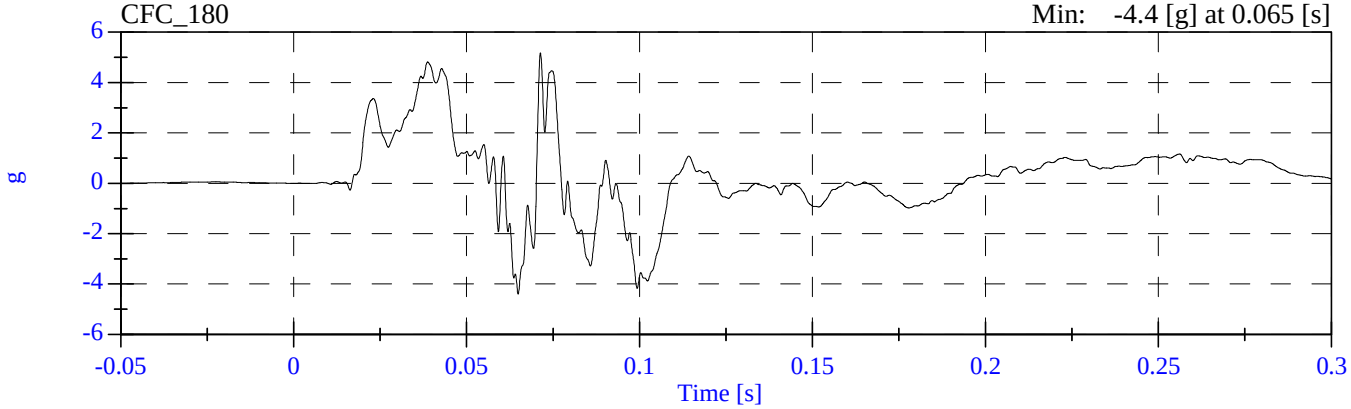


# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

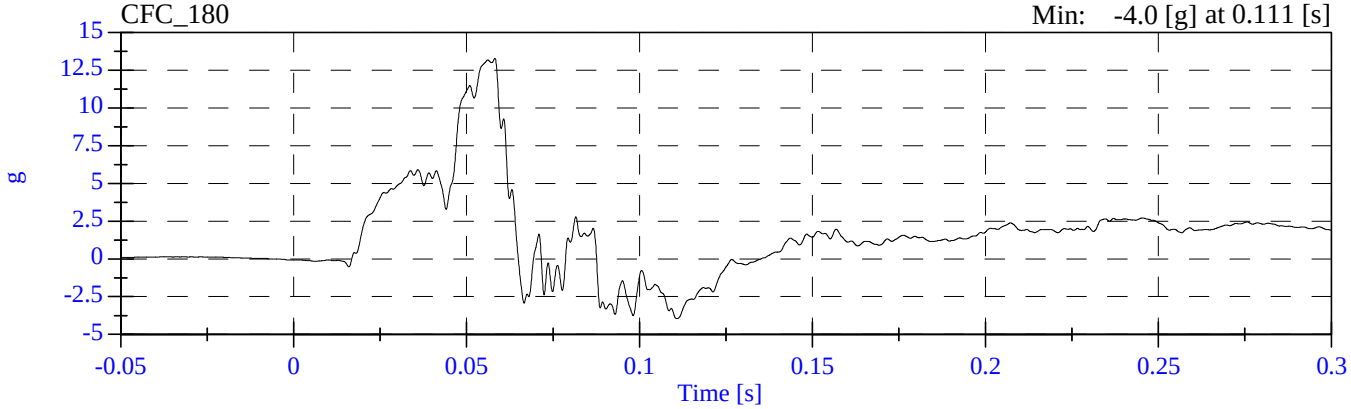
**V1P2 Chest x**
CFC_180
Max: 3.2 [g] at 0.283 [s]
Min: -50.6 [g] at 0.070 [s]



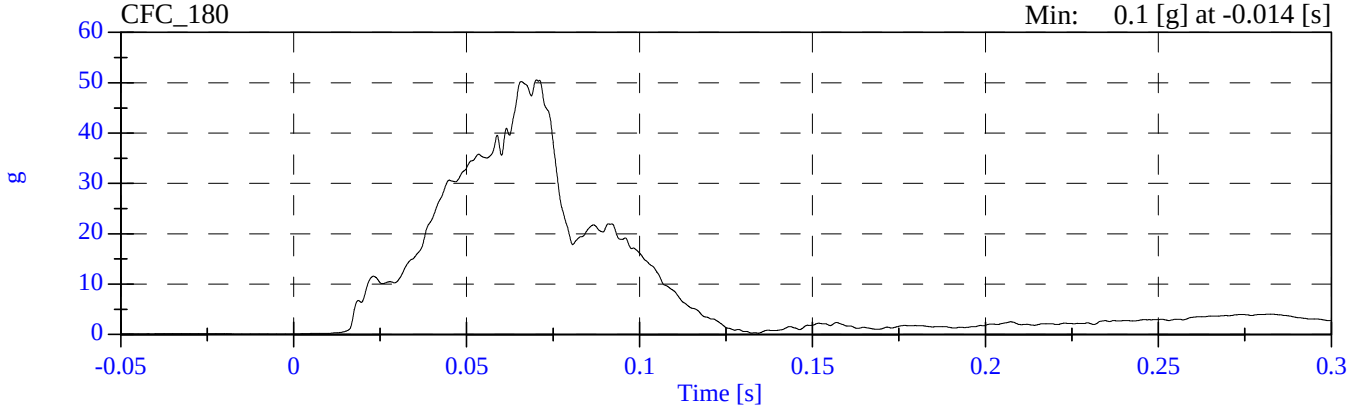

**V1P2 Chest y**
CFC_180
Max: 5.2 [g] at 0.071 [s]
Min: -4.4 [g] at 0.065 [s]



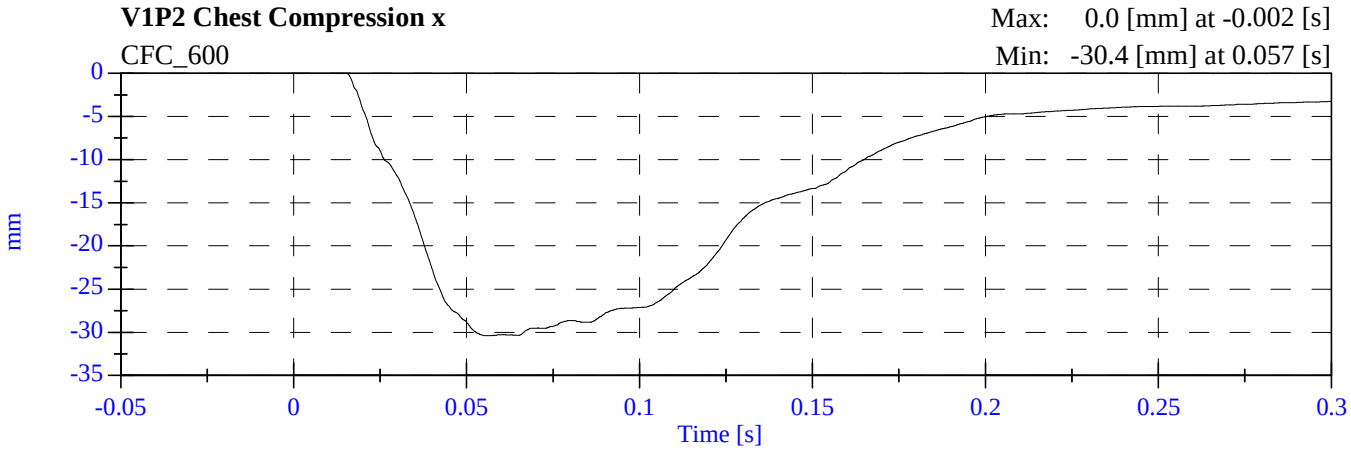

**V1P2 Chest z**
CFC_180
Max: 13.3 [g] at 0.058 [s]
Min: -4.0 [g] at 0.111 [s]




**V1P2 Chest Resultant**
CFC_180
Max: 50.6 [g] at 0.070 [s]
Min: 0.1 [g] at -0.014 [s]



# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009



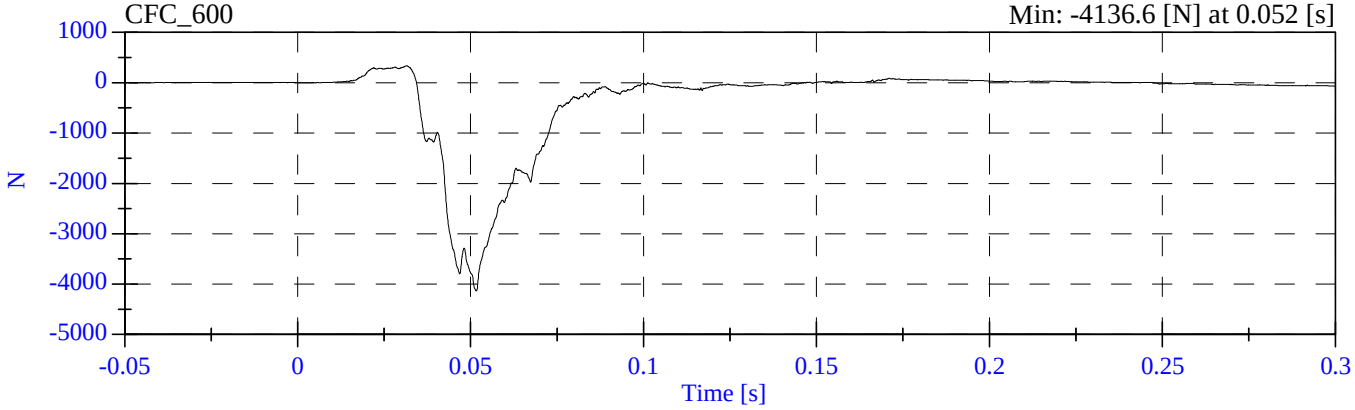
# NCAP 2009 Nissan Cube
# M95205 - June 09, 2009

**V1P2 Left Femur z**

Max: 335.8 [N] at 0.031 [s]

CFC_600

Min: -4136.6 [N] at 0.052 [s]

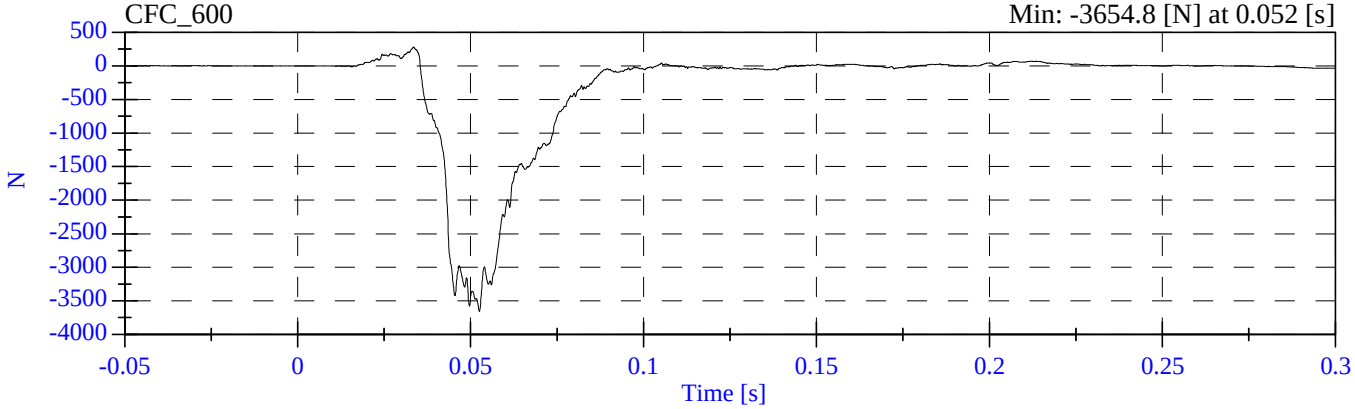



**V1P2 Right Femur z**

Max: 279.1 [N] at 0.034 [s]

CFC_600

Min: -3654.8 [N] at 0.052 [s]



**APPENDIX C**

PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

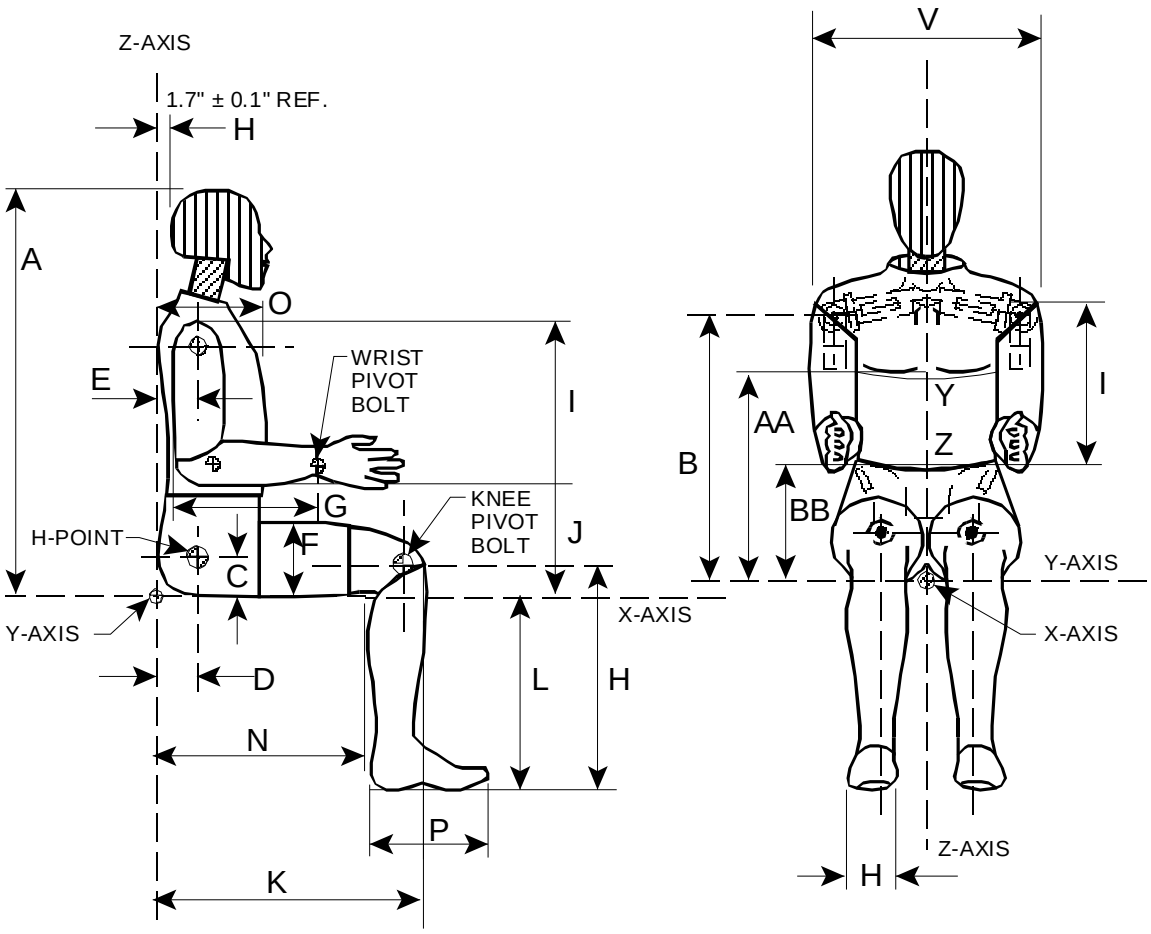
Dummy serial numbers and certification dates are:

| Position No./Location | Serial No. | Completion Date |
|---|---|---|
| #1/Driver | 064 | 3/25/09 |
| #2/Right Front Passenger | 061 | 3/25/09 |

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

# EXTERNAL DIMENSIONS SPECIFICATIONS




NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

| | |
|---|---|
| Dummy Serial Number | 064 |
| Sequential Test Number | 1 |
| Date | 02/10/09 |
| Workfile | 064H 02-10-09 |

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 27 |
| Peak Resultant Acceleration | 225-275 G's | 263.90 |
| Peak Lateral Acceleration | 15 G's Max | 7.33 |
| Is Acceleration Curve Unimodal? | YES | YES |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

| | | |
|---|---|---|
| Dummy Serial Number | 064 | |
| Sequential Test Number | 1 | |
| Date | 02/26/09 | 6 Axis Neck Transducer |
| Workfile | 064NF3 02-26-09 | |

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | 20.6 – 22.2 Deg C | 21.67 |
| Relative Humidity | | 10% - 70% | 23.0 |
| Impact Velocity | | 6.89 – 7.13 m/s | 7.03 |
| Pendulum Deceleration | 10 ms | 22.50 - 27.50 G's | 24.59 |
| | 20 ms | 17.60 - 22.60 G's | 20.94 |
| | 30 ms | 12.50 - 18.50 G's | 16.63 |
| Max Pendulum G's Above 30 ms | | 29 G's Max | 16.63 |
| Deceleration - Time Curve Decay Time to 5 G's | | 34 - 42 ms | 38.40 |
| D Plane Rotation | Max | 64 - 78 Deg | 70.63 |
| | Time | 57 - 64 ms | 60.10 |
| Moment About Occipital Condyle | Max | 88.13 – 108.47 N-m | 92.40 |
| | Time | 47 - 58 ms | 50.80 |
| Rotation Angle - Time Curve Decay Time to Zero | | 113 - 128 ms | 116.00 |
| Positive Moment - Time Curve Decay Time to Zero | | 97 - 107 ms | 98.60 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

| | | |
|---|---|---|
| Dummy Serial Number | 064 | |
| Sequential Test Number | 1 | |
| Date | 02/26/09 | 6 Axis Neck Transducer |
| Workfile | 064NE 02-26-09 | |

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | 20.6 – 22.2 Deg C | 21.67 |
| Relative Humidity | | 10% - 70% | 24.0 |
| Impact Velocity | | 5.94 – 6.19 m/s | 6.07 |
| Pendulum Deceleration | 10 ms | 17.20 - 21.20 G's | 20.00 |
| | 20 ms | 14.00 - 19.00 G's | 18.32 |
| | 30 ms | 11.00 - 16.00 G's | 14.49 |
| Max Pendulum G's Above 30 ms | | 22 G's Max | 14.49 |
| Deceleration - Time Curve Decay Time to 5 G's | | 38 - 46 ms | 39.70 |
| D Plane Rotation | Max | 81 - 106 Deg | 99.76 |
| | Time | 72 - 82 ms | 76.10 |
| Moment About Occipital Condyle | Max | -79.99 - -52.88 N-m | -70.85 |
| | Time | 65 - 79 ms | 71.60 |
| Rotation Angle - Time Curve Decay Time to Zero | | 147 - 174 ms | 156.60 |
| Positive Moment - Time Curve Decay Time to Zero | | 120 - 148 ms | 143.80 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

| | |
|---|---|
| Dummy Serial Number | 064 |
| Sequential Test Number | 1 |
| Date | 04/21/09 |
| Workfile | 064 142 RIBST12 04-21-09 |

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| Temperature | 20.6 – 22.2 Deg C | 21.0 |
| Relative Humidity | 10% - 70% | 30.0 |
| Pendulum Velocity | 6.58 – 6.83 m/s | 6.58 |
| Maximum Deflection | 63.50 – 72.64 mm | 68.32 |
| Maximum Resistive Force | 5159.9 – 5893.9 N | 5381.6 |
| Internal Hysteresis | 69 - 85 % | 71.80 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

| | |
|---|---|
| Dummy Serial Number | 064 |
| Sequential Test Number | 1 |
| Date | 02/16/09 |
| Workfile | 064LF/RF 02-16-09 |

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| **LEFT KNEE** | | |
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 18.0 |
| Probe Velocity | 2.07 – 2.13 m/s | 2.13 |
| Peak Knee Impact Force | 4715.1 – 5782.7 N | 5163.11 |
| **RIGHT KNEE** | | |
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 18.0 |
| Probe Velocity | 2.07 – 2.13 m/s | 2.13 |
| Peak Knee Impact Force | 4715.1 – 5782.7 N | 5335.72 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 064
Sequential Test Number 1
Date 03/25/09

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | | 21.0 |
| Relative Humidity | | | 18.0 |
| Location for Chest Circumference | AA | 16.9 -17.1 in | 17.0 |
| Location for Waist Circumference | BB | 8.9 - 9.1 in | 9.0 |
| Total Sitting Height | A | 34.6 - 35.0 in | 34.6 |
| Shoulder Pivot Height | B | 19.9 - 20.5 in | 20.5 |
| H-Point Height | C | 3.3 - 3.5 in | 3.5 |
| H-Point from Backline | D | 5.3 - 5.5 in | 5.5 |
| Shoulder Pivot from Backline | E | 3.3 - 3.7 in | 3.5 |
| Thigh Clearance | F | 5.5 - 6.1 in | 6.0 |
| Back of Elbow to Wrist Pivot | G | 11.4 - 12.0 in | 11.5 |
| Skull Cap to Backline | H | 1.6 - 1.8 in | 1.7 |
| Shoulder - Elbow Length | I | 13.0 - 13.6 in | 13.2 |
| Elbow Rest Height | J | 7.5 - 8.3 in | 7.8 |
| Buttock Knee Length | K | 22.8 - 23.8 in | 23.5 |
| Popliteal Height | L | 16.9 - 17.9 in | 17.5 |
| Knee Pivot Height | M | 19.1 - 19.7 in | 19.1 |
| Buttock Popliteal Length | N | 17.8 - 18.8 in | 18.7 |
| Chest Depth | O | 8.4 - 9.0 in | 8.5 |
| Foot Length | P | 9.9 - 10.5 in | 10.2 |
| Shoulder Breadth | V | 16.6 - 17.2 in | 16.8 |
| Foot Breadth | W | 3.6 - 4.2 in | 3.8 |
| Chest Circumference (With Jacket) | Y | 38.2 - 39.4 in | 38.5 |
| Waist Circumference | Z | 32.9 - 34.1 in | 33.4 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number 061
Sequential Test Number 1
Date 02-10-09
Workfile 061H 02-10-09

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 26.0 |
| Peak Resultant Acceleration | 225-275 G's | 267.36 |
| Peak Lateral Acceleration | 15 G's Max | 4.63 |
| Is Acceleration Curve Unimodal? | YES | YES |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

| | | |
|---|---|---|
| Dummy Serial Number | 061 | |
| Sequential Test Number | 1 | |
| Date | 03/16/09 | 6 Axis Neck Transducer |
| Workfile | 061NF 03-16-09 | |

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | 20.6 – 22.2 Deg C | 21.67 |
| Relative Humidity | | 10% - 70% | 61 |
| Impact Velocity | | 6.89 – 7.13 m/s | 7.00 |
| Pendulum Deceleration | 10 ms | 22.50 - 27.50 G's | 23.62 |
| | 20 ms | 17.60 - 22.60 G's | 21.16 |
| | 30 ms | 12.50 - 18.50 G's | 15.90 |
| Max Pendulum G's Above 30 ms | | 29 G's Max | 15.90 |
| Deceleration - Time Curve Decay Time to 5 G's | | 34 - 42 ms | 39.00 |
| D Plane Rotation | Max | 64 - 78 Deg | 69.60 |
| | Time | 57 - 64 ms | 60.30 |
| Moment About Occipital Condyle | Max | 88.13 – 108.47 N-m | 100.01 |
| | Time | 47 - 58 ms | 51.30 |
| Rotation Angle - Time Curve Decay Time to Zero | | 113 - 128 ms | 114.80 |
| Positive Moment - Time Curve Decay Time to Zero | | 97 - 107 ms | 98.60 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

| | | |
|---|---|---|
| Dummy Serial Number | 061 | |
| Sequential Test Number | 1 | |
| Date | 03/16/09 | 6 Axis Neck Transducer |
| Workfile | 061NE 03-16-09 | |

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | 20.6 – 22.2 Deg C | 21.11 |
| Relative Humidity | | 10% - 70% | 19.00 |
| Impact Velocity | | 5.94 – 6.19 m/s | 6.07 |
| Pendulum Deceleration | 10 ms | 17.20 - 21.20 G's | 19.50 |
| | 20 ms | 14.00 - 19.00 G's | 18.41 |
| | 30 ms | 11.00 - 16.00 G's | 14.63 |
| Max Pendulum G's Above 30 ms | | 22 G's Max | 14.63 |
| Deceleration - Time Curve Decay Time to 5 G's | | 38 - 46 ms | 40.30 |
| D Plane Rotation | Max | 81 - 106 Deg | 94.82 |
| | Time | 72 - 82 ms | 76.60 |
| Moment About Occipital Condyle | Max | -79.99 - -52.88 N-m | -60.25 |
| | Time | 65 - 79 ms | 72.00 |
| Rotation Angle - Time Curve Decay Time to Zero | | 147 - 174 ms | 162.10 |
| Positive Moment - Time Curve Decay Time to Zero | | 120 - 148 ms | 142.10 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

| | |
|---|---|
| Dummy Serial Number | 061 |
| Sequential Test Number | 1 |
| Date | 04/21/09 |
| Workfile | 061NRT1 04-21-09 |

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| Temperature | 20.6 – 22.2 Deg C | 21.1 |
| Relative Humidity | 10% - 70% | 34.0 |
| Pendulum Velocity | 6.58 – 6.83 m/s | 6.59 |
| Maximum Deflection | 63.50 – 72.64 mm | 64.01 |
| Maximum Resistive Force | 5159.9 – 5893.9 N | 5669.3 |
| Internal Hysteresis | 69 - 85 % | 73.77 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

| | |
|---|---|
| Dummy Serial Number | 061 |
| Sequential Test Number | 1 |
| Date | 02/16/09 |
| Workfile | 061LF/RF 02-16-09 |

| TEST PARAMETER | SPECIFICATION | TEST RESULTS |
|---|---|---|
| **LEFT KNEE** | | |
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 18 |
| Probe Velocity | 2.07 – 2.13 m/s | 2.12 |
| Peak Knee Impact Force | 4715.1 – 5782.7 N | 5279.06 |
| **RIGHT KNEE** | | |
| Temperature | 18.9 – 25.6 Deg C | 21.7 |
| Relative Humidity | 10% - 70% | 18 |
| Probe Velocity | 2.07 – 2.13 m/s | 2.12 |
| Peak Knee Impact Force | 4715.1 – 5782.7 N | 5288.93 |

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 061
Sequential Test Number 1
Date 3/25/09

| TEST PARAMETER | | SPECIFICATION | TEST RESULTS |
|---|---|---|---|
| Temperature | | | 21.0 |
| Relative Humidity | | | 18 |
| Location for Chest Circumference | AA | 16.9 -17.1 in | 17.0 |
| Location for Waist Circumference | BB | 8.9 - 9.1 in | 9.0 |
| Total Sitting Height | A | 34.6 - 35.0 in | 34.7 |
| Shoulder Pivot Height | B | 19.9 - 20.5 in | 20.4 |
| H-Point Height | C | 3.3 - 3.5 in | 3.5 |
| H-Point from Backline | D | 5.3 - 5.5 in | 5.3 |
| Shoulder Pivot from Backline | E | 3.3 - 3.7 in | 3.7 |
| Thigh Clearance | F | 5.5 - 6.1 in | 6.1 |
| Back of Elbow to Wrist Pivot | G | 11.4 - 12.0 in | 11.5 |
| Skull Cap to Backline | H | 1.6 - 1.8 in | 1.7 |
| Shoulder - Elbow Length | I | 13.0 - 13.6 in | 13.2 |
| Elbow Rest Height | J | 7.5 - 8.3 in | 8.0 |
| Buttock Knee Length | K | 22.8 - 23.8 in | 23.4 |
| Popliteal Height | L | 16.9 - 17.9 in | 17.5 |
| Knee Pivot Height | M | 19.1 - 19.7 in | 19.2 |
| Buttock Popliteal Length | N | 17.8 - 18.8 in | 18.7 |
| Chest Depth | O | 8.4 - 9.0 in | 8.4 |
| Foot Length | P | 9.9 - 10.5 in | 10.1 |
| Shoulder Breadth | V | 16.6 - 17.2 in | 16.8 |
| Foot Breadth | W | 3.6 - 4.2 in | 3.9 |
| Chest Circumference (With Jacket) | Y | 38.2 - 39.4 in | 38.5 |
| Waist Circumference | Z | 32.9 - 34.1 in | 33.4 |

Remarks:

Laboratory Technician: B. Swiecicki

**APPENDIX D**

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

| DRIVER DUMMY (S/N 064) | | Manufacturer | Serial # | Calibration | |
|---|---|---|---|---|---|
| | | | | Last | Next |
| Head | X | ENDEVCO | P52011 | 12/03/08 | 06/01/09 |
| | Y | ENDEVCO | P52128 | 12/03/08 | 06/01/09 |
| | Z | ENDEVCO | P51990 | 12/03/08 | 06/01/09 |
| Head | X (R) | ENDEVCO | P51303 | 12/03/08 | 06/01/09 |
| | Y (R) | ENDEVCO | P51985 | 12/03/08 | 06/01/09 |
| | Z (R) | ENDEVCO | P51294 | 12/03/08 | 06/01/09 |
| Neck Load Cell | X | DENTON | 2019Fx | 05/19/08 | 11/15/08 |
| | Y | DENTON | 2019Fy | 05/19/08 | 11/15/08 |
| | Z | DENTON | 2019Fz | 05/19/08 | 11/15/08 |
| Neck Moment | X | DENTON | 2019Mx | 05/19/08 | 11/15/08 |
| | Y | DENTON | 2019My | 05/19/08 | 11/15/08 |
| | Z | DENTON | 2019Mz | 05/19/08 | 11/15/08 |
| Chest | X | ENDEVCO | P52000 | 12/02/08 | 05/31/09 |
| | Y | ENDEVCO | P49163 | 12/02/08 | 05/31/09 |
| | Z | ENDEVCO | P52009 | 12/02/08 | 05/31/09 |
| Chest | X (R) | ENDEVCO | P52035 | 12/02/08 | 05/31/09 |
| | Y (R) | ENDEVCO | P52030 | 12/02/08 | 05/31/09 |
| | Z (R) | ENDEVCO | P52030 | 12/03/08 | 06/01/09 |
| Chest Deflection | X | SERVO | 64 | 06/24/08 | 12/21/08 |
| Pelvic | X | ENDEVCO | P17285 | 03/03/09 | 08/30/09 |
| | Y | ENDEVCO | P17837 | 04/01/09 | 09/28/09 |
| | Z | ENDEVCO | P17553 | 04/02/09 | 09/29/09 |

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

| DRIVER DUMMY (S/N 064) | | Manufacturer | Serial # | Calibration | |
|---|---|---|---|---|---|
| | | | | Last | Next |
| Left Femur Load Cell | Fz | DENTON | 1525 | 05/19/08 | 11/15/08 |
| Right Femur Load Cell | Fz | DENTON | 1533 | 05/19/08 | 11/15/08 |
| Left Upper Tibia | Mx | DENTON | 374Mx | 05/19/08 | 11/15/08 |
| | My | DENTON | 374My | 05/19/08 | 11/15/08 |
| Left Lower Tibia | Fz | DENTON | 372Fz | 05/19/08 | 11/15/08 |
| | Mx | DENTON | 372My | 05/19/08 | 11/15/08 |
| | My | DENTON | 372My | 05/19/08 | 11/15/08 |
| Right Upper Tibia | Mx | DENTON | 404Mx | 05/19/08 | 11/15/08 |
| | My | DENTON | 404My | 05/19/08 | 11/15/08 |
| Right Lower Tibia | Fz | DENTON | 396Fz | 05/19/08 | 11/15/08 |
| | Mx | DENTON | 396Mx | 05/19/08 | 11/15/08 |
| | My | DENTON | 396My | 05/19/08 | 11/15/08 |
| Left Foot Rear | X | ENDEVCO | P16286 | 03/03/09 | 08/30/09 |
| | Z | ENDEVCO | P52152 | 12/03/08 | 06/01/09 |
| Left Foot Front | Z | ENDEVCO | P52082 | 12/03/08 | 06/01/09 |
| Right Foot Rear | X | ENDEVCO | P52025 | 12/03/08 | 06/01/09 |
| | Z | ENDEVCO | P51873 | 12/03/08 | 06/01/09 |
| Right Foot Front | Z | ENDEVCO | P58987 | 12/03/08 | 06/01/09 |
| Lap Belt Load Cell | | First Technology | 173 | 04/02/09 | 09/29/09 |
| Shoulder Belt Load Cell | | First Technology | 178 | 04/02/09 | 09/29/09 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

| PASSENGER DUMMY (S/N 061) | | Manufacturer | Serial # | Calibration | |
|---|---|---|---|---|---|
| | | | | Last | Next |
| Head | X | ENDEVCO | P58871 | 11/24/08 | 05/23/09 |
| | Y | ENDEVCO | P51281 | 11/24/08 | 05/23/09 |
| | Z | ENDEVCO | P51209 | 11/24/08 | 05/23/09 |
| Head | X (R) | ENDEVCO | P52155 | 11/24/08 | 05/23/09 |
| | Y (R) | ENDEVCO | P51274 | 11/24/08 | 05/23/09 |
| | Z (R) | ENDEVCO | P15526 | 03/25/09 | 09/21/09 |
| Neck Load Cell | X | DENTON | 1916Fx | 05/19/08 | 11/15/08 |
| | Y | DENTON | 1916Fy | 05/19/08 | 11/15/08 |
| | Z | DENTON | 1916Fz | 05/19/08 | 11/15/08 |
| Neck Moment | X | DENTON | 1916Mx | 05/19/08 | 11/15/08 |
| | Y | DENTON | 1916My | 05/19/08 | 11/15/08 |
| | Z | DENTON | 1916Mz | 05/19/08 | 11/15/08 |
| Chest | X | ENDEVCO | P52157 | 11/24/08 | 05/23/09 |
| | Y | ENDEVCO | P52018 | 11/25/08 | 05/24/09 |
| | Z | ENDEVCO | P52133 | 11/25/08 | 05/24/09 |
| Chest | X (R) | ENDEVCO | P52156 | 11/24/08 | 05/23/09 |
| | Y (R) | ENDEVCO | P49179 | 11/25/08 | 05/24/09 |
| | Z (R) | ENDEVCO | P38188 | 03/24/09 | 09/20/09 |
| Chest Deflection | X | SERVO | 61 | 06/25/08 | 12/22/08 |
| Pelvic | X | ENDEVCO | P58743 | 12/02/08 | 05/31/09 |
| | Y | ENDEVCO | P58766 | 12/02/08 | 05/31/09 |
| | Z | ENDEVCO | P58767 | 12/02/08 | 05/31/09 |

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

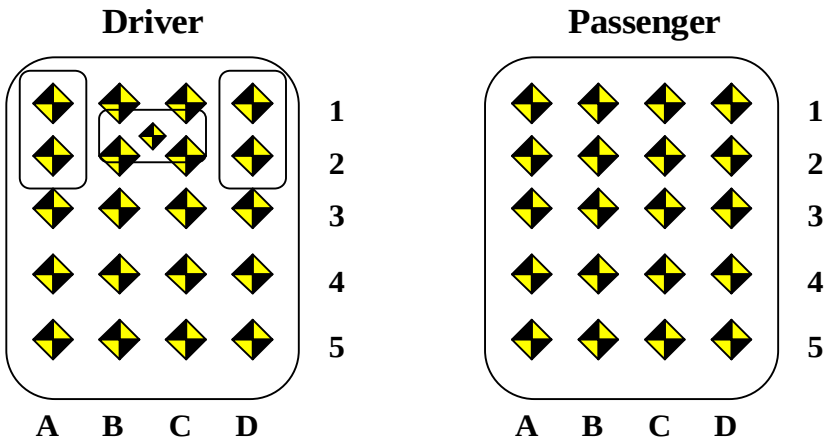
| PASSENGER DUMMY (S/N 061) | | Manufacturer | Serial # | Calibration | |
|---|---|---|---|---|---|
| | | | | Last | Next |
| Left Femur Load Cell | Fz | DENTON | 1532 | 05/19/08 | 11/15/08 |
| Right Femur Load Cell | Fz | DENTON | 1526 | 03/06/09 | 09/02/09 |
| Left Upper Tibia | Mx | DENTON | 91UMx | 06/16/08 | 12/13/08 |
| | My | DENTON | 91UMy | 06/16/08 | 12/13/08 |
| Left Lower Tibia | Fz | DENTON | 91LFz | 06/16/08 | 12/13/08 |
| | Mx | DENTON | 91LMx | 06/16/08 | 12/13/08 |
| | My | DENTON | 91LMy | 06/16/08 | 12/13/08 |
| Right Upper Tibia | Mx | DENTON | 265Mx | 06/16/08 | 12/13/08 |
| | My | DENTON | 265My | 06/16/08 | 12/13/08 |
| Right Lower Tibia | Fz | DENTON | 178Fz | 06/16/08 | 12/13/08 |
| | Mx | DENTON | 178Mx | 06/16/08 | 12/13/08 |
| | My | DENTON | 178My | 06/16/08 | 12/13/08 |
| Left Foot Rear | X | ENTRAN | 02I02I16-A05 | 11/25/08 | 05/24/09 |
| | Z | ENTRAN | 00L20-A30 | 11/24/08 | 05/23/09 |
| Left Foot Front | Z | ENTRAN | 00L20-A22 | 11/24/08 | 05/23/09 |
| Right Foot Rear | X | ENDEVCO | J29805 | 12/06/08 | 06/04/09 |
| | Z | ENTRAN | 00L20-A29 | 11/24/08 | 05/23/09 |
| Right Foot Front | Z | ENTRAN | 03E03E20-N12 | 11/24/08 | 05/23/09 |
| Lap Belt Load Cell | | First Technology | 156 | 04/02/09 | 09/29/09 |
| Shoulder Belt Load Cell | | First Technology | 159 | 04/02/09 | 09/29/09 |

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

| | Manufacturer | Serial # | Calibration | |
|---|---|---|---|---|
| | | | Last | Next |
| Left Seat Rear Crossmember X | ENDEVCO | P35803 | 03/02/09 | 9/02/09 |
| Right Rear Seat Crossmember X | ENDEVCO | P23885 | 03/02/09 | 9/02/09 |
| Top of Engine | GS SENSORS | 9440-039 | 01/28/09 | 7/28/09 |
| Bottom of Engine | ICS | FA2488 | 04/08/09 | 10/08/09 |
| Right Disc Brake Caliper | ICS | FA2479 | 04/07/09 | 10/07/09 |
| Left Disc Brake Caliper | ICS | FA2487 | 03/27/09 | 9/27/09 |
| Left Seat Rear Crossmember Z | ENDEVCO | P35789 | 03/02/09 | 9/02/09 |
| Right Seat Rear Crossmember Z | ENDEVCO | P32288 | 03/02/09 | 9/02/09 |

**APPENDIX E**

VEHICLE INTERIOR INTRUSION MEASUREMENTS

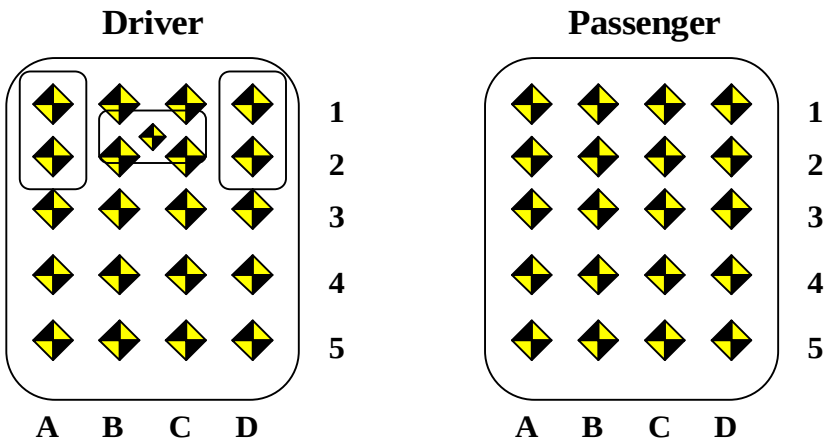



**Driver Side Intrusion Measurements**

| Intrusion Location | PRE-TEST (mm) | | | POST-TEST (mm) | | | CHANGE (mm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | X | Y | Z | X | Y | Z | X | Y | Z |
| A1 | 2778 | -541 | -391 | 2772 | -541 | -409 | 6 | 0 | 18 |
| B1 | 2894 | -413 | -388 | 2870 | -405 | -418 | 24 | -8 | 30 |
| C1 | 2886 | -286 | -390 | 2805 | -270 | -397 | 81 | -16 | 7 |
| D1 | 2890 | -160 | -390 | 2849 | -158 | -409 | 41 | -2 | 19 |
| A2 | 2738 | -541 | -344 | 2734 | -542 | -355 | 4 | 1 | 11 |
| B2 | 2832 | -413 | -330 | 2819 | -416 | -351 | 13 | 3 | 21 |
| C2 | 2833 | -286 | -333 | 2810 | -284 | -353 | 23 | -2 | 20 |
| D2 | 2814 | -162 | -337 | 2796 | -167 | -346 | 18 | 5 | 9 |
| A3 | 2710 | -545 | -308 | 2711 | -544 | -324 | -1 | -1 | 16 |
| B3 | 2767 | -414 | -290 | 2770 | -416 | -299 | -3 | 2 | 9 |
| C3 | 2768 | -287 | -290 | 2765 | -291 | -294 | 3 | 4 | 4 |
| D3 | 2758 | -163 | -294 | 2754 | -168 | -295 | 4 | 5 | 1 |
| A4 | 2670 | -540 | -285 | 2709 | -547 | -320 | -39 | 7 | 35 |
| B4 | 2670 | -418 | -284 | 2675 | -418 | -295 | -5 | 0 | 11 |
| C4 | 2671 | -290 | -286 | 2675 | -294 | -275 | -4 | 4 | -11 |
| D4 | 2672 | -167 | -288 | 2674 | -175 | -266 | -2 | 8 | -22 |
| A5 | 2572 | -546 | -284 | 2577 | -548 | -294 | -5 | 2 | 10 |
| B5 | 2574 | -421 | -285 | 2580 | -426 | -282 | -6 | 5 | -3 |
| C5 | 2575 | -297 | -286 | 2578 | -301 | -272 | -3 | 4 | -14 |
| D5 | 2577 | -169 | -287 | 2582 | -174 | -265 | -5 | 5 | -22 |
| BP | 2767 | -277 | -463 | 2737 | -284 | -453 | 30 | 7 | -10 |
| G | 2509 | -471 | -735 | 2499 | -179 | -738 | 10 | -292 | 3 |
| H | 2511 | -172 | -735 | 2514 | -477 | -743 | -3 | 305 | 8 |
| L | 2303 | -331 | -991 | 2359 | -335 | -946 | -56 | 4 | -45 |
| AB | 2223 | -554 | -302 | 2230 | -559 | -290 | -7 | 5 | -12 |

BP=Brake Pedal, G=Left side of bolster, H=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt

PASSENGER SIDE INTRUSION MEASUREMENTS




**Passenger Side Intrusion Measurements**

| Intrusion Location | PRE-TEST (mm) | | | POST-TEST (mm) | | | CHANGE (mm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | X | Y | Z | X | Y | Z | X | Y | Z |
| A1 | 2810 | 182 | -384 | 2786 | 181 | -389 | 24 | 1 | 5 |
| B1 | 2807 | 313 | -383 | 2789 | 309 | -396 | 18 | 4 | 13 |
| C1 | 2805 | 441 | -382 | 2792 | 438 | -397 | 13 | 3 | 15 |
| D1 | 2803 | 567 | -380 | 2799 | 564 | -400 | 4 | 3 | 20 |
| A2 | 2736 | 183 | -331 | 2722 | 183 | -330 | 14 | 0 | -1 |
| B2 | 2740 | 305 | -334 | 2731 | 308 | -339 | 9 | -3 | 5 |
| C2 | 2740 | 438 | -335 | 2735 | 436 | -342 | 5 | 2 | 7 |
| D2 | 2746 | 567 | -339 | 2742 | 565 | -351 | 4 | 2 | 12 |
| A3 | 2670 | 180 | -289 | 2670 | 187 | -271 | 0 | -7 | -18 |
| B3 | 2669 | 306 | -291 | 2672 | 311 | -282 | -3 | -5 | -9 |
| C3 | 2670 | 435 | -291 | 2672 | 439 | -290 | -2 | -4 | -1 |
| D3 | 2671 | 564 | -290 | 2669 | 565 | -296 | 2 | -1 | 6 |
| A4 | 2580 | 180 | -289 | 2585 | 184 | -267 | -5 | -4 | -22 |
| B4 | 2577 | 305 | -289 | 2584 | 305 | -274 | -7 | 0 | -15 |
| C4 | 2579 | 432 | -288 | 2585 | 434 | -284 | -6 | -2 | -4 |
| D4 | 2579 | 561 | -289 | 2585 | 561 | -297 | -6 | 0 | 8 |
| A5 | 2485 | 175 | -289 | 2486 | 179 | -261 | -1 | -4 | -28 |
| B5 | 2482 | 302 | -288 | 2489 | 302 | -271 | -7 | 0 | -17 |
| C5 | 2483 | 427 | -288 | 2489 | 432 | -281 | -6 | -5 | -7 |
| D5 | 2487 | 561 | -288 | 2490 | 562 | -293 | -3 | -1 | 5 |
| R | 2514 | 173 | -738 | 2510 | 166 | -761 | 4 | 7 | 23 |
| S | 2522 | 478 | -739 | 2506 | 476 | -756 | 16 | 2 | 17 |
| AB | 2225 | 556 | -306 | 2227 | 555 | -300 | -2 | 1 | -6 |

R=Left side of bolster, S=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt