*** * * A T T E N T I O N * * ***

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**Individual Vehicle dimensions were obtained through the use of the Expert AutoStats(R) program.**

**The Expert AutoStats(R) program contains a multitude of vehicle dimensions and specifications on over 43,000 different vehicles and 203 different manufacturers spanning more than 70 years.**

**While every attempt has been made to ensure accurate data,these dimensions are meant to be used as first approximations. Some measurements are dependant on such factors as tire and rim sizes, tire inflation pressure and wear, suspension system condition, bumper type and style, and other manufacturing variations from vehicle to vehicle.**

**Whenever feasible, the vehicle in question or an exemplar vehicle should be measured to verify data important to your case.**

**Individual Vehicle Data Search Service (R)**

**Provided by:**
**4N6XPRT SYSTEMS (R)**
**Forensic Expert Software**
**La Mesa, CA 91942-9342**

**(619) 464-3478 / (800) 266-9778 / FAX: (619) 464-2206**
**http://www.4n6xprt.com**

**Through the use of**

**E X P E R T A U T O S T A T S (R)**



**DEVELOPED BY:**
**Daniel W. Vomhof III & Daniel W. Vomhof, Ph.D.**

**VEHICLE DATA RESEARCH BY:**
**Sheryl Cozby, Marion Vomhof, Muriel Vomhof, & Cindy Christensen**

# Expert VIN DeCoder®



Version Number 3.2.0

DeCoded VIN: 1G1JC5243W7315828

| | |
|---|---|
| Model: | 1998 Chevrolet Cavalier 4 Door Sedan |
| Engine Size: | 2.2L/ 133 cu.in. |
| Engine Description: | In-Line 4 cylinder with Overhead Valves (OHV) |
| Horse Power: | 115 @ 5000 rpm |
| Torque: | 136 lb-ft at 3600 rpm |
| Injection System: | Multi-Port Fuel Injection (MFI) |
| PSI: | 41-47 psi |
| Ignition: | Electronic |
| Manufacturer: | Chevrolet - United States |
| Assembly Plant: | Lordstown, OH |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/ Manual Seatbelts + Driver & Passenger Air Bags |

The First through Third characters (1G1) indicate a Chevrolet Car made in the U.S.A.

The Fourth and Fifth characters (JC) indicate a Cavalier

The Sixth character (5) indicate a 4 Door Sedan

The Seventh character (2) indicate Manual Seatbelts + Driver & Passenger Air Bags

The Eighth character (4) indicate the OEM engine: 2.2L/ 133 cu.in., L4 OHV

The Ninth character (the check digit) is entered as 3.
The VIN appears Valid, the calculated value is 3.

The Tenth character (W) indicate the model year 1998

The Eleventh character (7) indicate the vehicle was made in the assembly plant in Lordstown, OH

The Twelfth through Seventeenth characters (315828) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/16/2013

## 1998 CHEVROLET CAVALIER 4 DOOR SEDAN

| | | | | |
|---|---|---|---|---|
| Curb Weight: | 2617 | lbs. | 1187 | kg. |
| Curb Weight Distribution - Front: | 64 | % Rear: | 36 | % |
| Gross Vehicle Weight Rating: | 3619 | lbs. | 1642 | kg. |
| Number of Tires on Vehicle: | 4 | | | |
| Drive Wheels: | FRONT | | | |

| Horizontal Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 180 | 15.00 | 4.57 |
| Wheelbase: | 104 | 8.67 | 2.64 |
| Front Bumper to Front Axle: | 38 | 3.17 | 0.97 |
| Front Bumper to Front of Front Well: | 24 | 2.00 | 0.61 |
| Front Bumper to Front of Hood: | 5 | 0.42 | 0.13 |
| Front Bumper to Base of Windshield: | 50 | 4.17 | 1.27 |
| Front Bumper to Top of Windshield: | 77 | 6.42 | 1.96 |
| Rear Bumper to Rear Axle: | 38 | 3.17 | 0.97 |
| Rear Bumper to Rear of Rear Well: | 24 | 2.00 | 0.61 |
| Rear Bumper to Rear of Trunk: | 5 | 0.42 | 0.13 |
| Rear Bumper to Base of Rear Window: | 20 | 1.67 | 0.51 |
| **Width Dimensions** | | | |
| Maximum Width: | 68 | 5.67 | 1.73 |
| Front Track: | 57 | 4.75 | 1.45 |
| Rear Track: | 58 | 4.83 | 1.47 |
| **Vertical Dimensions** | | | |
| Height: | 55 | 4.58 | 1.40 |
| Ground to - | | | |
| Front Bumper (Top) | 23 | 1.92 | 0.58 |
| Headlight - center | 26 | 2.17 | 0.66 |
| Hood - top front: | 31 | 2.58 | 0.79 |
| Base of Windshield | 37 | 3.08 | 0.94 |
| Rear Bumper - top: | 24 | 2.00 | 0.61 |
| Trunk - top rear: | 39 | 3.25 | 0.99 |
| Base of Rear Window: | 41 | 3.42 | 1.04 |

## 1998 CHEVROLET CAVALIER 4 DOOR SEDAN

| Interior Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 55 | 4.58 | 1.40 |
| Front Seat to Headliner | 39 | 3.25 | 0.99 |
| Front Leg Room - seatback to floor (max) | 42 | 3.50 | 1.07 |
| Rear Seat Shoulder Width | 54 | 4.50 | 1.37 |
| Rear Seat to Headliner | 37 | 3.08 | 0.94 |
| Front Leg Room - seatback to floor (min) | 35 | 2.92 | 0.89 |

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

### Steering Data

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 432 | 36.00 | 10.97 |
| Steering Ratio: 15.22:1 | | | |
| Wheel Radius: | 12 | 1.00 | 0.30 |
| Tire Size (OEM): 195-70R14 | | | |

### Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM
ABS System: ABS

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 133.0 ft t = 3.0 sec a = -29.1 ft/sec² G-force = -0.90

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | 3.8 | sec | a = | 11.6 | ft/sec² | G-force = 0.36 |
| 0 to 60mph | t = | 10.1 | sec | a = | 8.7 | ft/sec² | G-force = 0.27 |
| 45 to 65mph | t = | 7.1 | sec | a = | 4.1 | ft/sec² | G-force = 0.13 |

Transmission Type: 5spd MANUAL

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 2002

## 1998 CHEVROLET CAVALIER 4 DOOR SEDAN

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.33 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 37.44 |
| Inches in front of rear axle | = | 66.56 |
| Inches from side of vehicle | = | 34.00 |
| Inches from ground | = | 21.59 |
| Inches from front corner | = | 82.75 |
| Inches from rear corner | = | 109.95 |
| Inches from front bumper | = | 75.44 |
| Inches from rear bumper | = | 104.56 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 1489.51 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 1441.83 | lb*ft*sec² |
| Roll Moment of Inertia | = | 321.06 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 58.0 | deg |
| Angle Front of Hood to Windshield Base | = | 7.6 | deg |
| Angle Front of Hood to Windshield Top | = | 17.0 | deg |
| Angle of Windshield | = | 30.7 | deg |
| Angle of Steering Tires at Max Turn | = | 27.6 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test

## #2528

## 1997 CHEVROLET CAVALIER

Provided By

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# Similar Vehicle database reader

You entered: **1998 CHEVROLET CAVALIER**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

| Year Range | Make | Model | Body Styles | Wheelbase |
|---|---|---|---|---|
| 1995 - 2003 | CHEVROLET | CAVALIER | 2D, 4D, CONV, SW | 104.1 |
| Remarks: Mild restyle in 2003. | | | | |
| 1995 - 2005 | PONTIAC | SUNFIRE | 2D, 4D, SW | 104.1 |
| Remarks: | | | | |
| 2003 - 2005 | CHEVROLET | CAVALIER | 2D, 4D, CONV, SW | 104.1 |
| Remarks: Mild restyle in 2003. | | | | |



If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

## Test Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2528 | NHTSA Test Reference Guide Version # | V4 | | | |
| Test Date | 1997-02-05 | Contract # | DTNH22-90-D-12121 | | | |
| Contract/Study Title | NCAP TEST - 1997 CHEVROLET CAVALIER (NHTSA NO.: MV0111) | | | | | |
| Test Objective(s) | VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE DATA | | | | | |
| Test Type | NEW CAR ASSESSMENT TEST | Configuration | VEHICLE INTO BARRIER | | | |
| Impact Angle | 0 | Side Impact Point | 0 | mm | 0.0 | inches |
| | | Offset Distance | 0 | mm | 0.0 | inches |
| | | Closing Speed | 56.3 | Km/Hr | 34.98 | MPH |
| Test Performer | MGA RESEARCH | | | | | |
| Test Reference # | BT97020501 | | | | | |
| Test Track Surface | CONCRETE | Condition | DRY | | | |
| Ambient Temperature | 22 C | 71.6 F | Total Number of Curves | 111 | | |
| Data Recorder Type | OTHER | Data Link | UMBILICAL CABLE | | | |
| Test Commentary | HIGH SPEED ANALOG TO DIGITAL RECORDER | | | | | |

## Fixed Barrier Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Barrier Type | RIGID | Pole Barrier Diameter | 9999 | mm | 9999 | inches |
| Barrier Shape | LOAD CELL BARRIER | | | | | |
| Barrier Commentary | NO COMMENTS | | | | | |

# 1997 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 2528 | | |
| Vehicle # | 1 | Sex | MALE |
| Location | LEFT FRONT SEAT | Age | 0 |
| Position | CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 50 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 036 | | |
| Occupant Modification | NO COMMENTS | | |
| Occupant Description | NO COMMENTS | | |
| Occupant Commentary | NO COMMENTS | | |

## Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 319 | mm | 12.6 | inches | Head Injury Criteria (HIC) | 646 | |
| WindShield | 563 | mm | 22.2 | inches | HIC Lower Time Interval (ms) | 57.6 | |
| Seatback | 9999 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 93.6 | |
| Side Header | 209 | mm | 8.2 | inches | | | |
| Side Window | 312 | mm | 12.3 | inches | | | |
| Neck to Seatback | 9999 | mm | 0.0 | inches | | | |
| First Contact Region (Head) | AIR BAG | | | | | | |
| Second Contact Region (Head) | | | | | | | |

## Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 512 | mm | 20.2 | inches | Arm to Door | 94 | mm | 3.7 | inches |
| Steering Wheel | 319 | mm | 12.6 | inches | Hip to Door | 110 | mm | 4.3 | inches |
| Seatback | 9999 | mm | 0.0 | inches | | | | | |
| Chest Severity Index | 478 | | | | Pelvic Peak Lateral Acceleration (g's) | 0 | | | |
| Thoracic Trauma Index | 0 | | | | Thorax Peak Acceleration (g's) | 50.3 | | | |
| Lap Belt Peak Load | 5835 | Newtons | 1311.8 | pound Force | | | | | |
| Shoulder Belt Peak Load | 5254 | Newtons | 1181.2 | pound Force | | | | | |
| First Contact Region (Chest/Abdomen) | AIR BAG | | | | | | | | |
| Second Contact Region (Chest/Abdomen) | NONE | | | | | | | | |

## Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 151 | mm | 5.9 | inches | Knees to Seatback | 9999 | mm | 0.0 | inches |
| Left Femur Peak Load | -3225 | Newtons | -725.0 | pounds Force | | | | | |
| Right Femur Peak Load | -4267 | Newtons | -959.3 | pounds Force | | | | | |
| First Contact Region (Legs) | KNEE RESTRAINT | | | | | | | | |
| Second Contact Region (Legs) | | | | | | | | | |

## 1997 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2528 | | | | | |
| Vehicle # | 1 | Sex | MALE | | | |
| Location | LEFT FRONT SEAT | Age | 0 | | | |
| Position | CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 036 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | NO COMMENTS |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |

# 1997 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 2528 | | |
| Vehicle # | 1 | Sex | MALE |
| Location | RIGHT FRONT SEAT | Age | 0 |
| Position | CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 50 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 037 | | |
| Occupant Modification | NO COMMENTS | | |
| Occupant Description | NO COMMENTS | | |
| Occupant Commentary | NO COMMENTS | | |

## Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 322 | mm | 12.7 | inches | Head Injury Criteria (HIC) | 885 | |
| WindShield | 593 | mm | 23.3 | inches | HIC Lower Time Interval (ms) | 64 | |
| Seatback | 9999 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 95.7 | |
| Side Header | 207 | mm | 8.1 | inches | | | |
| Side Window | 317 | mm | 12.5 | inches | | | |

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

## Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 493 | mm | 19.4 | inches | Arm to Door | 111 | mm | 4.4 | inches |
| Steering Wheel | 9999 | mm | 0.0 | inches | Hip to Door | 109 | mm | 4.3 | inches |
| Seatback | 9999 | mm | 0.0 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 473 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 44.5 |

| | | | | |
|---|---|---|---|---|
| Lap Belt Peak Load | 4683 | Newtons | 1052.8 | pound Force |
| Shoulder Belt Peak Load | 4830 | Newtons | 1085.8 | pound Force |

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

## Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 116 | mm | 4.6 | inches | Knees to Seatback | 9999 | mm | 0.0 | inches |

| | | | | |
|---|---|---|---|---|
| Left Femur Peak Load | -3944 | Newtons | -886.7 | pounds Force |
| Right Femur Peak Load | -4207 | Newtons | -945.8 | pounds Force |

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

## 1997 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2528 | | | | | |
| Vehicle # | 1 | Sex | MALE | | | |
| Location | RIGHT FRONT SEAT | Age | 0 | | | |
| Position | CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 037 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | NO COMMENTS |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |

# Vehicle 1 1997 CHEVROLET CAVALIER

| | | | |
|---|---|---|---|
| Test # | 2528 | | |
| VIN | 1G1JC1244V7205524 | NHTSA Test Vehicle Number | 1 |
| Year | 1997 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CHEVROLET | Post-test Steering Column Shear Capsule Seperation | UNKNOWN |
| Model | CAVALIER | Steering Column Collapse Mechanism | UNKNOWN |
| Body | TWO DOOR COUPE | | |
| Engine | 4 CYLINDER TRANSVERSE FRONT | | |
| Displacement | 2.2 Liter | Transmission | MANUAL - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NO COMMENTS | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 4302 | mm | 169.4 | inches | CG behind Front Axle | 1024 | mm | 40.3 | inches |
| Vehicle Width | 1726 | mm | 68.0 | inches | Center of Damage to CG Axis | 0 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2646 | mm | 104.2 | inches | Total Length of Indentation | 1396 | mm | 55.0 | inches |
| Vehicle Test Weight | 1414 | KG | 3117 | pounds | Maximum Static Crush Depth | 519 | mm | 20.4 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 35.0 | mph |

Vehicle Damage Index: 12FDEW5

Principal Direction of Force: 0

## Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

| | | | | |
|---|---|---|---|---|
| DPD 1 | 393 | mm | 15.5 | inches |
| DPD 2 | 466 | mm | 18.3 | inches |
| DPD 3 | 519 | mm | 20.4 | inches |
| DPD 4 | 504 | mm | 19.8 | inches |
| DPD 5 | 376 | mm | 14.8 | inches |
| DPD 6 | 215 | mm | 8.5 | inches |

## Crush from Pre & Post Test Damage Measurements

| | Pre-Test | | Post-Test | | Crush Depth | |
|---|---|---|---|---|---|---|
| Left Bumper Corner | 158.5 | inches | 145.0 | inches | 13.5 | inches |
| | 4026 | mm | 3683 | mm | 343 | mm |
| Centerline | 169.4 | inches | 148.1 | inches | 21.2 | inches |
| | 4302 | mm | 3763 | mm | 539 | mm |
| Right Bumper Corner | 158.5 | inches | 150.0 | inches | 8.5 | inches |
| | 4026 | mm | 3811 | mm | 215 | mm |

| Bumper Engagement (Inline Impact Only) | Sill Engagement (Side Impact Only) | A-pillar Engagement (Side Impact Only) |
|---|---|---|
| 999.0 | NOT APPLICABLE | 999.0 |

| Moving Test Cart Angle | Moving Test Cart/Vehicle Crabbed Angle | Vehicle Orientation on Cart Moving Test Cart |
|---|---|---|
| NOT APPLICABLE | 0.0 | NOT APPLICABLE |
| *Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground* | *Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle* | *Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion* |

## Vehicle 1 1997 CHEVROLET CAVALIER

| | | | |
|---|---|---|---|
| Test # | 2528 | | |
| VIN | 1G1JC1244V7205524 | NHTSA Test Vehicle Number | 1 |
| Year | 1997 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CHEVROLET | Post-test Steering Column Shear Capsule Seperation | UNKNOWN |
| Model | CAVALIER | Steering Column Collapse Mechanism | UNKNOWN |
| Body | TWO DOOR COUPE | | |
| Engine | 4 CYLINDER TRANSVERSE FRONT | | |
| Displacement | 2.2 Liter | Transmission | MANUAL - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NO COMMENTS | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 4302 | mm | 169.4 | inches | CG behind Front Axle | 1024 | mm | 40.3 | inches |
| Vehicle Width | 1726 | mm | 68.0 | inches | Center of Damage to CG Axis | 0 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2646 | mm | 104.2 | inches | Total Length of Indentation | 1396 | mm | 55.0 | inches |
| Vehicle Test Weight | 1414 | KG | 3117 | pounds | Maximum Static Crush Depth | 519 | mm | 20.4 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 35.0 | mph |

Vehicle Damage Index: 12FDEW5 — Principal Direction of Force: 0

## Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

| Left Side Pre-Test mm | Left Side Pre-Test inches | Left Side Post-Test mm | Left Side Post-Test inches | Centerline | Centerline Pre-Test mm | Centerline Pre-Test inches | Centerline Post-Test mm | Centerline Post-Test inches | Right Side Pre-Test mm | Right Side Pre-Test inches | Right Side Post-Test mm | Right Side Post-Test inches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Length of Vehicle at Centerline | 4302 | 169.4 | 3763 | 148.1 | | | | |
| | | | | Engine Block | 450 | 17.7 | 450 | 17.7 | | | | |
| 4026 | 158.5 | 3683 | 145.0 | Front Bumper Corner | | | | | 4026 | 158.5 | 3811 | 150.0 |
| | | | | Front of Engine | 3558 | 140.1 | 3337 | 131.4 | | | | |
| 3198 | 125.9 | 3144 | 123.8 | Firewall | | | | | 3198 | 125.9 | 2978 | 117.2 |
| | | | | | 3186 | 125.4 | 3044 | 119.8 | | | | |
| 2750 | 108.3 | 2762 | 108.7 | Upper Leading Edge of Door | | | | | 2754 | 108.4 | 2757 | 108.5 |
| 2800 | 110.2 | 2783 | 109.6 | Lower Leading Edge of Door | | | | | 2798 | 110.2 | 2779 | 109.4 |
| 2810 | 110.6 | 2792 | 109.9 | Bottom of 'A' Post | | | | | 2810 | 110.6 | 2764 | 108.8 |
| 1485 | 58.5 | 1488 | 58.6 | Upper Trailing Edge of Door | | | | | 1485 | 58.5 | 1486 | 58.5 |
| 1464 | 57.6 | 1456 | 57.3 | Lower Trailing Edge of Door | | | | | 1463 | 57.6 | 1455 | 57.3 |
| | | | | Steering Column | 2327 | 91.6 | 2331 | 91.8 | | | | |
| | | | | Center of Seering Column to 'A' Post (Horizontal) | 345 | 13.6 | 276 | 10.9 | | | | |
| | | | | Center of Steering Column to Headliner (Vertical) | 422 | 16.6 | 332 | 13.1 | | | | |

# 1997 CHEVROLET CAVALIER

NHTSA Crash Test - #2528 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3117 pounds
Vehicle Closing Speed = 35.0 mph
Test Crush Length = 68.0 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 13.5 | 21.2 | 8.5 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 8.5 inches | | | | | 622.8 |
| Using a Rated No Damage Speed of | 2.5mph | 351.3 | 537.0 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 648.5 | 457.5 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 891.6 | 384.4 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 1080.7 | 317.6 | 1838.4 | |
| Average Crush = 16.1 inches | | | | | 173.6 |
| Using a Rated No Damage Speed of | 2.5mph | 185.5 | 149.7 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 342.4 | 127.5 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 470.7 | 107.1 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 570.6 | 88.5 | 1838.4 | |
| Maximum Crush = 21.2 inches | | | | | 100.1 |
| Using a Rated No Damage Speed of | 2.5mph | 140.8 | 86.3 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 260.0 | 73.5 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 357.5 | 61.8 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 433.3 | 51.1 | 1838.4 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 21.2 | 33.4 | -1.6 | -4.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.1**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 1997 CHEVROLET CAVALIER

NHTSA Crash Test - #2528 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3117 pounds
Vehicle Closing Speed = 35.0 mph
Test Crush Length = 55.0 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 13.5 | 21.2 | 8.5 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 8.5 inches | | | | | 770.0 |
| Using a Rated No Damage Speed of | 2.5mph | 434.3 | 663.9 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 801.8 | 565.7 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 1102.4 | 475.3 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 1336.2 | 392.7 | 2273.0 | |
| Average Crush = 16.1 inches | | | | | 214.6 |
| Using a Rated No Damage Speed of | 2.5mph | 229.3 | 185.1 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 423.3 | 157.7 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 582.0 | 132.5 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 705.4 | 109.5 | 2273.0 | |
| Maximum Crush = 21.2 inches | | | | | 123.8 |
| Using a Rated No Damage Speed of | 2.5mph | 174.1 | 106.7 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 321.5 | 90.9 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 442.0 | 76.4 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 535.7 | 63.1 | 2273.0 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 21.2 | 33.4 | -1.6 | -4.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.1**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 1997 CHEVROLET CAVALIER

NHTSA Crash Test - #2528 - Front Impact

Damage Profile Distances - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3117 pounds
Vehicle Closing Speed = 35.0 MPH
Test Crush Length = 68.0 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | 15.5 | 18.3 | 20.4 | 19.8 | 14.8 | 8.5 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 8.5 inches | | | | | 622.8 |
| Using a Rated No Damage Speed of | 2.5mph | 351.3 | 537.0 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 648.5 | 457.5 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 891.6 | 384.4 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 1080.7 | 317.6 | 1838.4 | |
| Average Crush = 17.1 inches | | | | | 153.9 |
| Using a Rated No Damage Speed of | 2.5mph | 174.6 | 132.7 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 322.3 | 113.0 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 443.2 | 95.0 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 537.2 | 78.5 | 1276.4 | |
| Maximum Crush = 20.4 inches | | | | | 108.1 |
| Using a Rated No Damage Speed of | 2.5mph | 146.4 | 93.2 | 114.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 270.2 | 79.4 | 459.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 371.5 | 66.7 | 1034.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 450.3 | 55.1 | 1838.4 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 20.4 | 32.7 | -2.3 | -6.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 1997 CHEVROLET CAVALIER

NHTSA Crash Test - #2528 - Front Impact

Damage Profile Distances - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3117 pounds
Vehicle Closing Speed = 35.0 MPH
Test Crush Length = 55.0 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | 15.5 | 18.3 | 20.4 | 19.8 | 14.8 | 8.5 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 8.5 inches | | | | | 770.0 |
| Using a Rated No Damage Speed of | 2.5mph | 434.3 | 663.9 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 801.8 | 565.7 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 1102.4 | 475.3 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 1336.2 | 392.7 | 2273.0 | |
| Average Crush = 17.1 inches | | | | | 190.3 |
| Using a Rated No Damage Speed of | 2.5mph | 215.9 | 164.0 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 398.5 | 139.8 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 548.0 | 117.4 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 664.2 | 97.0 | 1578.1 | |
| Maximum Crush = 20.4 inches | | | | | 133.7 |
| Using a Rated No Damage Speed of | 2.5mph | 181.0 | 115.3 | 142.1 | |
| Using a Rated No Damage Speed of | 5.0mph | 334.1 | 98.2 | 568.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 459.3 | 82.5 | 1278.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 556.7 | 68.2 | 2273.0 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 20.4 | 32.7 | -2.3 | -6.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# Available Test Results
## Front Impact Test Summary

Report Filter Settings

Year Range: 1995 - 2003
Make: CHEVROLET
Model: CAVALIER

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 3180 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 15.0 | 29.2 | 262.7 | 84.9 | 406.3 | 123.5 | 22.8 |
| 2688 | 1998 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 18.8 | 35.2 | 270.3 | 86.9 | 420.2 | 118.1 | 26.4 |
| 3096 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 13.5 | 29.0 | 290.3 | 103.7 | 406.6 | 151.2 | 25.1 |
| 3179 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 13.4 | 29.2 | 292.4 | 105.5 | 405.2 | 153.7 | 25.4 |
| 2546 | 1996 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 18.8 | 34.9 | 303.7 | 96.8 | 476.6 | 131.8 | 26.0 |
| 5206 | 2004 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 15.3 | 29.6 | 318.0 | 102.7 | 492.2 | 148.6 | 23.0 |
| 2253 | 1995 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 19.7 | 35.1 | 318.9 | 97.7 | 520.3 | 132.8 | 25.1 |
| 2528 | 1997 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 17.1 | 35.0 | 322.8 | 113.3 | 459.6 | 154.3 | 28.7 |
| 2850 | 1997 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 16.5 | 30.1 | 347.2 | 105.4 | 571.9 | 151.6 | 21.9 |
| 2689 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 14.2 | 35.1 | 361.0 | 152.9 | 426.0 | 208.0 | 34.7 |
| 3178 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 9.7 | 25.1 | 371.0 | 152.9 | 450.1 | 238.6 | 25.8 |
| 2754 | 1997 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 15.5 | 34.9 | 380.0 | 146.5 | 492.9 | 199.6 | 31.4 |
| 3112 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 9.0 | 24.9 | 399.2 | 176.4 | 451.7 | 276.1 | 27.5 |
| 4445 | 2003 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 12.7 | 34.8 | 424.3 | 198.3 | 453.9 | 270.6 | 38.0 |
| 2214 | 1995 PONTIAC SUNFIRE FOUR DOOR SEDAN | 5.0 | 10.8 | 29.6 | 429.3 | 194.8 | 472.9 | 282.1 | 32.3 |
| | **Average (AVG)** | | | | **339.4** | **127.9** | **460.4** | **182.7** | **27.6** |
| | **Minimum (MIN)** | | | | **262.7** | **84.9** | **405.2** | **118.1** | **21.9** |
| | **Maximum (MAX)** | | | | **429.3** | **198.3** | **571.9** | **282.1** | **38.0** |
| | **Standard Deviation (STDev-sample)** | | | | **53.3** | **38.9** | **46.6** | **58.5** | **4.6** |
| | **Number of Tests (n)** | | | **15** | | | | | |

# Available Test Results

## Front Impact Test Summary

Report Filter Settings

Year Range: 1995 - 2003
Make: CHEVROLET
Model: CAVALIER

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 3178 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 23.3 | 25.1 | 155.2 | 26.8 | 450.1 | 41.8 | 10.8 |
| 3112 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 21.5 | 24.9 | 167.7 | 31.1 | 451.7 | 48.7 | 11.6 |
| 3180 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 17.8 | 29.2 | 221.0 | 60.1 | 406.3 | 87.4 | 19.2 |
| 2688 | 1998 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 22.6 | 35.2 | 224.0 | 59.7 | 420.2 | 81.1 | 21.9 |
| 3179 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 17.3 | 29.2 | 226.6 | 63.4 | 405.2 | 92.3 | 19.7 |
| 3096 | 1999 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 15.9 | 29.0 | 245.3 | 74.0 | 406.6 | 108.0 | 21.2 |
| 2528 | 1997 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 21.2 | 35.0 | 259.8 | 73.4 | 459.6 | 99.9 | 23.1 |
| 2689 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 19.3 | 35.1 | 266.0 | 83.0 | 426.0 | 112.9 | 25.6 |
| 2546 | 1996 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 21.2 | 34.9 | 268.8 | 75.8 | 476.6 | 103.3 | 23.0 |
| 5206 | 2004 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 17.8 | 29.6 | 273.2 | 75.8 | 492.2 | 109.7 | 19.8 |
| 2253 | 1995 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 22.3 | 35.1 | 281.2 | 76.0 | 520.3 | 103.3 | 22.1 |
| 2754 | 1997 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 19.7 | 34.9 | 299.7 | 91.1 | 492.9 | 124.1 | 24.8 |
| 2873 | 1997 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 11.3 | 25.4 | 301.3 | 108.9 | 417.0 | 168.7 | 22.9 |
| 2850 | 1997 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 18.1 | 30.1 | 317.4 | 88.1 | 571.9 | 126.7 | 20.0 |
| 3177 | 1998 CHEVROLET CAVALIER FOUR DOOR SEDAN | 5.0 | 10.4 | 25.0 | 346.9 | 133.1 | 452.2 | 207.9 | 24.0 |
| 4445 | 2003 CHEVROLET CAVALIER TWO DOOR COUPE | 5.0 | 15.4 | 34.8 | 351.9 | 136.4 | 453.9 | 186.1 | 31.5 |
| 2214 | 1995 PONTIAC SUNFIRE FOUR DOOR SEDAN | 5.0 | 11.5 | 29.6 | 404.4 | 172.9 | 472.9 | 250.4 | 30.4 |
| | **Average (AVG)** | | | | **271.2** | **84.1** | **457.4** | **120.7** | **21.8** |
| | **Minimum (MIN)** | | | | **155.2** | **26.8** | **405.2** | **41.8** | **10.8** |
| | **Maximum (MAX)** | | | | **404.4** | **172.9** | **571.9** | **250.4** | **31.5** |
| | **Standard Deviation (STDev-sample)** | | | | **64.1** | **36.9** | **44.9** | **54.4** | **5.3** |
| | **Number of Tests (n)** | | | **17** | | | | | |

# Expert VIN DeCoder®



Version Number 3.2.0

DeCoded VIN: 1G4CW52K?SH640024

| | |
|---|---|
| Model: | 1995 Buick Park Avenue 4 Door Sedan |
| Engine Size: | 3.8 L/ 231 cu.in. |
| Engine Description: | V-6 cylinder with Overhead Valves |
| Horse Power: | 205 @ 5200 rpm |
| Torque: | 230 lb-ft at 4000 rpm |
| Injection System: | Multiport Fuel Injection (MFI) |
| PSI: | 41-47 psi |
| Ignition: | Electronic |
| Manufacturer: | Buick-Oldsmobile-Cadillac |
| Assembly Plant: | Flint, MI. |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/ Active (Manual) Seatbelts + Driver & Passenger Air Bags |

The First through Third characters (1G4) indicate a Buick Car made in the U.S.A.

The Fourth and Fifth characters (CW) indicate a Park Avenue

The Sixth character (5) indicate a 4 Door Sedan

The Seventh character (2) indicate Active (Manual) Seatbelts + Driver & Passenger Air Bags

The Eighth character (K) indicate the OEM engine: 3.8 L/ 231 cu.in., V6, OHV

The Ninth character (the check digit) is entered as ?.
The VIN appears Invalid, the calculated value is 2.

The Tenth character (S) indicate the model year 1995

The Eleventh character (H) indicate the vehicle was made in the assembly plant in Flint, MI.

The Twelfth through Seventeenth characters (640024) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/16/2013

**1995 BUICK PARK AVENUE 4 DOOR SEDAN**

| | | | | | |
|---|---|---|---|---|---|
| Curb Weight: | | 3533 | lbs. | 1603 | kg. |
| Curb Weight Distribution - | Front: | 63 | % Rear: | 37 | % |
| Gross Vehicle Weight Rating: | | 4730 | lbs. | 2145 | kg. |
| Number of Tires on Vehicle: | | 4 | | | |
| Drive Wheels: | | FRONT | | | |

| **Horizontal Dimensions** | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 206 | 17.17 | 5.23 |
| Wheelbase: | 111 | 9.25 | 2.82 |
| Front Bumper to Front Axle: | 46 | 3.83 | 1.17 |
| Front Bumper to Front of Front Well: | 29 | 2.42 | 0.74 |
| Front Bumper to Front of Hood: | 6 | 0.50 | 0.15 |
| Front Bumper to Base of Windshield: | 57 | 4.75 | 1.45 |
| Front Bumper to Top of Windshield: | 86 | 7.17 | 2.18 |
| Rear Bumper to Rear Axle: | 49 | 4.08 | 1.24 |
| Rear Bumper to Rear of Rear Well: | 33 | 2.75 | 0.84 |
| Rear Bumper to Rear of Trunk: | | | |
| Rear Bumper to Base of Rear Window: | | | |
| **Width Dimensions** | | | |
| Maximum Width: | 74 | 6.17 | 1.88 |
| Front Track: | 60 | 5.00 | 1.52 |
| Rear Track: | 61 | 5.08 | 1.55 |
| **Vertical Dimensions** | | | |
| Height: | 55 | 4.58 | 1.40 |
| Ground to - | | | |
| Front Bumper (Top) | 21 | 1.75 | 0.53 |
| Headlight - center | 26 | 2.17 | 0.66 |
| Hood - top front: | 29 | 2.42 | 0.74 |
| Base of Windshield | 38 | 3.17 | 0.97 |
| Rear Bumper - top: | 23 | 1.92 | 0.58 |
| Trunk - top rear: | | | |
| Base of Rear Window: | | | |

**1995 BUICK PARK AVENUE 4 DOOR SEDAN**

| Interior Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 59 | 4.92 | 1.50 |
| Front Seat to Headliner | 39 | 3.25 | 0.99 |
| Front Leg Room - seatback to floor (max) | 43 | 3.58 | 1.09 |
| Rear Seat Shoulder Width | 59 | 4.92 | 1.50 |
| Rear Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (min) | 41 | 3.42 | 1.04 |

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

**Steering Data**

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 504 | 42.00 | 12.80 |
| Steering Ratio: | :1 | | |
| Wheel Radius: | 12 | 1.00 | 0.30 |
| Tire Size (OEM): | 205-70R15 | | |

**Acceleration & Braking Information**

Brake Type: FRONT DISC - REAR DRUM
ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = ft t = sec a = ft/sec² G-force =

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | | sec | a = | | ft/sec² | G-force = |
| 0 to 60mph | t = | 7.3 | sec | a = | 12.1 | ft/sec² | G-force = 0.37 |
| 45 to 65mph | t = | | sec | a = | | ft/sec² | G-force = |

Transmission Type: AUTOMATIC

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 1996

## 1995 BUICK PARK AVENUE 4 DOOR SEDAN

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.40 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 41.07 |
| Inches in front of rear axle | = | 69.93 |
| Inches from side of vehicle | = | 37.00 |
| Inches from ground | = | 21.59 |
| Inches from front corner | = | 94.61 |
| Inches from rear corner | = | 124.55 |
| Inches from front bumper | = | 87.07 |
| Inches from rear bumper | = | 118.93 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 2432.99 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 2348.67 | lb*ft*sec² |
| Roll Moment of Inertia | = | 485.94 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 53.1 | deg |
| Angle Front of Hood to Windshield Base | = | 10.0 | deg |
| Angle Front of Hood to Windshield Top | = | 16.7 | deg |
| Angle of Windshield | = | 27.3 | deg |
| Angle of Steering Tires at Max Turn | = | 25.2 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

4N6XPRT StifCalcs - Selected Vehicle: 1995 BUICK PARK AVENUE

File Print Reports Settings Help Reg To: TUCRRC StifCalcs Version: 3.2.0

Basic Vehicle Search | NHTSA Test Selection | Advanced Vehicle Search | Force Balance | NHTSA Download

Available Test | Test Information | Occupant Information | Vehicle Information | Stiffness Calcs

# Available Tests in the NHTSA database for a 1991 - 1996 BUICK PARK AVENUE

## Similar Vehicles Searched Year Range (1991 - 1996)

Print

### Frontal Test(s)

| Test No. | Year | Make | Model | Impact Speed | Max Crush | Crush Factor | VDI | PDOF | Test Config | VIN |
|---|---|---|---|---|---|---|---|---|---|---|
| 1603 | 1991 | BUICK | PARK AVENUE | 29.5 | 25.0 | 13.9 | 12FDEW3 | 0 | VEHICLE INTO... | 1G4CW53L3M1... |
| | | | | | | | | | | |
| | | | | | | | | | | |

### Rear Test(s)

**No Rear Tests: 1991 - 1996**

### Side Test(s)

**No Side Tests: 1991 - 1996**

Print

### Other Test(s)

## Available Test Results
### Side Impact Test Summary

## Report Filter Settings

Year Range: 1965 - 2013

Bodystyle: FOUR DOOR SEDAN

Wheelbase Range: 110.3-111.3

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 7033 | 2011 AUDI A4 FOUR DOOR SEDAN | 2.0 | 19.9 | 19.9 | 45.3 | 20.4 | 50.2 | 25.2 | 8.0 |
| 7859 | 2012 BMW 328 I FOUR DOOR SEDAN | 2.0 | 16.8 | 19.8 | 51.8 | 27.5 | 48.8 | 34.0 | 9.4 |
| 371 | 1976 PLYMOUTH VOLARE FOUR DOOR SEDAN | 2.0 | 17.4 | 18.2 | 76.8 | 35.7 | 82.6 | 45.0 | 7.6 |
| 4607 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 2.0 | 13.7 | 25.3 | 91.9 | 78.2 | 53.9 | 92.2 | 18.7 |
| 2716 | 1998 PONTIAC BONNEVILLE FOUR DOOR SEDAN | 2.0 | 8.8 | 24.9 | 94.9 | 123.2 | 36.5 | 145.7 | 28.2 |
| 2502 | 1997 BUICK LESABRE FOUR DOOR SEDAN | 2.0 | 7.1 | 21.6 | 98.8 | 136.4 | 35.8 | 165.8 | 26.2 |
| 3519 | 2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 2.0 | 10.6 | 25.4 | 104.2 | 114.6 | 47.4 | 135.0 | 24.3 |
| 2679 | 1998 BUICK LESABRE FOUR DOOR SEDAN | 2.0 | 9.2 | 24.9 | 107.7 | 133.8 | 43.3 | 158.2 | 26.9 |
| 4610 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 7.3 | 25.1 | 119.0 | 187.3 | 37.8 | 221.1 | 34.4 |
| 3803 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 7.2 | 25.0 | 125.4 | 201.1 | 39.1 | 237.6 | 34.9 |
| 3575 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 8.2 | 25.2 | 129.4 | 182.6 | 45.9 | 215.5 | 30.9 |
| 4642 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.6 | 21.7 | 131.8 | 229.6 | 37.8 | 278.6 | 33.3 |
| 125 | 1976 PLYMOUTH VOLARE FOUR DOOR SEDAN | 2.0 | 12.3 | 17.4 | 132.1 | 82.4 | 105.8 | 105.2 | 9.8 |
| 4380 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 6.8 | 25.2 | 133.7 | 228.1 | 39.2 | 269.1 | 37.3 |
| 4551 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.6 | 21.5 | 135.7 | 234.9 | 39.2 | 285.5 | 32.9 |
| 3210 | 2000 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 11.7 | 25.1 | 135.7 | 134.1 | 68.7 | 158.2 | 21.6 |
| 6520 | 2009 AUDI A4 FOUR DOOR SEDAN | 2.0 | 7.1 | 24.7 | 179.2 | 285.6 | 56.2 | 338.1 | 34.3 |
| 7028 | 2011 AUDI A4 FOUR DOOR SEDAN | 2.0 | 9.3 | 25.1 | 184.0 | 230.1 | 73.6 | 271.6 | 27.3 |
| 5267 | 2005 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 7.3 | 25.0 | 190.7 | 300.2 | 60.6 | 354.5 | 34.3 |
| 5871 | 2007 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 7.0 | 25.1 | 197.9 | 327.1 | 59.9 | 386.1 | 36.1 |
| 6283 | 2006 TOYOTA AVALON FOUR DOOR SEDAN | 2.0 | 7.8 | 20.0 | 198.1 | 229.8 | 85.4 | 283.7 | 20.6 |
| 5379 | 2005 TOYOTA AVALON FOUR DOOR SEDAN | 2.0 | 6.0 | 25.3 | 200.6 | 391.4 | 51.4 | 461.5 | 42.9 |
| 5965 | 2007 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 6.4 | 25.2 | 211.0 | 384.5 | 57.9 | 453.7 | 39.9 |
| 6515 | 2009 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.7 | 24.9 | 250.6 | 506.1 | 62.0 | 598.3 | 43.8 |
| 5548 | 2006 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 4.6 | 25.0 | 273.6 | 678.9 | 55.1 | 802.3 | 53.9 |
| 7858 | 2012 BMW 328 I FOUR DOOR SEDAN | 2.0 | 4.3 | 25.9 | 285.5 | 793.1 | 51.4 | 931.5 | 62.3 |
| 6607 | 2008 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.4 | 17.7 | 290.5 | 418.0 | 100.9 | 531.6 | 22.9 |
| | **Average (AVG)** | | | | **154.7** | **248.0** | **56.5** | **295.7** | **29.7** |
| | **Minimum (MIN)** | | | | **45.3** | **20.4** | **35.8** | **25.2** | **7.6** |
| | **Maximum (MAX)** | | | | **290.5** | **793.1** | **105.8** | **931.5** | **62.3** |
| | **Standard Deviation (STDev-sample)** | | | | **67.9** | **187.4** | **19.0** | **221.6** | **13.1** |
| | **Number of Tests (n)** | | | **27** | | | | | |

## Available Test Results
### Side Impact Test Summary

## Report Filter Settings

Year Range: 1965 - 2013

Bodystyle: FOUR DOOR SEDAN

Wheelbase Range: 110.3-111.3

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 7033 | 2011 AUDI A4 FOUR DOOR SEDAN | 2.0 | 19.9 | 19.9 | 45.3 | 20.4 | 50.2 | 25.2 | 8.0 |
| 7859 | 2012 BMW 328 I FOUR DOOR SEDAN | 2.0 | 16.8 | 19.8 | 51.8 | 27.5 | 48.8 | 34.0 | 9.4 |
| 371 | 1976 PLYMOUTH VOLARE FOUR DOOR SEDAN | 2.0 | 17.4 | 18.2 | 76.8 | 35.7 | 82.6 | 45.0 | 7.6 |
| 4607 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 2.0 | 13.7 | 25.3 | 91.9 | 78.2 | 53.9 | 92.2 | 18.7 |
| 2716 | 1998 PONTIAC BONNEVILLE FOUR DOOR SEDAN | 2.0 | 8.8 | 24.9 | 94.9 | 123.2 | 36.5 | 145.7 | 28.2 |
| 2502 | 1997 BUICK LESABRE FOUR DOOR SEDAN | 2.0 | 7.1 | 21.6 | 98.8 | 136.4 | 35.8 | 165.8 | 26.2 |
| 3519 | 2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 2.0 | 10.6 | 25.4 | 104.2 | 114.6 | 47.4 | 135.0 | 24.3 |
| 2679 | 1998 BUICK LESABRE FOUR DOOR SEDAN | 2.0 | 9.2 | 24.9 | 107.7 | 133.8 | 43.3 | 158.2 | 26.9 |
| 4610 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 7.3 | 25.1 | 119.0 | 187.3 | 37.8 | 221.1 | 34.4 |
| 3803 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 7.2 | 25.0 | 125.4 | 201.1 | 39.1 | 237.6 | 34.9 |
| 3575 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 8.2 | 25.2 | 129.4 | 182.6 | 45.9 | 215.5 | 30.9 |
| 4642 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.6 | 21.7 | 131.8 | 229.6 | 37.8 | 278.6 | 33.3 |
| 125 | 1976 PLYMOUTH VOLARE FOUR DOOR SEDAN | 2.0 | 12.3 | 17.4 | 132.1 | 82.4 | 105.8 | 105.2 | 9.8 |
| 4380 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 6.8 | 25.2 | 133.7 | 228.1 | 39.2 | 269.1 | 37.3 |
| 4551 | 2002 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.6 | 21.5 | 135.7 | 234.9 | 39.2 | 285.5 | 32.9 |
| 3210 | 2000 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 11.7 | 25.1 | 135.7 | 134.1 | 68.7 | 158.2 | 21.6 |
| 6520 | 2009 AUDI A4 FOUR DOOR SEDAN | 2.0 | 7.1 | 24.7 | 179.2 | 285.6 | 56.2 | 338.1 | 34.3 |
| 7028 | 2011 AUDI A4 FOUR DOOR SEDAN | 2.0 | 9.3 | 25.1 | 184.0 | 230.1 | 73.6 | 271.6 | 27.3 |
| 5267 | 2005 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 7.3 | 25.0 | 190.7 | 300.2 | 60.6 | 354.5 | 34.3 |
| 5871 | 2007 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 7.0 | 25.1 | 197.9 | 327.1 | 59.9 | 386.1 | 36.1 |
| 6283 | 2006 TOYOTA AVALON FOUR DOOR SEDAN | 2.0 | 7.8 | 20.0 | 198.1 | 229.8 | 85.4 | 283.7 | 20.6 |
| 5379 | 2005 TOYOTA AVALON FOUR DOOR SEDAN | 2.0 | 6.0 | 25.3 | 200.6 | 391.4 | 51.4 | 461.5 | 42.9 |
| 5965 | 2007 BUICK LACROSSE FOUR DOOR SEDAN | 2.0 | 6.4 | 25.2 | 211.0 | 384.5 | 57.9 | 453.7 | 39.9 |
| 6515 | 2009 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.7 | 24.9 | 250.6 | 506.1 | 62.0 | 598.3 | 43.8 |
| 5548 | 2006 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 4.6 | 25.0 | 273.6 | 678.9 | 55.1 | 802.3 | 53.9 |
| 7858 | 2012 BMW 328 I FOUR DOOR SEDAN | 2.0 | 4.3 | 25.9 | 285.5 | 793.1 | 51.4 | 931.5 | 62.3 |
| 6607 | 2008 CHEVROLET IMPALA FOUR DOOR SEDAN | 2.0 | 5.4 | 17.7 | 290.5 | 418.0 | 100.9 | 531.6 | 22.9 |
| | **Average (AVG)** | | | | **154.7** | **248.0** | **56.5** | **295.7** | **29.7** |
| | **Minimum (MIN)** | | | | **45.3** | **20.4** | **35.8** | **25.2** | **7.6** |
| | **Maximum (MAX)** | | | | **290.5** | **793.1** | **105.8** | **931.5** | **62.3** |
| | **Standard Deviation (STDev-sample)** | | | | **67.9** | **187.4** | **19.0** | **221.6** | **13.1** |
| | **Number of Tests (n)** | | | **27** | | | | | |

# 1998 CHEVROLET CAVALIER - Front Impact

| | |
|---|---|
| Curb Weight (pounds): | 2617 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 2617 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 5.0 |
| Energy Crush Depth (inches): | 8.32 |
| Damage Length (inches): | 38.0 |
| Crush Profile Measurements: | 5 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 1489.51 |

**"Known" Stifness Values**

| | A | B |
|---|---|---|
| Average | 339.4 | 127.9 |
| Minimum | 262.7 | 84.9 |
| Maximum | 429.3 | 198.3 |
| Std. Devation | 53.3 | 38.9 |

| | | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|---|
| C1 (inches) | 10.00 | 7.00 | 61.25 | 4.40 | 269.79 | 3.33 | 204.17 |
| C2 (inches) | 7.50 | 11.00 | 79.75 | 3.63 | 289.21 | 16.44 | 1310.83 |
| C3 (inches) | 7.00 | 9.00 | 66.38 | 3.69 | 244.97 | 22.58 | 1498.50 |
| C4 (inches) | 7.75 | 11.00 | 108.63 | 5.01 | 544.61 | 38.89 | 4224.92 |
| C5 (inches) | 12.00 | | | | | | |
| C6 (inches) | | | | | | | |
| C7 (inches) | | | | | | | |
| C8 (inches) | | | | | | | |
| C9 (inches) | | | | | | | |
| C10 (inches) | | | | | | | |

Average Crush (inches): 8.32

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | Closing Speed (MPH) |
|---|---|---|---|---|---|---|---|
| Minimum | 262.7 | 84.9 | 18405.50 | 17746.01 | 14.3 | 15.2 | 26.5 |
| Avg - 2 Std. Deviations | 232.8 | 50.1 | 12339.00 | 13473.51 | 12.4 | 13.0 | 22.6 |
| Avg - 1 Std. Deviations | 286.1 | 89.0 | 19497.90 | 18992.15 | 14.8 | 15.7 | 27.3 |
| Average | 339.4 | 127.9 | 26656.80 | 24737.20 | 16.8 | 18.1 | 31.4 |
| Avg + 1 Std. Deviations | 392.7 | 166.8 | 33815.70 | 30550.26 | 18.7 | 20.1 | 35.1 |
| Avg + 2 Std. Deviations | 446.0 | 205.7 | 40974.60 | 36392.75 | 20.4 | 22.0 | 38.3 |
| Maximum | 429.3 | 198.3 | 39488.10 | 35061.78 | 20.0 | 21.6 | 37.7 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 4.27 | $k^2$ | 2639.11 |
| Damage Centroid Depth (y) (inches) | 22.91 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 316.00 | | |

# 1995 BUICK PARK AVENUE - Side Impact

| | |
|---|---|
| Curb Weight (pounds): | 3533 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 3533 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 2.0 |
| Energy Crush Depth (inches): | 7.86 |
| Damage Length (inches): | 97.0 |
| Crush Profile Measurements: | 8 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 2432.99 |

| | | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|---|
| C1 (inches) | 1.50 | 16.00 | 68.00 | 2.42 | 164.67 | 9.73 | 661.33 |
| C2 (inches) | 7.00 | 11.00 | 68.75 | 3.14 | 215.88 | 16.28 | 1119.25 |
| C3 (inches) | 5.50 | 9.00 | 78.75 | 4.58 | 360.38 | 23.06 | 1815.75 |
| C4 (inches) | 12.00 | 16.00 | 212.00 | 6.64 | 1408.67 | 56.25 | 11925.33 |
| C5 (inches) | 14.50 | 9.00 | 127.13 | 7.06 | 898.03 | 40.46 | 5143.50 |
| C6 (inches) | 13.75 | 4.00 | 47.50 | 5.99 | 284.38 | 21.89 | 1040.00 |
| C7 (inches) | 10.00 | 32.00 | 160.00 | 3.33 | 533.33 | 202.67 | 32426.67 |
| C8 (inches) | 0.00 | | | | | | |
| C9 (inches) | | | | | | | |
| C10 (inches) | | | | | | | |

Average Crush (inches): 7.86

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | bsub1 |
|---|---|---|---|---|---|---|---|
| Minimum | 68.1 | 39.6 | 18405.50 | 17557.99 | 12.2 | 11.3 | 20.5 |
| Avg - 2 Std. Deviations | 54.5 | 25.4 | 12339.00 | 12127.06 | 10.1 | 9.6 | 16.4 |
| Avg - 1 Std. Deviations | 70.2 | 42.2 | 19497.90 | 18530.31 | 12.5 | 11.6 | 21.2 |
| Average | 83.3 | 59.3 | 26656.80 | 24873.07 | 14.5 | 13.4 | 25.1 |
| Avg + 1 Std. Deviations | 94.7 | 76.7 | 33815.70 | 31178.63 | 16.3 | 14.9 | 28.5 |
| Avg + 2 Std. Deviations | 104.9 | 94.1 | 40974.60 | 37458.33 | 17.8 | 16.3 | 31.6 |
| Maximum | 102.9 | 90.5 | 39488.10 | 36156.15 | 17.5 | 16.0 | 31.0 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 5.07 | $k^2$ | 3193.12 |
| Damage Centroid Depth (y) (inches) | 71.03 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 762.13 | | |

# Expert VIN DeCoder®



Version Number 3.2.0

DeCoded VIN: 2G1WS551269435709

| | |
|---|---|
| Model: | 2006 Chevrolet Impala Police Sedan 4 Door Sedan |
| Engine Size: | 3.9L / 238 cu.in. |
| Engine Description: | V6 Cylinder with Overhead Valves (OHV) |
| Horse Power: | 240 @ 6000 rpm |
| Torque: | 241 lb-ft at 2800 rpm |
| Injection System: | Sequential Port Fuel Injection (SEFI) |
| PSI: | 50-60 psi |
| Ignition: | Electronic |
| Manufacturer: | General Motors |
| Assembly Plant: | Oshawa #1, ON |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/ Manual Belts W/Driver & Passenger and Side Air Bags |

The First through Third characters (2G1) indicate a Chevrolet Car made in Canada

The Fourth and Fifth characters (WS) indicate an Impala Police Sedan

The Sixth character (5) indicate a 4 Door Sedan

The Seventh character (5) indicate Manual Belts W/Driver & Passenger and Side Air Bags

The Eighth character (1) indicate the OEM engine: 3.9L / 238 cu.in., V6 OHV

The Ninth character (the check digit) is entered as 2.
The VIN appears Valid, the calculated value is 2.

The Tenth character (6) indicate the model year 2006

The Eleventh character (9) indicate the vehicle was made in the assembly plant in Oshawa #1, ON

The Twelfth through Seventeenth characters (435709) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/18/2013

## 2006 CHEVROLET IMPALA MSP POLICE PACKAGE 4 DOOR SEDAN

| | | | | | |
|---|---|---|---|---|---|
| Curb Weight: | | 3725 | lbs. | 1690 | kg. |
| Curb Weight Distribution - | Front: | 62 | % Rear: | 38 | % |
| Gross Vehicle Weight Rating: | | 4678 | lbs. | 2122 | kg. |
| Number of Tires on Vehicle: | | 4 | | | |
| Drive Wheels: | | FRONT | | | |

| Horizontal Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 200 | 16.67 | 5.08 |
| Wheelbase: | 111 | 9.25 | 2.82 |
| Front Bumper to Front Axle: | 42 | 3.50 | 1.07 |
| Front Bumper to Front of Front Well: | 26 | 2.17 | 0.66 |
| Front Bumper to Front of Hood: | 7 | 0.58 | 0.18 |
| Front Bumper to Base of Windshield: | 50 | 4.17 | 1.27 |
| Front Bumper to Top of Windshield: | 83 | 6.92 | 2.11 |
| Rear Bumper to Rear Axle: | 47 | 3.92 | 1.19 |
| Rear Bumper to Rear of Rear Well: | 33 | 2.75 | 0.84 |
| Rear Bumper to Rear of Trunk: | 9 | 0.75 | 0.23 |
| Rear Bumper to Base of Rear Window: | 26 | 2.17 | 0.66 |
| **Width Dimensions** | | | |
| Maximum Width: | 73 | 6.08 | 1.85 |
| Front Track: | 61 | 5.08 | 1.55 |
| Rear Track: | 61 | 5.08 | 1.55 |
| **Vertical Dimensions** | | | |
| Height: | 59 | 4.92 | 1.50 |
| Ground to - | | | |
| Front Bumper (Top) | 23 | 1.92 | 0.58 |
| Headlight - center | 28 | 2.33 | 0.71 |
| Hood - top front: | 30 | 2.50 | 0.76 |
| Base of Windshield | 38 | 3.17 | 0.97 |
| Rear Bumper - top: | 28 | 2.33 | 0.71 |
| Trunk - top rear: | 44 | 3.67 | 1.12 |
| Base of Rear Window: | 45 | 3.75 | 1.14 |

## 2006 CHEVROLET IMPALA MSP POLICE PACKAGE 4 DOOR SEDAN

| Interior Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 59 | 4.92 | 1.50 |
| Front Seat to Headliner | 39 | 3.25 | 0.99 |
| Front Leg Room - seatback to floor (max) | 42 | 3.50 | 1.07 |
| Rear Seat Shoulder Width | 59 | 4.92 | 1.50 |
| Rear Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (min) | 38 | 3.17 | 0.97 |

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

### Steering Data

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 456 | 38.00 | 11.58 |
| Steering Ratio: | :1 | | |
| Wheel Radius: | | | |
| Tire Size (OEM): | P225/60R16 | | |

### Acceleration & Braking Information

Brake Type: ALL DISC
ABS System: ALL WHEEL ABS

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 139.0 ft t = 3.2 sec a = -27.8 ft/sec² G-force = -0.86

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | 3.3 | sec | a = | 13.3 | ft/sec² | G-force = 0.41 |
| 0 to 60mph | t = | 8.7 | sec | a = | 10.1 | ft/sec² | G-force = 0.31 |
| 45 to 65mph | t = | 4.7 | sec | a = | 6.2 | ft/sec² | G-force = 0.20 |

Transmission Type: 4spd AUTOMATIC

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 2.5 mph

N.S.D.C = 2006 - 2006

## 2006 CHEVROLET IMPALA MSP POLICE PACKAGE 4 DOOR SEDAN

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.32 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 42.18 |
| Inches in front of rear axle | = | 68.82 |
| Inches from side of vehicle | = | 36.50 |
| Inches from ground | = | 23.16 |
| Inches from front corner | = | 91.75 |
| Inches from rear corner | = | 121.44 |
| Inches from front bumper | = | 84.18 |
| Inches from rear bumper | = | 115.82 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 2630.75 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 2538.75 | lb*ft*sec² |
| Roll Moment of Inertia | = | 520.50 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 45.0 | deg |
| Angle Front of Hood to Windshield Base | = | 10.5 | deg |
| Angle Front of Hood to Windshield Top | = | 19.6 | deg |
| Angle of Windshield | = | 29.9 | deg |
| Angle of Steering Tires at Max Turn | = | 27.9 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test

## #7488

## 2012 CHEVROLET IMPALA

Provided By

4N6XPRT StifCalcs®

Registered to:

TUCRRC
800 TUCKER DRIVE
TULSA  OK 74104-9700
12R-110829SC03101


4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

You entered: **2006 CHEVROLET IMPALA**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

| Year Range | Make | Model | Body Styles | Wheelbase |
|---|---|---|---|---|
| 2005 - 2009 | BUICK | LACROSSE | 4D | 111.7 |
| Remarks: | | | | |
| 2006 - 2008 | PONTIAC | GRAND PRIX | 2D, 4D | 110.5 |
| Remarks: | | | | |
| 2006 - 2007 | CHEVROLET | MONTE CARLO | 2D | 108 |
| Remarks: | | | | |
| 2006 - 2012 | CHEVROLET | IMPALA | 2D, 4D, SW | 110.5, 125 |
| Remarks: | | | | |



If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

## Test Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 7488 | NHTSA Test Reference Guide Version # | V5 | | | |
| Test Date | 2011-10-22 | Contract # | DTNH22-06-D-00024 | | | |
| Contract/Study Title | NEW CAR ASSESSMENT PROGRAM FRONTAL BARRIER IMPACT TEST | | | | | |
| Test Objective(s) | TO OBTAIN VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT INFORMATION | | | | | |
| Test Type | NEW CAR ASSESSMENT TEST | Configuration | VEHICLE INTO BARRIER | | | |
| Impact Angle | 0 | Side Impact Point | 0 | mm | 0.0 | inches |
| | | Offset Distance | 0 | mm | 0.0 | inches |
| | | Closing Speed | 56.2 | Km/Hr | 34.89 | MPH |
| Test Performer | CALSPAN | | | | | |
| Test Reference # | RUN2544 | | | | | |
| Test Track Surface | CONCRETE | Condition | DRY | | | |
| Ambient Temperature | 9 C | 48.2 F | Total Number of Curves | 137 | | |
| Data Recorder Type | DIGITAL DATA ACQUISITION | Data Link | UMBILICAL CABLE | | | |
| Test Commentary | TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0 | | | | | |

## Fixed Barrier Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Barrier Type | RIGID | Pole Barrier Diameter | 0 | mm | 0 | inches |
| Barrier Shape | LOAD CELL BARRIER | | | | | |
| Barrier Commentary | FRONTAL FLAT BARRIER WITH 36 LOADCELLS | | | | | |

## 2012 CHEVROLET IMPALA LEFT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 7488 | | |
| Vehicle # | 1 | Sex | MALE |
| Location | LEFT FRONT SEAT | Age | 0 |
| Position | CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 50 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | MFG: FIRST TECHNOLOGY SAFETY SYSTEMS: 064 | | |
| Occupant Modification | NO COMMENTS | | |
| Occupant Description | NO COMMENTS | | |
| Occupant Commentary | CNTRH2 =HEADREST | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 358 | mm | 14.1 | inches | Head Injury Criteria (HIC) | 223 | |
| WindShield | 683 | mm | 26.9 | inches | HIC Lower Time Interval (ms) | 66.7 | |
| Seatback | 0 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 81.7 | |
| Side Header | 223 | mm | 8.8 | inches | | | |
| Side Window | 380 | mm | 15.0 | inches | | | |

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 558 | mm | 22.0 | inches | Arm to Door | 128 | mm | 5.0 | inches |
| Steering Wheel | 311 | mm | 12.2 | inches | Hip to Door | 149 | mm | 5.9 | inches |
| Seatback | 0 | mm | 0.0 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 380 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 45.6 |

| | | | | |
|---|---|---|---|---|
| Lap Belt Peak Load | 7885 | Newtons | 1772.6 | pound Force |
| Shoulder Belt Peak Load | 3563 | Newtons | 801.0 | pound Force |

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

### Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 180 | mm | 7.1 | inches | Knees to Seatback | 0 | mm | 0.0 | inches |

| | | | | |
|---|---|---|---|---|
| Left Femur Peak Load | -208 | Newtons | -46.8 | pounds Force |
| Right Femur Peak Load | -963 | Newtons | -216.5 | pounds Force |

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

## 2012 CHEVROLET IMPALA LEFT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 7488 | | | | | |
| Vehicle # | 1 | Sex | MALE | | | |
| Location | LEFT FRONT SEAT | Age | 0 | | | |
| Position | CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | MFG: FIRST TECHNOLOGY SAFETY SYSTEMS: 064 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CNTRH2 =HEADREST |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | BELT - CONVENTIONAL MOUNT |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | BELT PRETENSIONER & LOAD LIMITER |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | STEERING WHEEL |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | FRONTAL AIRBAG |

## 2012 CHEVROLET IMPALA RIGHT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 7488 | | |
| Vehicle # | 1 | Sex | FEMALE |
| Location | RIGHT FRONT SEAT | Age | 0 |
| Position | FORWARD OF CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 5 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | MFG: FIRST TECHNOLOGY SAFETY SYSTEMS S/N:273 | | |
| Occupant Modification | NO COMMENTS | | |
| Occupant Description | NO COMMENTS | | |
| Occupant Commentary | CNTRH2 =HEADREST | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 290 | mm | 11.4 | inches | Head Injury Criteria (HIC) | 236 | |
| WindShield | 602 | mm | 23.7 | inches | HIC Lower Time Interval (ms) | 69 | |
| Seatback | 0 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 84 | |
| Side Header | 238 | mm | 9.4 | inches | | | |
| Side Window | 370 | mm | 14.6 | inches | | | |
| Neck to Seatback | 0 | mm | 0.0 | inches | | | |
| First Contact Region (Head) | AIR BAG | | | | | | |
| Second Contact Region (Head) | | | | | | | |

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 454 | mm | 17.9 | inches | Arm to Door | 73 | mm | 2.9 | inches |
| Steering Wheel | 0 | mm | 0.0 | inches | Hip to Door | 222 | mm | 8.7 | inches |
| Seatback | 0 | mm | 0.0 | inches | | | | | |
| Chest Severity Index | 287 | | | | Pelvic Peak Lateral Acceleration (g's) | 0 | | | |
| Thoracic Trauma Index | 0 | | | | Thorax Peak Acceleration (g's) | 36.5 | | | |
| Lap Belt Peak Load | 3503 | Newtons | 787.5 | pound Force | | | | | |
| Shoulder Belt Peak Load | 3469 | Newtons | 779.9 | pound Force | | | | | |
| First Contact Region (Chest/Abdomen) | AIR BAG | | | | | | | | |
| Second Contact Region (Chest/Abdomen) | NONE | | | | | | | | |

### Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 115 | mm | 4.5 | inches | Knees to Seatback | 0 | mm | 0.0 | inches |
| Left Femur Peak Load | -3105 | Newtons | -698.0 | pounds Force | | | | | |
| Right Femur Peak Load | -1406 | Newtons | -316.1 | pounds Force | | | | | |
| First Contact Region (Legs) | DASHPANEL | | | | | | | | |
| Second Contact Region (Legs) | | | | | | | | | |

## 2012 CHEVROLET IMPALA RIGHT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 7488 | | | | | |
| Vehicle # | 1 | Sex | FEMALE | | | |
| Location | RIGHT FRONT SEAT | Age | 0 | | | |
| Position | FORWARD OF CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 5 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | MFG: FIRST TECHNOLOGY SAFETY SYSTEMS S/N:273 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CNTRH2 =HEADREST |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | BELT - CONVENTIONAL MOUNT |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | BELT PRETENSIONER & LOAD LIMITER |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | DASH PANEL - TOP |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | FRONTAL AIRBAG |

# Vehicle 1 2012 CHEVROLET IMPALA

| | | | |
|---|---|---|---|
| Test # | 7488 | | |
| VIN | 2G1WA5E37C1117437 | NHTSA Test Vehicle Number | 1 |
| Year | 2012 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CHEVROLET | Post-test Steering Column Shear Capsule Seperation | NO SEPARATION |
| Model | IMPALA | Steering Column Collapse Mechanism | NONE |
| Body | FOUR DOOR SEDAN | | |
| Engine | V6 TRANSVERSE FRONT | | |
| Displacement | 3.6 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NONE | | |
| Vehicle Commentary | TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vehicle Length | 5094 | mm | 200.6 | inches | CG behind Front Axle | 1195 | mm | 47.0 | inches |
| Vehicle Width | 1843 | mm | 72.6 | inches | Center of Damage to CG Axis | 153 | mm | 6.0 | inches |
| Vehicle Wheelbase | 2808 | mm | 110.6 | inches | Total Length of Indentation | 1399 | mm | 55.1 | inches |
| Vehicle Test Weight | 1851 | KG | 4080 | pounds | Maximum Static Crush Depth | 674 | mm | 26.5 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 34.9 | mph |

Vehicle Damage Index: 12FDEW3

Principal Direction of Force: 0

## Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

| | | | | |
|---|---|---|---|---|
| DPD 1 | 479 | mm | 18.9 | inches |
| DPD 2 | 629 | mm | 24.8 | inches |
| DPD 3 | 666 | mm | 26.2 | inches |
| DPD 4 | 651 | mm | 25.6 | inches |
| DPD 5 | 599 | mm | 23.6 | inches |
| DPD 6 | 492 | mm | 19.4 | inches |

## Crush from Pre & Post Test Damage Measurements

| | Pre-Test | | Post-Test | | Crush Depth | |
|---|---|---|---|---|---|---|
| Left Bumper Corner | 197.4 | inches | 173.0 | inches | 24.4 | inches |
| | 5014 | mm | 4394 | mm | 620 | mm |
| Centerline | 200.6 | inches | 174.1 | inches | 26.5 | inches |
| | 5094 | mm | 4421 | mm | 673 | mm |
| Right Bumper Corner | 197.6 | inches | 174.5 | inches | 23.0 | inches |
| | 5018 | mm | 4433 | mm | 585 | mm |

| Bumper Engagement (Inline Impact Only) | Sill Engagement (Side Impact Only) | A-pillar Engagement (Side Impact Only) |
|---|---|---|
| 0.0 | NOT APPLICABLE | 0.0 |

| Moving Test Cart Angle | Moving Test Cart/Vehicle Crabbed Angle | Vehicle Orientation on Cart Moving Test Cart |
|---|---|---|
| DIRECT ENGAGEMENT | 0.0 | NOT APPLICABLE |
| *Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground* | *Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle* | *Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion* |

## Vehicle 1 2012 CHEVROLET IMPALA

| | | | |
|---|---|---|---|
| Test # | 7488 | | |
| VIN | 2G1WA5E37C1117437 | NHTSA Test Vehicle Number | 1 |
| Year | 2012 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CHEVROLET | Post-test Steering Column Shear Capsule Seperation | NO SEPARATION |
| Model | IMPALA | Steering Column Collapse Mechanism | NONE |
| Body | FOUR DOOR SEDAN | | |
| Engine | V6 TRANSVERSE FRONT | | |
| Displacement | 3.6 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NONE | | |
| Vehicle Commentary | TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 5094 | mm | 200.6 | inches | CG behind Front Axle | 1195 | mm | 47.0 | inches |
| Vehicle Width | 1843 | mm | 72.6 | inches | Center of Damage to CG Axis | 153 | mm | 6.0 | inches |
| Vehicle Wheelbase | 2808 | mm | 110.6 | inches | Total Length of Indentation | 1399 | mm | 55.1 | inches |
| Vehicle Test Weight | 1851 | KG | 4080 | pounds | Maximum Static Crush Depth | 674 | mm | 26.5 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 34.9 | mph |

Vehicle Damage Index 12FDEW3 Principal Direction of Force 0

## Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

| Left Side | | | | Centerline | | | | Right Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-Test | | Post-Test | | Pre-Test | | Post-Test | | Pre-Test | | Post-Test | |
| mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches |
| | | | | Length of Vehicle at Centerline | | | | | | | |
| | | | | 5094 | 200.6 | 4421 | 174.1 | | | | |
| | | | | Engine Block | | | | | | | |
| | | | | 401 | 15.8 | 392 | 15.4 | | | | |
| 5014 | 197.4 | 4394 | 173.0 | Front Bumper Corner | | | | 5018 | 197.6 | 4433 | 174.5 |
| | | | | Front of Engine | | | | | | | |
| | | | | 4430 | 174.4 | 4136 | 162.8 | | | | |
| 3902 | 153.6 | 3844 | 151.3 | Firewall | | | | 3876 | 152.6 | 3826 | 150.6 |
| | | | | 3905 | 153.7 | 0 | 0.0 | | | | |
| 3501 | 137.8 | 3503 | 137.9 | Upper Leading Edge of Door | | | | 3504 | 138.0 | 3500 | 137.8 |
| 3492 | 137.5 | 3493 | 137.5 | Lower Leading Edge of Door | | | | 3494 | 137.6 | 3488 | 137.3 |
| 3491 | 137.4 | 3489 | 137.4 | Bottom of 'A' Post | | | | 3491 | 137.4 | 3488 | 137.3 |
| 2408 | 94.8 | 2407 | 94.8 | Upper Trailing Edge of Door | | | | 2409 | 94.8 | 2406 | 94.7 |
| 2414 | 95.0 | 2415 | 95.1 | Lower Trailing Edge of Door | | | | 2419 | 95.2 | 2411 | 94.9 |
| | | | | Steering Column | | | | | | | |
| | | | | 3000 | 118.1 | 2981 | 117.4 | | | | |
| | | | | Center of Seering Column to 'A' Post (Horizontal) | | | | | | | |
| | | | | 281 | 11.1 | 249 | 9.8 | | | | |
| | | | | Center of Steering Column to Headliner (Vertical) | | | | | | | |
| | | | | 437 | 17.2 | 401 | 15.8 | | | | |

# 2012 CHEVROLET IMPALA

NHTSA Crash Test - #7488 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 4080 pounds
Vehicle Closing Speed = 34.9 mph
Test Crush Length = 72.6 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 24.4 | 26.5 | 23.0 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 23.0 inches | | | | | 103.7 |
| Using a Rated No Damage Speed of | 2.5mph | 158.7 | 89.4 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 292.9 | 76.1 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 402.6 | 63.9 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 487.8 | 52.8 | 2253.8 | |
| Average Crush = 25.1 inches | | | | | 87.1 |
| Using a Rated No Damage Speed of | 2.5mph | 145.4 | 75.1 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 268.4 | 63.9 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 368.9 | 53.7 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 447.0 | 44.3 | 2253.8 | |
| Maximum Crush = 26.5 inches | | | | | 78.1 |
| Using a Rated No Damage Speed of | 2.5mph | 137.7 | 67.3 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 254.2 | 57.3 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 349.4 | 48.2 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 423.4 | 39.8 | 2253.8 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 26.5 | 37.3 | 2.4 | 6.5 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.4**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2012 CHEVROLET IMPALA

NHTSA Crash Test - #7488 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 4080 pounds
Vehicle Closing Speed = 34.9 mph
Test Crush Length = 55.1 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 24.4 | 26.5 | 23.0 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 23.0 inches | | | | | 136.6 |
| Using a Rated No Damage Speed of | 2.5mph | 209.1 | 117.8 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 385.9 | 100.3 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 530.4 | 84.2 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 642.6 | 69.5 | 2969.1 | |
| Average Crush = 25.1 inches | | | | | 114.7 |
| Using a Rated No Damage Speed of | 2.5mph | 191.6 | 98.9 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 353.6 | 84.2 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 486.0 | 70.7 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 588.9 | 58.4 | 2969.1 | |
| Maximum Crush = 26.5 inches | | | | | 102.9 |
| Using a Rated No Damage Speed of | 2.5mph | 181.5 | 88.7 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 334.9 | 75.5 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 460.3 | 63.4 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 557.7 | 52.4 | 2969.1 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 26.5 | 37.3 | 2.4 | 6.5 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.4**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2012 CHEVROLET IMPALA

NHTSA Crash Test - #7488 - Front Impact

Damage Profile Distances - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 4080 pounds
Vehicle Closing Speed = 34.9 MPH
Test Crush Length = 72.6 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | 18.9 | 24.8 | 26.2 | 25.6 | 23.6 | 19.4 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 18.9 inches | | | | | 153.6 |
| Using a Rated No Damage Speed of | 2.5mph | 193.1 | 132.4 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 356.4 | 112.7 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 489.9 | 94.7 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 593.6 | 78.2 | 2253.8 | |
| Average Crush = 23.9 inches | | | | | 96.1 |
| Using a Rated No Damage Speed of | 2.5mph | 152.7 | 82.8 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 281.9 | 70.5 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 387.4 | 59.2 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 469.4 | 48.9 | 1562.8 | |
| Maximum Crush = 26.2 inches | | | | | 79.9 |
| Using a Rated No Damage Speed of | 2.5mph | 139.3 | 68.9 | 140.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 257.1 | 58.7 | 563.5 | |
| Using a Rated No Damage Speed of | 7.5mph | 353.4 | 49.3 | 1267.8 | |
| Using a Rated No Damage Speed of | 10.0mph | 428.2 | 40.7 | 2253.8 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 26.2 | 37.1 | 2.2 | 5.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.6**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2012 CHEVROLET IMPALA

NHTSA Crash Test - #7488 - Front Impact

Damage Profile Distances - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 4080 pounds
Vehicle Closing Speed = 34.9 MPH
Test Crush Length = 55.1 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | 18.9 | 24.8 | 26.2 | 25.6 | 23.6 | 19.4 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 18.9 inches | | | | | 202.4 |
| Using a Rated No Damage Speed of | 2.5mph | 254.4 | 174.4 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 469.6 | 148.5 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 645.4 | 124.7 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 782.0 | 103.0 | 2969.1 | |
| Average Crush = 23.9 inches | | | | | 126.5 |
| Using a Rated No Damage Speed of | 2.5mph | 201.2 | 109.1 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 371.3 | 92.9 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 510.4 | 78.0 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 618.4 | 64.4 | 2058.8 | |
| Maximum Crush = 26.2 inches | | | | | 105.3 |
| Using a Rated No Damage Speed of | 2.5mph | 183.5 | 90.8 | 185.6 | |
| Using a Rated No Damage Speed of | 5.0mph | 338.7 | 77.3 | 742.3 | |
| Using a Rated No Damage Speed of | 7.5mph | 465.6 | 64.9 | 1670.1 | |
| Using a Rated No Damage Speed of | 10.0mph | 564.1 | 53.6 | 2969.1 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 26.2 | 37.1 | 2.2 | 5.9 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.6**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# Available Test Results
## Front Impact Test Summary

Report Filter Settings

Year Range: 2006 - 2012
Make: CHEVROLET
Model: IMPALA

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 5578 | 2006 CHEVROLET MONTE CARLO TWO DOOR C... | 5.0 | 26.3 | 35.0 | 250.4 | 57.1 | 549.0 | 77.7 | 18.6 |
| 7488 | 2012 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 23.9 | 34.9 | 282.3 | 70.7 | 563.5 | 96.4 | 20.4 |
| 5468 | 2006 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 23.5 | 35.1 | 283.3 | 72.5 | 553.6 | 98.6 | 20.9 |
| 5547 | 2006 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 23.8 | 35.2 | 286.3 | 72.4 | 565.9 | 98.5 | 20.7 |
| 5274 | 2005 BUICK LACROSSE FOUR DOOR SEDAN | 5.0 | 23.4 | 35.1 | 287.8 | 74.2 | 558.3 | 100.9 | 21.1 |
| 6052 | 2007 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 12.4 | 24.7 | 382.5 | 121.6 | 601.5 | 191.1 | 19.7 |
| 7496 | 2012 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 6.5 | 20.0 | 494.8 | 229.5 | 533.3 | 407.7 | 24.8 |
| | **Average (AVG)** | | | | **323.9** | **99.7** | **560.7** | **153.0** | **20.9** |
| | **Minimum (MIN)** | | | | **250.4** | **57.1** | **533.3** | **77.7** | **18.6** |
| | **Maximum (MAX)** | | | | **494.8** | **229.5** | **601.5** | **407.7** | **24.8** |
| | **Standard Deviation (STDev-sample)** | | | | **85.8** | **60.7** | **21.0** | **118.2** | **1.9** |
| | **Number of Tests (n)** | | | **7** | | | | | |

# Available Test Results
## Front Impact Test Summary

Report Filter Settings

Year Range: 2006 - 2012
Make: CHEVROLET
Model: IMPALA

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 7496 | 2012 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 15.4 | 20.0 | 207.6 | 40.4 | 533.3 | 71.8 | 10.4 |
| 5578 | 2006 CHEVROLET MONTE CARLO TWO DOOR C... | 5.0 | 28.0 | 35.0 | 235.7 | 50.6 | 549.0 | 68.9 | 17.5 |
| 5547 | 2006 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 28.3 | 35.2 | 240.8 | 51.2 | 565.9 | 69.6 | 17.4 |
| 5468 | 2006 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 26.7 | 35.1 | 249.3 | 56.1 | 553.6 | 76.3 | 18.4 |
| 7488 | 2012 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 26.5 | 34.9 | 253.9 | 57.2 | 563.5 | 77.9 | 18.4 |
| 5274 | 2005 BUICK LACROSSE FOUR DOOR SEDAN | 5.0 | 24.9 | 35.1 | 269.7 | 65.2 | 558.3 | 88.6 | 19.8 |
| 6052 | 2007 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 13.9 | 24.7 | 340.6 | 96.4 | 601.5 | 151.5 | 17.6 |
| | **Average (AVG)** | | | | **256.8** | **59.6** | **560.7** | **86.4** | **17.1** |
| | **Minimum (MIN)** | | | | **207.6** | **40.4** | **533.3** | **68.9** | **10.4** |
| | **Maximum (MAX)** | | | | **340.6** | **96.4** | **601.5** | **151.5** | **19.8** |
| | **Standard Deviation (STDev-sample)** | | | | **41.6** | **17.9** | **21.0** | **29.5** | **3.1** |
| | **Number of Tests (n)** | | | **7** | | | | | |

# Expert VIN DeCoder®



Version Number 3.2.0.1

DeCoded VIN: 1G6EL12Y0SU601252

| | |
|---|---|
| Model: | 1995 Cadillac Eldorado 2 Door Coupe |
| Engine Size: | 4.6L/ 279cu.in. |
| Engine Description: | V8 cylinder with Dual Overhead Cam (DOHC) |
| Horse Power: | 275 @ 5600 rpm |
| Torque: | 300 lb-ft at 4000 rpm |
| Injection System: | Multiport Fuel Injection(MFI) |
| PSI: | 40-50 psi |
| Ignition: | Electronic |
| Manufacturer: | Buick, Oldsmobile, Cadillac |
| Assembly Plant: | Hamtramck, MI |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/Active (Manual) Seatbelts + Driver & Passenger Air Bags |

The First through Third characters (1G6) indicate a Cadillac Car made in the U.S.A.

The Fourth and Fifth characters (EL) indicate an Eldorado

The Sixth character (1) indicate a 2 Door Coupe

The Seventh character (2) indicate Active (Manual) Seatbelts + Driver & Passenger Air Bags

The Eighth character (Y) indicate the OEM engine: 4.6L/ 279cu.in., V8, DOHC

The Ninth character (the check digit) is entered as 0.
The VIN appears Valid, the calculated value is 0.

The Tenth character (S) indicate the model year 1995

The Eleventh character (U) indicate the vehicle was made in the assembly plant in Hamtramck, MI

The Twelfth through Seventeenth characters (601252) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/18/2013

## 1995 CADILLAC ELDORADO 2 DOOR COUPE

| | | | | |
|---|---|---|---|---|
| Curb Weight: | 3773 | lbs. | 1711 | kg. |
| Curb Weight Distribution - Front: | 64 | % Rear: | 36 | % |
| Gross Vehicle Weight Rating: | 4774 | lbs. | 2165 | kg. |
| Number of Tires on Vehicle: | 4 | | | |
| Drive Wheels: | FRONT | | | |

| **Horizontal Dimensions** | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 202 | 16.83 | 5.13 |
| Wheelbase: | 108 | 9.00 | 2.74 |
| Front Bumper to Front Axle: | 46 | 3.83 | 1.17 |
| Front Bumper to Front of Front Well: | 31 | 2.58 | 0.79 |
| Front Bumper to Front of Hood: | 4 | 0.33 | 0.10 |
| Front Bumper to Base of Windshield: | 59 | 4.92 | 1.50 |
| Front Bumper to Top of Windshield: | 90 | 7.50 | 2.29 |
| Rear Bumper to Rear Axle: | 48 | 4.00 | 1.22 |
| Rear Bumper to Rear of Rear Well: | 32 | 2.67 | 0.81 |
| Rear Bumper to Rear of Trunk: | 4 | 0.33 | 0.10 |
| Rear Bumper to Base of Rear Window: | 28 | 2.33 | 0.71 |
| **Width Dimensions** | | | |
| Maximum Width: | 76 | 6.33 | 1.93 |
| Front Track: | 61 | 5.08 | 1.55 |
| Rear Track: | 61 | 5.08 | 1.55 |
| **Vertical Dimensions** | | | |
| Height: | 54 | 4.50 | 1.37 |
| Ground to - | | | |
| Front Bumper (Top) | 22 | 1.83 | 0.56 |
| Headlight - center | 26 | 2.17 | 0.66 |
| Hood - top front: | 29 | 2.42 | 0.74 |
| Base of Windshield | 37 | 3.08 | 0.94 |
| Rear Bumper - top: | 24 | 2.00 | 0.61 |
| Trunk - top rear: | 39 | 3.25 | 0.99 |
| Base of Rear Window: | 42 | 3.50 | 1.07 |

## 1995 CADILLAC ELDORADO 2 DOOR COUPE

| Interior Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 58 | 4.83 | 1.47 |
| Front Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (max) | 43 | 3.58 | 1.09 |
| Rear Seat Shoulder Width | 58 | 4.83 | 1.47 |
| Rear Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (min) | 36 | 3.00 | 0.91 |

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

### Steering Data

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 480 | 40.00 | 12.19 |
| Steering Ratio: | 15.60:1 | | |
| Wheel Radius: | 13 | 1.08 | 0.33 |
| Tire Size (OEM): | P225/60R16 | | |

### Acceleration & Braking Information

Brake Type: ALL DISC
ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 142.0 ft t = 3.2 sec a = -27.2 ft/sec² G-force = -0.85

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | 2.5 | sec | a = | 17.6 | ft/sec² | G-force = 0.55 |
| 0 to 60mph | t = | 6.6 | sec | a = | 13.3 | ft/sec² | G-force = 0.41 |
| 45 to 65mph | t = | 3.1 | sec | a = | 9.5 | ft/sec² | G-force = 0.30 |

Transmission Type: AUTOMATIC

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 2003

## 1995 CADILLAC ELDORADO 2 DOOR COUPE

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.38 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 38.88 |
| Inches in front of rear axle | = | 69.12 |
| Inches from side of vehicle | = | 38.00 |
| Inches from ground | = | 22.06 |
| Inches from front corner | = | 93.00 |
| Inches from rear corner | = | 123.13 |
| Inches from front bumper | = | 84.88 |
| Inches from rear bumper | = | 117.12 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 2680.19 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 2586.27 | lb*ft*sec² |
| Roll Moment of Inertia | = | 529.14 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 60.3 | deg |
| Angle Front of Hood to Windshield Base | = | 8.3 | deg |
| Angle Front of Hood to Windshield Top | = | 15.0 | deg |
| Angle of Windshield | = | 25.8 | deg |
| Angle of Steering Tires at Max Turn | = | 25.8 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test

## #2523

## 1997 CADILLAC DE VILLE

Provided By

4N6XPRT StifCalcs®

Registered to:

TUCRRC
800 TUCKER DRIVE
TULSA  OK 74104-9700
12R-110829SC03101


4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

You entered: **1995 CADILLAC ELDORADO**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

| Year Range | Make | Model | Body Styles | Wheelbase |
|---|---|---|---|---|
| 1992 - 1997 | CADILLAC | SEVILLE | 4D | 112.2 |
| Remarks: | | | | |
| 1992 - 2002 | CADILLAC | ELDORADO | 2D | 108 |
| Remarks: SAME OLD CAR | | | | |
| 1994 - 1999 | CADILLAC | DEVILLE | 2D, 4D | 115.3 |
| Remarks: (STRETCHED WB) | | | | |



If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

## Test Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2523 | NHTSA Test Reference Guide Version # | V4 | | | |
| Test Date | 1997-03-06 | Contract # | DTNH22-93-C-02047 | | | |
| Contract/Study Title | NCAP HIGH SPEED LATERAL - 1997 CADILLAC DEVILLE (NHTSA NO: MV0112) | | | | | |
| Test Objective(s) | VEHICLE CRASHWORTHINESS AND OCCUPANT PROTECTION | | | | | |
| Test Type | NEW CAR ASSESSMENT TEST | Configuration | IMPACTOR INTO VEHICLE | | | |
| Impact Angle | 270 | Side Impact Point | N/A | mm | N/A | inches |
| | | Offset Distance | 0 | mm | 0.0 | inches |
| | | Closing Speed | 62.3 | Km/Hr | 38.71 | MPH |
| Test Performer | MGA RESEARCH | | | | | |
| Test Reference # | BT97030601 | | | | | |
| Test Track Surface | CONCRETE | Condition | DRY | | | |
| Ambient Temperature | 21 C | 69.8 F | Total Number of Curves | 60 | | |
| Data Recorder Type | OTHER | Data Link | UMBILICAL CABLE | | | |
| Test Commentary | ANALOG TO DIGITAL RECORDING WITH DAS 16F METRABYTE CARD | | | | | |

## Fixed Barrier Information

| | | | | | |
|---|---|---|---|---|---|
| Barrier Type | | Pole Barrier Diameter | | mm | inches |
| Barrier Shape | | | | | |
| Barrier Commentary | | | | | |

# 1997 CADILLAC DE VILLE LEFT FRONT SEAT OCCUPANT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Test # | 2523 | | | | | | |
| Vehicle # | 2 | | | Sex | MALE | | |
| Location | LEFT FRONT SEAT | | | Age | 99 | | |
| Position | CENTER POSITION | | | Height | 999 | mm | 39.3 inches |
| Type | NHTSA SIDE IMPACT DUMMY | | | Weight | 999.0 | kg | 2202 pounds |
| Size | 50 PERCENTILE | | | | | | |

| | |
|---|---|
| Calibration Method | HSRI |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 269 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CHEST AND LEG CONTACTED THE LEFT DOOR |

## Head

Head to -

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Windshielder Header | 357 | mm | 14.1 | inches | Head Injury Criteria (HIC) | 261 | | |
| WindShield | 609 | mm | 24.0 | inches | HIC Lower Time Interval (ms) | 48 | | |
| Seatback | 9999 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 84 | | |
| Side Header | 216 | mm | 8.5 | inches | | | | |
| Side Window | 366 | mm | 14.4 | inches | | | | |

Neck to Seatback 9999 mm 0.0 inches

| | |
|---|---|
| First Contact Region (Head) | SEAT BACK |
| Second Contact Region (Head) | |

## Chest

Chest to -

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dash | 487 | mm | 19.2 | inches | Arm to Door | 159 | mm | 6.3 inches |
| Steering Wheel | 281 | mm | 11.1 | inches | Hip to Door | 149 | mm | 5.9 inches |
| Seatback | 9999 | mm | 0.0 | inches | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 9999 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 999.9 |

Lap Belt Peak Load 9999 Newtons 2247.9 pound Force

Shoulder Belt Peak Load 9999 Newtons 2247.9 pound Force

| | |
|---|---|
| First Contact Region (Chest/Abdomen) | AIR BAG |
| Second Contact Region (Chest/Abdomen) | OTHER |

## Legs

Knees to Dash 150 mm 5.9 inches Knees to Seatback 9999 mm 0.0 inches

Left Femur Peak Load -9999 Newtons -2247.9 pounds Force

Right Femur Peak Load -9999 Newtons -2247.9 pounds Force

| | |
|---|---|
| First Contact Region (Legs) | OTHER |
| Second Contact Region (Legs) | |

## 1997 CADILLAC DE VILLE LEFT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2523 | | | | | |
| Vehicle # | 2 | Sex | MALE | | | |
| Location | LEFT FRONT SEAT | Age | 99 | | | |
| Position | CENTER POSITION | Height | 999 | mm | 39.3 | inches |
| Type | NHTSA SIDE IMPACT DUMMY | Weight | 999.0 | kg | 2202 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HSRI |
| Occupant Manufacturer | FIRST TECHNOLOGY: S/N 269 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CHEST AND LEG CONTACTED THE LEFT DOOR |

### Restraints

| | |
|---|---|
| Restraint # 1 | FRONTAL AIRBAG |
| Mounted | |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | 3 POINT BELT |
| Mounted | |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |

# 1997 CADILLAC DE VILLE LEFT REAR SEAT OCCUPANT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Test # | 2523 | | | | | | |
| Vehicle # | 2 | | | Sex | MALE | | |
| Location | LEFT REAR SEAT | | | Age | 99 | | |
| Position | NOT APLLICABLE | | | Height | 999 | mm | 39.3 inches |
| Type | NHTSA SIDE IMPACT DUMMY | | | Weight | 999.0 | kg | 2202 pounds |
| Size | 50 PERCENTILE | | | | | | |

| | |
|---|---|
| Calibration Method | HSRI |
| Occupant Manufacturer | FIRST TECHNOLOGIES: S/N 272 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CHEST AND LEG CONTACTED THE LEFT DOOR |

## Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 9999 | mm | 0.0 | inches | Head Injury Criteria (HIC) | 580 | |
| WindShield | 9999 | mm | 0.0 | inches | HIC Lower Time Interval (ms) | 70 | |
| Seatback | 658 | mm | 25.9 | inches | HIC Upper Time Interval (ms) | 92 | |
| Side Header | 216 | mm | 8.5 | inches | | | |
| Side Window | 356 | mm | 14.0 | inches | | | |

Neck to Seatback 9999 mm 0.0 inches

| | |
|---|---|
| First Contact Region (Head) | C PILLAR |
| Second Contact Region (Head) | |

## Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 9999 | mm | 0.0 | inches | Arm to Door | 144 | mm | 5.7 | inches |
| Steering Wheel | 9999 | mm | 0.0 | inches | Hip to Door | 177 | mm | 7.0 | inches |
| Seatback | 595 | mm | 23.4 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 9999 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 999.9 |

Lap Belt Peak Load 9999 Newtons 2247.9 pound Force

Shoulder Belt Peak Load 9999 Newtons 2247.9 pound Force

| | |
|---|---|
| First Contact Region (Chest/Abdomen) | OTHER |
| Second Contact Region (Chest/Abdomen) | NONE |

## Legs

Knees to Dash 9999 mm 0.0 inches Knees to Seatback 332 mm 13.1 inches

Left Femur Peak Load -9999 Newtons -2247.9 pounds Force

Right Femur Peak Load -9999 Newtons -2247.9 pounds Force

| | |
|---|---|
| First Contact Region (Legs) | OTHER |
| Second Contact Region (Legs) | |

## 1997 CADILLAC DE VILLE LEFT REAR SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 2523 | | | | | |
| Vehicle # | 2 | Sex | MALE | | | |
| Location | LEFT REAR SEAT | Age | 99 | | | |
| Position | NOT APLLICABLE | Height | 999 | mm | 39.3 | inches |
| Type | NHTSA SIDE IMPACT DUMMY | Weight | 999.0 | kg | 2202 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HSRI |
| Occupant Manufacturer | FIRST TECHNOLOGIES: S/N 272 |
| Occupant Modification | NO COMMENTS |
| Occupant Description | NO COMMENTS |
| Occupant Commentary | CHEST AND LEG CONTACTED THE LEFT DOOR |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | NONE |
| Mounted | |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |

# Vehicle 1 0 NHTSA DEFORMABLE IMPACTOR

| | | | |
|---|---|---|---|
| Test # | 2523 | | |
| VIN | | NHTSA Test Vehicle Number | 1 |
| Year | 0 | Vehicle Modification Indicator | RESEARCH VEHICLE |
| Make | NHTSA | Post-test Steering Column Shear Capsule Seperation | NOT APPLICABLE |
| Model | DEFORMABLE IMPACTOR | Steering Column Collapse Mechanism | NOT APPLICABLE |
| Body | NOT APPLICABLE | | |
| Engine | NOT APPLICABLE | | |
| Displacement | 0 Liter | Transmission | NOT APPLICABLE |
| Vehicle Modification(s) Description | FMVSS 214 DEFORMABLE BARRIER AND IMPACTOR | | |
| Vehicle Commentary | FMVSS 214 MOVING BARRIER | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 4115 | mm | 162.0 | inches | CG behind Front Axle | 1102 | mm | 43.4 | inches |
| Vehicle Width | 1252 | mm | 49.3 | inches | Center of Damage to CG Axis | 9999 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2591 | mm | 102.0 | inches | Total Length of Indentation | 99999 | mm | 0.0 | inches |
| Vehicle Test Weight | 1356 | KG | 2989 | pounds | Maximum Static Crush Depth | 0 | mm | 0.0 | inches |
| | | | | | Pre-Impact Speed | 62 | kph | 38.7 | mph |

Vehicle Damage Index: 9999999

Principal Direction of Force: 0

## Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

| | | | | |
|---|---|---|---|---|
| DPD 1 | 0 | mm | 0.0 | inches |
| DPD 2 | 0 | mm | 0.0 | inches |
| DPD 3 | 0 | mm | 0.0 | inches |
| DPD 4 | 0 | mm | 0.0 | inches |
| DPD 5 | 0 | mm | 0.0 | inches |
| DPD 6 | 0 | mm | 0.0 | inches |

## Crush from Pre & Post Test Damage Measurements

| | Pre-Test | | Post-Test | | Crush Depth | |
|---|---|---|---|---|---|---|
| Left Bumper Corner | 0.0 | inches | 0.0 | inches | 0.0 | inches |
| | 0 | mm | 0 | mm | 0 | mm |
| Centerline | 0.0 | inches | 0.0 | inches | 0.0 | inches |
| | 0 | mm | 0 | mm | 0 | mm |
| Right Bumper Corner | 0.0 | inches | 0.0 | inches | 0.0 | inches |
| | 0 | mm | 0 | mm | 0 | mm |

**Bumper Engagement (Inline Impact Only)**: 27.0

**Sill Engagement (Side Impact Only)**: DIRECT ENGAGEMENT

**A-pillar Engagement (Side Impact Only)**: 999.0

**Moving Test Cart Angle**: NOT APPLICABLE

*Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground*

**Moving Test Cart/Vehicle Crabbed Angle**: 27.0

*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*

**Vehicle Orientation on Cart Moving Test Cart**: DIRECT ENGAGEMENT

*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

## Vehicle 1 0 NHTSA DEFORMABLE IMPACTOR

| | | | |
|---|---|---|---|
| Test # | 2523 | | |
| VIN | | NHTSA Test Vehicle Number | 1 |
| Year | 0 | Vehicle Modification Indicator | RESEARCH VEHICLE |
| Make | NHTSA | Post-test Steering Column Shear Capsule Seperation | NOT APPLICABLE |
| Model | DEFORMABLE IMPACTOR | Steering Column Collapse Mechanism | NOT APPLICABLE |
| Body | NOT APPLICABLE | | |
| Engine | NOT APPLICABLE | | |
| Displacement | 0 Liter | Transmission | NOT APPLICABLE |
| Vehicle Modification(s) Description | FMVSS 214 DEFORMABLE BARRIER AND IMPACTOR | | |
| Vehicle Commentary | FMVSS 214 MOVING BARRIER | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 4115 | mm | 162.0 | inches | CG behind Front Axle | 1102 | mm | 43.4 | inches |
| Vehicle Width | 1252 | mm | 49.3 | inches | Center of Damage to CG Axis | 9999 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2591 | mm | 102.0 | inches | Total Length of Indentation | 99999 | mm | 0.0 | inches |
| Vehicle Test Weight | 1356 | KG | 2989 | pounds | Maximum Static Crush Depth | 0 | mm | 0.0 | inches |
| | | | | | Pre-Impact Speed | 62 | kph | 38.7 | mph |

Vehicle Damage Index 9999999 Principal Direction of Force 0

## Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

| Left Side | | | | Centerline | | | | Right Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-Test | | Post-Test | | Pre-Test | | Post-Test | | Pre-Test | | Post-Test | |
| mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches |
| | | | | Length of Vehicle at Centerline | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| | | | | Engine Block | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 0 | 0.0 | 0 | 0.0 | Front Bumper Corner | | | | 0 | 0.0 | 0 | 0.0 |
| | | | | Front of Engine | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 0 | 0.0 | 0 | 0.0 | Firewall | | | | 0 | 0.0 | 0 | 0.0 |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 0 | 0.0 | 0 | 0.0 | Upper Leading Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Lower Leading Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Bottom of 'A' Post | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Upper Trailing Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Lower Trailing Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| | | | | Steering Column | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| | | | | Center of Seering Column to 'A' Post (Horizontal) | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| | | | | Center of Steering Column to Headliner (Vertical) | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |

# Vehicle 2 1997 CADILLAC DE VILLE

| | | | |
|---|---|---|---|
| Test # | 2523 | | |
| VIN | 1G6KD54Y9VU249670 | NHTSA Test Vehicle Number | 2 |
| Year | 1997 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CADILLAC | Post-test Steering Column Shear Capsule Seperation | NOT APPLICABLE |
| Model | DE VILLE | Steering Column Collapse Mechanism | UNKNOWN |
| Body | FOUR DOOR SEDAN | | |
| Engine | OTHER | | |
| Displacement | 4.6 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NO COMMENTS | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vehicle Length | 5301 | mm | 208.7 | inches | CG behind Front Axle | 1239 | mm | 48.8 | inches |
| Vehicle Width | 1937 | mm | 76.3 | inches | Center of Damage to CG Axis | -394 | mm | -15.5 | inches |
| Vehicle Wheelbase | 2901 | mm | 114.2 | inches | Total Length of Indentation | 4950 | mm | 194.9 | inches |
| Vehicle Test Weight | 2081 | KG | 4587 | pounds | Maximum Static Crush Depth | 480 | mm | 18.9 | inches |
| | | | | | Pre-Impact Speed | 0 | kph | 0.0 | mph |

Vehicle Damage Index: 09LPAW7

Principal Direction of Force: 270

## Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

| | | | | |
|---|---|---|---|---|
| DPD 1 | 23 | mm | 0.9 | inches |
| DPD 2 | 51 | mm | 2.0 | inches |
| DPD 3 | 427 | mm | 16.8 | inches |
| DPD 4 | 437 | mm | 17.2 | inches |
| DPD 5 | 61 | mm | 2.4 | inches |
| DPD 6 | 17 | mm | 0.7 | inches |

## Crush from Pre & Post Test Damage Measurements

| | Pre-Test | | Post-Test | | Crush Depth | |
|---|---|---|---|---|---|---|
| Left Bumper Corner | 198.8 | inches | 195.6 | inches | 3.3 | inches |
| | 5050 | mm | 4967 | mm | 83 | mm |
| Centerline | 208.7 | inches | 207.2 | inches | 1.5 | inches |
| | 5301 | mm | 5263 | mm | 38 | mm |
| Right Bumper Corner | 199.0 | inches | 199.1 | inches | -0.1 | inches |
| | 5055 | mm | 5057 | mm | -2 | mm |

**Bumper Engagement (Inline Impact Only):** 27.0

**Sill Engagement (Side Impact Only):** DIRECT ENGAGEMENT

**A-pillar Engagement (Side Impact Only):** 90.0

**Moving Test Cart Angle:** NOT APPLICABLE

*Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground*

**Moving Test Cart/Vehicle Crabbed Angle:** 27.0

*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*

**Vehicle Orientation on Cart Moving Test Cart:** DIRECT ENGAGEMENT

*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

## Vehicle 2 1997 CADILLAC DE VILLE

| | | | |
|---|---|---|---|
| Test # | 2523 | | |
| VIN | 1G6KD54Y9VU249670 | NHTSA Test Vehicle Number | 2 |
| Year | 1997 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | CADILLAC | Post-test Steering Column Shear Capsule Seperation | NOT APPLICABLE |
| Model | DE VILLE | Steering Column Collapse Mechanism | UNKNOWN |
| Body | FOUR DOOR SEDAN | | |
| Engine | OTHER | | |
| Displacement | 4.6 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | NO COMMENTS | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 5301 | mm | 208.7 | inches | CG behind Front Axle | 1239 | mm | 48.8 | inches |
| Vehicle Width | 1937 | mm | 76.3 | inches | Center of Damage to CG Axis | -394 | mm | -15.5 | inches |
| Vehicle Wheelbase | 2901 | mm | 114.2 | inches | Total Length of Indentation | 4950 | mm | 194.9 | inches |
| Vehicle Test Weight | 2081 | KG | 4587 | pounds | Maximum Static Crush Depth | 480 | mm | 18.9 | inches |
| | | | | | Pre-Impact Speed | 0 | kph | 0.0 | mph |

| | | | |
|---|---|---|---|
| Vehicle Damage Index | 09LPAW7 | Principal Direction of Force | 270 |

## Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

| Left Side | | | | Centerline | | | | Right Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-Test | | Post-Test | | Pre-Test | | Post-Test | | Pre-Test | | Post-Test | |
| mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches |
| | | | | Length of Vehicle at Centerline | | | | | | | |
| | | | | 5301 | 208.7 | 5263 | 207.2 | | | | |
| | | | | Engine Block | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 5050 | 198.8 | 4967 | 195.6 | Front Bumper Corner | | | | 5055 | 199.0 | 5057 | 199.1 |
| | | | | Front of Engine | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 0 | 0.0 | 0 | 0.0 | Firewall | | | | 0 | 0.0 | 0 | 0.0 |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| 0 | 0.0 | 0 | 0.0 | Upper Leading Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Lower Leading Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Bottom of 'A' Post | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Upper Trailing Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| 0 | 0.0 | 0 | 0.0 | Lower Trailing Edge of Door | | | | 0 | 0.0 | 0 | 0.0 |
| | | | | Steering Column | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| | | | | Center of Seering Column to 'A' Post (Horizontal) | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |
| | | | | Center of Steering Column to Headliner (Vertical) | | | | | | | |
| | | | | 0 | 0.0 | 0 | 0.0 | | | | |

# 1997 CADILLAC DE VILLE

NHTSA Crash Test - #2523 - Side Impact

Damage Profile Distances - Indention Length - KE Equivalent Speed - Trapezoidal Average

Test Vehicle Weight = 4587 pounds
KE Equivalent Speed = 24.3 MPH
Test Crush Length = 194.9 inches

Impactor Weight = 2989
Impactor Test Speed = 38.7

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Rear) | 0.9 | 2.0 | 16.8 | 17.2 | 2.4 | 0.7 | (Front) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 0.7 inches | | | | | 22766.4 |
| Using a Rated No Damage Speed of | 1.0mph | 628.5 | 20932.3 | 9.4 | |
| Using a Rated No Damage Speed of | 2.0mph | 1203.0 | 19175.2 | 37.7 | |
| Using a Rated No Damage Speed of | 3.0mph | 1723.6 | 17495.1 | 84.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 2603.2 | 14366.0 | 235.9 | |
| Average Crush = 7.8 inches | | | | | 183.4 |
| Using a Rated No Damage Speed of | 1.0mph | 56.4 | 168.6 | 9.4 | |
| Using a Rated No Damage Speed of | 2.0mph | 108.0 | 154.4 | 37.7 | |
| Using a Rated No Damage Speed of | 3.0mph | 154.7 | 140.9 | 84.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 233.6 | 115.7 | 176.7 | |
| Maximum Crush = 17.2 inches | | | | | 37.7 |
| Using a Rated No Damage Speed of | 1.0mph | 25.6 | 34.7 | 9.4 | |
| Using a Rated No Damage Speed of | 2.0mph | 49.0 | 31.8 | 37.7 | |
| Using a Rated No Damage Speed of | 3.0mph | 70.1 | 29.0 | 84.9 | |
| Using a Rated No Damage Speed of | 5.0mph | 105.9 | 23.8 | 235.9 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 17.2 | 30.1 | 5.7 | 19.1 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 13.7**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# Available Test Results
## Side Impact Test Summary

Report Filter Settings

Year Range: 1992 - 2002
Make: CADILLAC
Model: ELDORADO

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 3669 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 8.4 | 22.7 | 101.9 | 125.8 | 41.2 | 151.3 | 24.6 |
| 4094 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 9.7 | 26.8 | 102.2 | 131.0 | 39.9 | 153.0 | 29.7 |
| 2523 | 1997 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 7.8 | 24.3 | 107.4 | 152.8 | 37.7 | 181.4 | 30.2 |
| 4086 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 10.4 | 26.4 | 119.1 | 139.5 | 50.8 | 163.3 | 26.8 |
| | **Average (AVG)** | | | | **107.7** | **137.3** | **42.4** | **162.2** | **27.8** |
| | **Minimum (MIN)** | | | | **101.9** | **125.8** | **37.7** | **151.3** | **24.6** |
| | **Maximum (MAX)** | | | | **119.1** | **152.8** | **50.8** | **181.4** | **30.2** |
| | **Standard Deviation (STDev-sample)** | | | | **8.0** | **11.8** | **5.8** | **13.8** | **2.6** |
| | **Number of Tests (n)** | | | **4** | | | | | |

# Available Test Results
## Side Impact Test Summary

Report Filter Settings

Year Range: 1992 - 2002
Make: CADILLAC
Model: ELDORADO

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 3669 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 21.3 | 22.7 | 40.2 | 19.6 | 41.2 | 23.6 | 9.7 |
| 4094 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 22.2 | 26.8 | 44.5 | 24.8 | 39.9 | 29.0 | 12.9 |
| 2523 | 1997 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 18.9 | 24.3 | 44.6 | 26.3 | 37.7 | 31.2 | 12.5 |
| 4086 | 1999 CADILLAC DE VILLE FOUR DOOR SEDAN | 2.0 | 24.7 | 26.4 | 50.3 | 24.9 | 50.8 | 29.2 | 11.3 |
| | **Average (AVG)** | | | | **44.9** | **23.9** | **42.4** | **28.2** | **11.6** |
| | **Minimum (MIN)** | | | | **40.2** | **19.6** | **37.7** | **23.6** | **9.7** |
| | **Maximum (MAX)** | | | | **50.3** | **26.3** | **50.8** | **31.2** | **12.9** |
| | **Standard Deviation (STDev-sample)** | | | | **4.1** | **2.9** | **5.8** | **3.3** | **1.4** |
| | **Number of Tests (n)** | | | **4** | | | | | |

# 2006 CHEVROLET IMPALA MSP POLICE PACKAGE - Front Impact

| | |
|---|---|
| Curb Weight (pounds): | 3725 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 3725 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 5.0 |
| Energy Crush Depth (inches): | 16.19 |
| Damage Length (inches): | 48.0 |
| Crush Profile Measurements: | 3 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 2630.75 |

**"Known" Stifness Values**

| | A | B |
|---|---|---|
| Average | 323.9 | 99.7 |
| Minimum | 250.4 | 57.1 |
| Maximum | 494.8 | 229.5 |
| Std. Devation | 85.8 | 60.7 |

| | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|
| C1 (inches) 18.00 | 27.00 | 472.50 | 8.75 | 4135.50 | 13.37 | 6318.00 |
| C2 (inches) 17.00 | 21.00 | 304.50 | 7.32 | 2229.50 | 30.90 | 9408.00 |
| C3 (inches) 12.00 | | | | | | |
| C4 (inches) | | | | | | |
| C5 (inches) | | | | | | |
| C6 (inches) | | | | | | |
| C7 (inches) | | | | | | |
| C8 (inches) | | | | | | |
| C9 (inches) | | | | | | |
| C10 (inches) | | | | | | |

Average Crush (inches): 16.19

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | Closing Speed (MPH) |
|---|---|---|---|---|---|---|---|
| Minimum | 250.4 | 57.1 | 28192.95 | 48696.34 | 19.8 | 17.9 | 35.5 |
| Avg - 2 Std. Deviations | 152.3 | -21.7 | N/A | N/A | N/A | N/A | N/A |
| Avg - 1 Std. Deviations | 238.1 | 39.0 | 20865.90 | 39010.49 | 17.7 | 15.8 | 31.4 |
| Average | 323.9 | 99.7 | 46507.05 | 75959.60 | 24.7 | 22.5 | 44.6 |
| Avg + 1 Std. Deviations | 409.7 | 160.4 | 72148.20 | 113699.85 | 30.3 | 27.6 | 54.9 |
| Avg + 2 Std. Deviations | 495.5 | 221.1 | 97789.35 | 151579.65 | 34.9 | 31.9 | 63.4 |
| Maximum | 494.8 | 229.5 | 101035.95 | 155902.49 | 35.4 | 32.4 | 64.4 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 8.19 | $k^2$ | 3274.70 |
| Damage Centroid Depth (y) (inches) | 20.24 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 777.00 | | |

# 1995 CADILLAC ELDORADO - Side Impact

| | |
|---|---|
| Curb Weight (pounds): | 3773 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 3773 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 2.0 |
| Energy Crush Depth (inches): | 8.90 |
| Damage Length (inches): | 72.0 |
| Crush Profile Measurements: | 9 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 2680.19 |

| | | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|---|
| C1 (inches) | 1.00 | 17.00 | 25.50 | 0.78 | 19.83 | 9.44 | 240.83 |
| C2 (inches) | 2.00 | 12.00 | 78.00 | 3.77 | 294.00 | 19.38 | 1512.00 |
| C3 (inches) | 11.00 | 11.00 | 137.50 | 6.28 | 863.50 | 27.72 | 3811.50 |
| C4 (inches) | 14.00 | 6.00 | 90.00 | 7.51 | 676.00 | 21.07 | 1896.00 |
| C5 (inches) | 16.00 | 11.00 | 159.50 | 7.28 | 1160.50 | 49.31 | 7865.00 |
| C6 (inches) | 13.00 | 2.00 | 24.00 | 6.01 | 144.33 | 10.97 | 263.33 |
| C7 (inches) | 11.00 | 6.00 | 63.00 | 5.25 | 331.00 | 38.95 | 2454.00 |
| C8 (inches) | 10.00 | 7.00 | 63.00 | 4.52 | 284.67 | 52.37 | 3299.33 |
| C9 (inches) | 8.00 | | | | | | |
| C10 (inches) | | | | | | | |

Average Crush (inches): 8.90

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | bsub1 |
|---|---|---|---|---|---|---|---|
| Minimum | 112.6 | 75.3 | 28192.95 | 30208.03 | 15.5 | 17.6 | 23.6 |
| Avg - 2 Std. Deviations | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Avg - 1 Std. Deviations | 95.6 | 54.4 | 20865.90 | 22710.69 | 13.4 | 15.6 | 20.0 |
| Average | 147.1 | 128.6 | 46507.05 | 48806.73 | 19.7 | 22.2 | 30.8 |
| Avg + 1 Std. Deviations | 185.4 | 204.4 | 72148.20 | 74665.68 | 24.4 | 27.2 | 38.8 |
| Avg + 2 Std. Deviations | 217.3 | 280.8 | 97789.35 | 100409.51 | 28.3 | 31.5 | 45.5 |
| Maximum | 221.1 | 290.5 | 101035.95 | 103663.42 | 28.7 | 32.0 | 46.3 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 5.89 | $k^2$ | 3293.80 |
| Damage Centroid Depth (y) (inches) | 33.32 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 640.50 | | |

# Expert VIN DeCoder®



Version Number 3.2.0

DeCoded VIN: 2G1WF55K3Y9287419

| | |
|---|---|
| Model: | 2000 Chevrolet Impala 4 Door Sedan |
| Engine Size: | 3.8L / 231cu.in. |
| Engine Description: | V6 Cylinder with Overhead Valves (OHV) |
| Horse Power: | 205 @ 5200 rpm |
| Torque: | 230 lb-ft at 4000 rpm |
| Injection System: | Multi-Port Fuel Injection (MFI) |
| PSI: | 41-47 psi |
| Ignition: | Electronic |
| Manufacturer: | Buick, Olsmobile, Cadillac |
| Assembly Plant: | Oshawa #1, ON |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/ Manual Belts W/Driver & Passenger and Side Air Bags |

The First through Third characters (2G1) indicate a Chevrolet Car made in Canada

The Fourth and Fifth characters (WF) indicate an Impala

The Sixth character (5) indicate a 4 Door Sedan

The Seventh character (5) indicate Manual Belts W/Driver & Passenger and Side Air Bags

The Eighth character (K) indicate the OEM engine: 3.8L / 231cu.in., V6 OHV

The Ninth character (the check digit) is entered as 3.
The VIN appears Invalid, the calculated value is 8.

The Tenth character (Y) indicate the model year 2000

The Eleventh character (9) indicate the vehicle was made in the assembly plant in Oshawa #1, ON

The Twelfth through Seventeenth characters (287419) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/16/2013

## 2000 CHEVROLET IMPALA 4 DOOR SEDAN

| | | | | |
|---|---|---|---|---|
| Curb Weight: | 3389 | lbs. | 1537 | kg. |
| Curb Weight Distribution - Front: | 62 | % Rear: | 38 | % |
| Gross Vehicle Weight Rating: | 4565 | lbs. | 2071 | kg. |
| Number of Tires on Vehicle: | 4 | | | |
| Drive Wheels: | FRONT | | | |

| Horizontal Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 200 | 16.67 | 5.08 |
| Wheelbase: | 111 | 9.25 | 2.82 |
| Front Bumper to Front Axle: | 41 | 3.42 | 1.04 |
| Front Bumper to Front of Front Well: | 26 | 2.17 | 0.66 |
| Front Bumper to Front of Hood: | 5 | 0.42 | 0.13 |
| Front Bumper to Base of Windshield: | 49 | 4.08 | 1.24 |
| Front Bumper to Top of Windshield: | 83 | 6.92 | 2.11 |
| Rear Bumper to Rear Axle: | 48 | 4.00 | 1.22 |
| Rear Bumper to Rear of Rear Well: | 31 | 2.58 | 0.79 |
| Rear Bumper to Rear of Trunk: | 7 | 0.58 | 0.18 |
| Rear Bumper to Base of Rear Window: | 29 | 2.42 | 0.74 |
| **Width Dimensions** | | | |
| Maximum Width: | 73 | 6.08 | 1.85 |
| Front Track: | 62 | 5.17 | 1.57 |
| Rear Track: | 61 | 5.08 | 1.55 |
| **Vertical Dimensions** | | | |
| Height: | 58 | 4.83 | 1.47 |
| Ground to - | | | |
| Front Bumper (Top) | 23 | 1.92 | 0.58 |
| Headlight - center | 27 | 2.25 | 0.69 |
| Hood - top front: | 29 | 2.42 | 0.74 |
| Base of Windshield | 39 | 3.25 | 0.99 |
| Rear Bumper - top: | 31 | 2.58 | 0.79 |
| Trunk - top rear: | 44 | 3.67 | 1.12 |
| Base of Rear Window: | 45 | 3.75 | 1.14 |

## 2000 CHEVROLET IMPALA 4 DOOR SEDAN

### Interior Dimensions

| | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 58 | 4.83 | 1.47 |
| Front Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (max) | 42 | 3.50 | 1.07 |
| Rear Seat Shoulder Width | 58 | 4.83 | 1.47 |
| Rear Seat to Headliner | 37 | 3.08 | 0.94 |
| Front Leg Room - seatback to floor (min) | 36 | 3.00 | 0.91 |

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS

### Steering Data

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 456 | 38.00 | 11.58 |
| Steering Ratio: | :1 | | |
| Wheel Radius: | 12 | 1.00 | 0.30 |
| Tire Size (OEM): | P225/60R16 | | |

### Acceleration & Braking Information

Brake Type: ALL DISC

ABS System: ALL WHEEL ABS - OPTIONAL

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):

d = 174.0 ft  t = 4.0 sec  a = -22.2 ft/sec²  G-force = -0.69

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | 3.0 | sec | a = | 14.7 | ft/sec² | G-force = 0.46 |
| 0 to 60mph | t = | 9.2 | sec | a = | 9.6 | ft/sec² | G-force = 0.30 |
| 45 to 65mph | t = | | sec | a = | | ft/sec² | G-force = |

Transmission Type: 4spd AUTOMATIC

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 2.5 mph

N.S.D.C = 2000 - 2005

## 2000 CHEVROLET IMPALA 4 DOOR SEDAN

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.35 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 42.18 |
| Inches in front of rear axle | = | 68.82 |
| Inches from side of vehicle | = | 36.50 |
| Inches from ground | = | 22.77 |
| Inches from front corner | = | 90.84 |
| Inches from rear corner | = | 122.39 |
| Inches from front bumper | = | 83.18 |
| Inches from rear bumper | = | 116.82 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 2284.67 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 2206.11 | lb*ft*sec² |
| Roll Moment of Inertia | = | 460.02 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 50.2 | deg |
| Angle Front of Hood to Windshield Base | = | 12.8 | deg |
| Angle Front of Hood to Windshield Top | = | 19.1 | deg |
| Angle of Windshield | = | 26.6 | deg |
| Angle of Steering Tires at Max Turn | = | 27.9 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test

## #4775

## 2004 PONTIAC GRAND PRIX

Provided By

4N6XPRT StifCalcs®

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(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

You entered: **2000 CHEVROLET IMPALA**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

| Year Range | Make | Model | Body Styles | Wheelbase |
|---|---|---|---|---|
| 2000 - 2005 | CHEVROLET | IMPALA | 2D, 4D, SW | 110.5, 125 |
| Remarks: | | | | |
| 1997 - 2004 | BUICK | REGAL | 2D, 4D, SW | 107.5 |
| Remarks: Regal now same as Century | | | | |
| 1997 - 2003 | PONTIAC | GRAND PRIX | 2D, 4D | 110.5 |
| Remarks: | | | | |
| 1998 - 2002 | OLDSMOBILE | INTRIGUE | 4D | 109 |
| Remarks: | | | | |
| 1997 - 2005 | BUICK | CENTURY | 2D, 4D, SW | 109, 116 |
| Remarks: | | | | |
| 2000 - 2005 | CHEVROLET | MONTE CARLO | 2D | 108 |
| Remarks: | | | | |
| 2004 - 2005 | PONTIAC | GRAND PRIX | 2D, 4D | 110.5 |
| Remarks: | | | | |



If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

## Test Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 4775 | NHTSA Test Reference Guide Version # | V5 | | | |
| Test Date | 2003-10-07 | Contract # | DTNH22-01-D-02005 | | | |
| Contract/Study Title | 35 MPH NCAP FRONTAL - 2004 PONTIAC GRAND PRIX GT 4 DOOR SEDAN | | | | | |
| Test Objective(s) | OBTAIN ATD AND VEHICLE DATA | | | | | |
| Test Type | NEW CAR ASSESSMENT TEST | Configuration | VEHICLE INTO BARRIER | | | |
| Impact Angle | 0 | Side Impact Point | 0 | mm | 0.0 | inches |
| | | Offset Distance | 0 | mm | 0.0 | inches |
| | | Closing Speed | 55.9 | Km/Hr | 34.73 | MPH |
| Test Performer | KARCO ENGINEERING | | | | | |
| Test Reference # | M40100 | | | | | |
| Test Track Surface | CONCRETE | Condition | DRY | | | |
| Ambient Temperature | 29 C | 84.2 F | Total Number of Curves | 185 | | |
| Data Recorder Type | DIGITAL DATA ACQUISITION | Data Link | OTHER | | | |
| Test Commentary | DATALINK IS NONE, ON-BOARD DAS | | | | | |

## Fixed Barrier Information

| | | | | | |
|---|---|---|---|---|---|
| Barrier Type | RIGID | Pole Barrier Diameter | 0 | mm | 0 inches |
| Barrier Shape | LOAD CELL BARRIER | | | | |
| Barrier Commentary | NO COMMENTS | | | | |

## 2004 PONTIAC GRAND PRIX LEFT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| Vehicle # | 1 | Sex | MALE |
| Location | LEFT FRONT SEAT | Age | 0 |
| Position | CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 50 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | VECTOR, S/N:035 | | |
| Occupant Modification | UNMODIFIED | | |
| Occupant Description | N0 COMMENTS | | |
| Occupant Commentary | NO COMMENTS | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 300 | mm | 11.8 | inches | Head Injury Criteria (HIC) | 596 | |
| WindShield | 590 | mm | 23.2 | inches | HIC Lower Time Interval (ms) | 61.8 | |
| Seatback | 0 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 96.1 | |
| Side Header | 235 | mm | 9.3 | inches | | | |
| Side Window | 335 | mm | 13.2 | inches | | | |

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 530 | mm | 20.9 | inches | Arm to Door | 30 | mm | 1.2 | inches |
| Steering Wheel | 285 | mm | 11.2 | inches | Hip to Door | 185 | mm | 7.3 | inches |
| Seatback | 0 | mm | 0.0 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 0 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 58.5 |

| | | | | |
|---|---|---|---|---|
| Lap Belt Peak Load | 3935 | Newtons | 884.6 | pound Force |
| Shoulder Belt Peak Load | 3763 | Newtons | 846.0 | pound Force |

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

### Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 175 | mm | 6.9 | inches | Knees to Seatback | 0 | mm | 0.0 | inches |

| | | | | |
|---|---|---|---|---|
| Left Femur Peak Load | -6795 | Newtons | -1527.6 | pounds Force |
| Right Femur Peak Load | -6024 | Newtons | -1354.3 | pounds Force |

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

## 2004 PONTIAC GRAND PRIX LEFT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 4775 | | | | | |
| Vehicle # | 1 | Sex | MALE | | | |
| Location | LEFT FRONT SEAT | Age | 0 | | | |
| Position | CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | VECTOR, S/N:035 |
| Occupant Modification | UNMODIFIED |
| Occupant Description | N0 COMMENTS |
| Occupant Commentary | NO COMMENTS |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | BELT - CONVENTIONAL MOUNT |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | STEERING WHEEL |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |

## 2004 PONTIAC GRAND PRIX RIGHT FRONT SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| Vehicle # | 1 | Sex | MALE |
| Location | RIGHT FRONT SEAT | Age | 0 |
| Position | CENTER POSITION | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 50 PERCENTILE | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | VECTOR, S/N:034 | | |
| Occupant Modification | UNMODIFIED | | |
| Occupant Description | N0 COMMENTS | | |
| Occupant Commentary | NO COMMENTS | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 465 | mm | 18.3 | inches | Head Injury Criteria (HIC) | 509 | |
| WindShield | 785 | mm | 30.9 | inches | HIC Lower Time Interval (ms) | 61.9 | |
| Seatback | 0 | mm | 0.0 | inches | HIC Upper Time Interval (ms) | 97.8 | |
| Side Header | 290 | mm | 11.4 | inches | | | |
| Side Window | 355 | mm | 14.0 | inches | | | |

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 595 | mm | 23.4 | inches | Arm to Door | 50 | mm | 2.0 | inches |
| Steering Wheel | 0 | mm | 0.0 | inches | Hip to Door | 165 | mm | 6.5 | inches |
| Seatback | 0 | mm | 0.0 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 0 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 43.7 |

| | | | | |
|---|---|---|---|---|
| Lap Belt Peak Load | 3955 | Newtons | 889.1 | pound Force |
| Shoulder Belt Peak Load | 4090 | Newtons | 919.5 | pound Force |

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

### Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 155 | mm | 6.1 | inches | Knees to Seatback | 0 | mm | 0.0 | inches |

| | | | | |
|---|---|---|---|---|
| Left Femur Peak Load | -5512 | Newtons | -1239.2 | pounds Force |
| Right Femur Peak Load | -3737 | Newtons | -840.1 | pounds Force |

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

## 2004 PONTIAC GRAND PRIX RIGHT FRONT SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 4775 | | | | | |
| Vehicle # | 1 | Sex | MALE | | | |
| Location | RIGHT FRONT SEAT | Age | 0 | | | |
| Position | CENTER POSITION | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 50 PERCENTILE | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | VECTOR, S/N:034 |
| Occupant Modification | UNMODIFIED |
| Occupant Description | N0 COMMENTS |
| Occupant Commentary | NO COMMENTS |

### Restraints

| | |
|---|---|
| Restraint # 1 | 3 POINT BELT |
| Mounted | BELT - CONVENTIONAL MOUNT |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |
| Restraint # 2 | FRONTAL AIRBAG |
| Mounted | DASH PANEL - TOP |
| Deployment | DEPLOYED PROPERLY |
| Restraint Commentary | NO COMMENTS |

## 2004 PONTIAC GRAND PRIX RIGHT REAR SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| Vehicle # | 1 | Sex | NOT APPLICABLE |
| Location | RIGHT REAR SEAT | Age | 0 |
| Position | NOT APPLICABLE | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 3 YEAR OLD CHILD | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | FIRST TECHNOLOGY SAFETY SYSTEMS, S/N:139 | | |
| Occupant Modification | UNMODIFIED | | |
| Occupant Description | N0 COMMENTS | | |
| Occupant Commentary | CNTRH1:CHIN CONTACTED RETAINING CLIP | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 0 | mm | 0.0 | inches | Head Injury Criteria (HIC) | 533 | |
| WindShield | 0 | mm | 0.0 | inches | HIC Lower Time Interval (ms) | 76.9 | |
| Seatback | 550 | mm | 21.7 | inches | HIC Upper Time Interval (ms) | 112.9 | |
| Side Header | 0 | mm | 0.0 | inches | | | |
| Side Window | 406 | mm | 16.0 | inches | | | |
| Neck to Seatback | 0 | mm | 0.0 | inches | | | |
| First Contact Region (Head) | OTHER | | | | | | |
| Second Contact Region (Head) | | | | | | | |

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 0 | mm | 0.0 | inches | Arm to Door | 275 | mm | 10.8 | inches |
| Steering Wheel | 0 | mm | 0.0 | inches | Hip to Door | 330 | mm | 13.0 | inches |
| Seatback | 525 | mm | 20.7 | inches | | | | | |
| Chest Severity Index | 0 | | | | Pelvic Peak Lateral Acceleration (g's) | 0 | | | |
| Thoracic Trauma Index | 0 | | | | Thorax Peak Acceleration (g's) | 37.1 | | | |
| Lap Belt Peak Load | 0 | Newtons | 0.0 | pound Force | | | | | |
| Shoulder Belt Peak Load | 0 | Newtons | 0.0 | pound Force | | | | | |
| First Contact Region (Chest/Abdomen) | NONE | | | | | | | | |
| Second Contact Region (Chest/Abdomen) | NONE | | | | | | | | |

### Legs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Knees to Dash | 0 | mm | 0.0 | inches | Knees to Seatback | 374 | mm | 14.7 | inches |
| Left Femur Peak Load | 0 | Newtons | 0.0 | pounds Force | | | | | |
| Right Femur Peak Load | 0 | Newtons | 0.0 | pounds Force | | | | | |
| First Contact Region (Legs) | NONE | | | | | | | | |
| Second Contact Region (Legs) | | | | | | | | | |

## 2004 PONTIAC GRAND PRIX RIGHT REAR SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 4775 | | | | | |
| Vehicle # | 1 | | Sex | NOT APPLICABLE | | |
| Location | RIGHT REAR SEAT | | Age | 0 | | |
| Position | NOT APPLICABLE | | Height | 0 mm | 0.0 | inches |
| Type | HYBRID III DUMMY | | Weight | 0.0 kg | 0 | pounds |
| Size | 3 YEAR OLD CHILD | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | FIRST TECHNOLOGY SAFETY SYSTEMS, S/N:139 |
| Occupant Modification | UNMODIFIED |
| Occupant Description | N0 COMMENTS |
| Occupant Commentary | CNTRH1:CHIN CONTACTED RETAINING CLIP |

### Restraints

| | |
|---|---|
| Restraint # 1 | CONVERTIBLE CHILD SAFETY SEAT, FRONT FACING |
| Mounted | LATCH - LOWER ANCHORAGES AND TOP TETHER |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | MANUFACTURER:EVENFLO, MODEL:VANGUARD 5, MODEL# |
| Restraint # 2 | 5 POINT BELT |
| Mounted | CHILD SEAT |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |

## 2004 PONTIAC GRAND PRIX LEFT REAR SEAT OCCUPANT

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| Vehicle # | 1 | Sex | NOT APPLICABLE |
| Location | LEFT REAR SEAT | Age | 0 |
| Position | NOT APPLICABLE | Height | 0 mm 0.0 inches |
| Type | HYBRID III DUMMY | Weight | 0.0 kg 0 pounds |
| Size | 3 YEAR OLD CHILD | | |
| Calibration Method | HYBRID III | | |
| Occupant Manufacturer | FIRST TECHNOLOGY SAFETY SYSTEMS, S/N:082 | | |
| Occupant Modification | UNMODIFIED | | |
| Occupant Description | N0 COMMENTS | | |
| Occupant Commentary | CNTRH1, CHIN CONTACTED RETAINING CLIP | | |

### Head

Head to -

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Windshielder Header | 0 | mm | 0.0 | inches | Head Injury Criteria (HIC) | 583 | |
| WindShield | 0 | mm | 0.0 | inches | HIC Lower Time Interval (ms) | 76.4 | |
| Seatback | 555 | mm | 21.9 | inches | HIC Upper Time Interval (ms) | 112.4 | |
| Side Header | 0 | mm | 0.0 | inches | | | |
| Side Window | 385 | mm | 15.2 | inches | | | |

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): OTHER

Second Contact Region (Head):

### Chest

Chest to -

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Dash | 0 | mm | 0.0 | inches | Arm to Door | 250 | mm | 9.8 | inches |
| Steering Wheel | 0 | mm | 0.0 | inches | Hip to Door | 275 | mm | 10.8 | inches |
| Seatback | 500 | mm | 19.7 | inches | | | | | |

| | | | |
|---|---|---|---|
| Chest Severity Index | 0 | Pelvic Peak Lateral Acceleration (g's) | 0 |
| Thoracic Trauma Index | 0 | Thorax Peak Acceleration (g's) | 40.6 |

Lap Belt Peak Load 0 Newtons 0.0 pound Force

Shoulder Belt Peak Load 0 Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): NONE

Second Contact Region (Chest/Abdomen): NONE

### Legs

Knees to Dash 0 mm 0.0 inches Knees to Seatback 315 mm 12.4 inches

Left Femur Peak Load 0 Newtons 0.0 pounds Force

Right Femur Peak Load 0 Newtons 0.0 pounds Force

First Contact Region (Legs): NONE

Second Contact Region (Legs):

## 2004 PONTIAC GRAND PRIX LEFT REAR SEAT OCCUPANT

| | | | | | | |
|---|---|---|---|---|---|---|
| Test # | 4775 | | | | | |
| Vehicle # | 1 | Sex | NOT APPLICABLE | | | |
| Location | LEFT REAR SEAT | Age | 0 | | | |
| Position | NOT APPLICABLE | Height | 0 | mm | 0.0 | inches |
| Type | HYBRID III DUMMY | Weight | 0.0 | kg | 0 | pounds |
| Size | 3 YEAR OLD CHILD | | | | | |

| | |
|---|---|
| Calibration Method | HYBRID III |
| Occupant Manufacturer | FIRST TECHNOLOGY SAFETY SYSTEMS, S/N:082 |
| Occupant Modification | UNMODIFIED |
| Occupant Description | N0 COMMENTS |
| Occupant Commentary | CNTRH1, CHIN CONTACTED RETAINING CLIP |

### Restraints

| | |
|---|---|
| Restraint # 1 | CONVERTIBLE CHILD SAFETY SEAT, FRONT FACING |
| Mounted | LATCH - LOWER ANCHORAGES AND TOP TETHER |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | MANUFACTURER:CENTURY, MODEL:STE, MODEL# |
| Restraint # 2 | 5 POINT BELT |
| Mounted | CHILD SEAT |
| Deployment | NOT APPLICABLE |
| Restraint Commentary | NO COMMENTS |

# Vehicle 1 2004 PONTIAC GRAND PRIX

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| VIN | 2G2WP522941121660 | NHTSA Test Vehicle Number | 1 |
| Year | 2004 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | PONTIAC | Post-test Steering Column Shear Capsule Seperation | UNKNOWN |
| Model | GRAND PRIX | Steering Column Collapse Mechanism | UNKNOWN |
| Body | FOUR DOOR SEDAN | | |
| Engine | V6 TRANSVERSE FRONT | | |
| Displacement | 3.8 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | UNMODIFIED | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 5034 | mm | 198.2 | inches | CG behind Front Axle | 1131 | mm | 44.5 | inches |
| Vehicle Width | 1800 | mm | 70.9 | inches | Center of Damage to CG Axis | 0 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2815 | mm | 110.8 | inches | Total Length of Indentation | 1383 | mm | 54.4 | inches |
| Vehicle Test Weight | 1789 | KG | 3943 | pounds | Maximum Static Crush Depth | 587 | mm | 23.1 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 34.7 | mph |

Vehicle Damage Index: 12FDEW6

Principal Direction of Force: 0

## Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

| | | | | |
|---|---|---|---|---|
| DPD 1 | -472 | mm | -18.6 | inches |
| DPD 2 | -582 | mm | -22.9 | inches |
| DPD 3 | -584 | mm | -23.0 | inches |
| DPD 4 | -569 | mm | -22.4 | inches |
| DPD 5 | -539 | mm | -21.2 | inches |
| DPD 6 | -423 | mm | -16.7 | inches |

## Crush from Pre & Post Test Damage Measurements

| | Pre-Test | | Post-Test | | Crush Depth | |
|---|---|---|---|---|---|---|
| Left Bumper Corner | 190.3 | inches | 171.7 | inches | 18.6 | inches |
| | 4834 | mm | 4362 | mm | 472 | mm |
| Centerline | 198.2 | inches | 175.2 | inches | 23.0 | inches |
| | 5034 | mm | 4450 | mm | 584 | mm |
| Right Bumper Corner | 190.2 | inches | 173.6 | inches | 16.7 | inches |
| | 4832 | mm | 4409 | mm | 423 | mm |

| Bumper Engagement (Inline Impact Only) | Sill Engagement (Side Impact Only) | A-pillar Engagement (Side Impact Only) |
|---|---|---|
| 0.0 | NOT APPLICABLE | 0.0 |

| Moving Test Cart Angle | Moving Test Cart/Vehicle Crabbed Angle | Vehicle Orientation on Cart Moving Test Cart |
|---|---|---|
| DIRECT ENGAGEMENT | 0.0 | NOT APPLICABLE |
| *Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground* | *Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle* | *Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion* |

## Vehicle 1 2004 PONTIAC GRAND PRIX

| | | | |
|---|---|---|---|
| Test # | 4775 | | |
| VIN | 2G2WP522941121660 | NHTSA Test Vehicle Number | 1 |
| Year | 2004 | Vehicle Modification Indicator | PRODUCTION VEHICLE |
| Make | PONTIAC | Post-test Steering Column Shear Capsule Seperation | UNKNOWN |
| Model | GRAND PRIX | Steering Column Collapse Mechanism | UNKNOWN |
| Body | FOUR DOOR SEDAN | | |
| Engine | V6 TRANSVERSE FRONT | | |
| Displacement | 3.8 Liter | Transmission | AUTOMATIC - FRONT WHEEL DRIVE |
| Vehicle Modification(s) Description | UNMODIFIED | | |
| Vehicle Commentary | NO COMMENTS | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Vehicle Length | 5034 | mm | 198.2 | inches | CG behind Front Axle | 1131 | mm | 44.5 | inches |
| Vehicle Width | 1800 | mm | 70.9 | inches | Center of Damage to CG Axis | 0 | mm | 0.0 | inches |
| Vehicle Wheelbase | 2815 | mm | 110.8 | inches | Total Length of Indentation | 1383 | mm | 54.4 | inches |
| Vehicle Test Weight | 1789 | KG | 3943 | pounds | Maximum Static Crush Depth | 587 | mm | 23.1 | inches |
| | | | | | Pre-Impact Speed | 56 | kph | 34.7 | mph |

| | | | |
|---|---|---|---|
| Vehicle Damage Index | 12FDEW6 | Principal Direction of Force | 0 |

## Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

| Left Side | | | | Centerline | | | | Right Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-Test | | Post-Test | | Pre-Test | | Post-Test | | Pre-Test | | Post-Test | |
| mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches |
| | | | | Length of Vehicle at Centerline | | | | | | | |
| | | | | 5034 | 198.2 | 4450 | 175.2 | | | | |
| | | | | Engine Block | | | | | | | |
| | | | | 420 | 16.5 | 420 | 16.5 | | | | |
| 4834 | 190.3 | 4362 | 171.7 | Front Bumper Corner | | | | 4832 | 190.2 | 4409 | 173.6 |
| | | | | Front of Engine | | | | | | | |
| | | | | 4400 | 173.2 | 4088 | 160.9 | | | | |
| 3764 | 148.2 | 3699 | 145.6 | Firewall | | | | 3759 | 148.0 | 3714 | 146.2 |
| | | | | 3816 | 150.2 | 3763 | 148.1 | | | | |
| 3414 | 134.4 | 3401 | 133.9 | Upper Leading Edge of Door | | | | 3414 | 134.4 | 3405 | 134.1 |
| 3372 | 132.8 | 3360 | 132.3 | Lower Leading Edge of Door | | | | 3371 | 132.7 | 3356 | 132.1 |
| 3371 | 132.7 | 3355 | 132.1 | Bottom of 'A' Post | | | | 3359 | 132.2 | 3346 | 131.7 |
| 2315 | 91.1 | 2301 | 90.6 | Upper Trailing Edge of Door | | | | 2314 | 91.1 | 2304 | 90.7 |
| 2329 | 91.7 | 2317 | 91.2 | Lower Trailing Edge of Door | | | | 2322 | 91.4 | 2310 | 90.9 |
| | | | | Steering Column | | | | | | | |
| | | | | 2932 | 115.4 | 2940 | 115.7 | | | | |
| | | | | Center of Seering Column to 'A' Post (Horizontal) | | | | | | | |
| | | | | 405 | 15.9 | 415 | 16.3 | | | | |
| | | | | Center of Steering Column to Headliner (Vertical) | | | | | | | |
| | | | | 415 | 16.3 | 373 | 14.7 | | | | |

# 2004 PONTIAC GRAND PRIX

NHTSA Crash Test - #4775 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3943 pounds
Vehicle Closing Speed = 34.7 mph
Test Crush Length = 70.9 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 18.6 | 23.0 | 16.7 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 16.7 inches | | | | | 192.9 |
| Using a Rated No Damage Speed of | 2.5mph | 215.2 | 166.1 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 397.0 | 141.4 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 545.5 | 118.6 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 660.5 | 97.8 | 2230.4 | |
| Average Crush = 20.3 inches | | | | | 130.6 |
| Using a Rated No Damage Speed of | 2.5mph | 177.0 | 112.4 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 326.6 | 95.7 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 448.7 | 80.3 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 543.4 | 66.2 | 2230.4 | |
| Maximum Crush = 23.0 inches | | | | | 101.7 |
| Using a Rated No Damage Speed of | 2.5mph | 156.3 | 87.6 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 288.3 | 74.5 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 396.1 | 62.5 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 479.6 | 51.6 | 2230.4 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

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**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 23.0 | 34.7 | 0.0 | 0.1 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2004 PONTIAC GRAND PRIX

NHTSA Crash Test - #4775 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3943 pounds
Vehicle Closing Speed = 34.7 mph
Test Crush Length = 54.4 inches

**Pre/Post Collision Crush Depths (inches)**

| | Left Side Crush | Centerline Crush | Right Side Crush | |
|---|---|---|---|---|
| (Driver Side) | 18.6 | 23.0 | 16.7 | (Pass. Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 16.7 inches | | | | | 251.1 |
| Using a Rated No Damage Speed of | 2.5mph | 280.1 | 216.2 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 516.7 | 184.0 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 709.9 | 154.3 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 859.7 | 127.3 | 2902.8 | |
| Average Crush = 20.3 inches | | | | | 169.9 |
| Using a Rated No Damage Speed of | 2.5mph | 230.4 | 146.3 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 425.1 | 124.5 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 584.0 | 104.4 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 707.2 | 86.2 | 2902.8 | |
| Maximum Crush = 23.0 inches | | | | | 132.4 |
| Using a Rated No Damage Speed of | 2.5mph | 203.4 | 114.0 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 375.2 | 97.0 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 515.5 | 81.4 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 624.2 | 67.1 | 2902.8 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

**4N6XPRT System's First Approximation Crush Factor (CF)**

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 23.0 | 34.7 | 0.0 | 0.1 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2004 PONTIAC GRAND PRIX

NHTSA Crash Test - #4775 - Front Impact

Damage Profile Distances - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3943 pounds
Vehicle Closing Speed = 34.7 MPH
Test Crush Length = 70.9 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | -18.6 | -22.9 | -23.0 | -22.4 | -21.2 | -16.7 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 6.0 inches | | | | | 1494.4 |
| Using a Rated No Damage Speed of | 2.5mph | 599.0 | 1287.0 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 1105.1 | 1095.1 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 1518.2 | 918.6 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 1838.4 | 757.7 | 2230.4 | |
| Average Crush = 20.4 inches | | | | | 129.3 |
| Using a Rated No Damage Speed of | 2.5mph | 176.2 | 111.3 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 325.0 | 94.7 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 446.5 | 79.5 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 540.7 | 65.5 | 1543.2 | |
| Maximum Crush = 23.0 inches | | | | | 101.7 |
| Using a Rated No Damage Speed of | 2.5mph | 156.3 | 87.6 | 139.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 288.3 | 74.5 | 557.6 | |
| Using a Rated No Damage Speed of | 7.5mph | 396.1 | 62.5 | 1254.6 | |
| Using a Rated No Damage Speed of | 10.0mph | 479.6 | 51.6 | 2230.4 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 23.0 | 34.7 | 0.0 | 0.1 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# 2004 PONTIAC GRAND PRIX

NHTSA Crash Test - #4775 - Front Impact

Damage Profile Distances - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3943 pounds
Vehicle Closing Speed = 34.7 MPH
Test Crush Length = 54.4 inches

**Damage Profile Distance Collision Crush Depths (inches)**

| | DPD1 | DPD2 | DPD3 | DPD4 | DPD5 | DPD6 | |
|---|---|---|---|---|---|---|---|
| (Driver Side) | -18.6 | -22.9 | -23.0 | -22.4 | -21.2 | -16.7 | (Pass Side) |

| | | CRASH 3 Stiffness Coefficents | | | SMAC Stiffness |
|---|---|---|---|---|---|
| | | A | B | G | Kv |
| Minimum Crush = 6.0 inches | | | | | 1945.0 |
| Using a Rated No Damage Speed of | 2.5mph | 779.6 | 1675.1 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 1438.3 | 1425.3 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 1976.0 | 1195.6 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 2392.8 | 986.2 | 2902.8 | |
| Average Crush = 20.4 inches | | | | | 168.3 |
| Using a Rated No Damage Speed of | 2.5mph | 229.3 | 144.9 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 423.0 | 123.3 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 581.2 | 103.4 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 703.8 | 85.3 | 2008.5 | |
| Maximum Crush = 23.0 inches | | | | | 132.4 |
| Using a Rated No Damage Speed of | 2.5mph | 203.4 | 114.0 | 181.4 | |
| Using a Rated No Damage Speed of | 5.0mph | 375.2 | 97.0 | 725.7 | |
| Using a Rated No Damage Speed of | 7.5mph | 515.5 | 81.4 | 1632.9 | |
| Using a Rated No Damage Speed of | 10.0mph | 624.2 | 67.1 | 2902.8 | |

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

**********

## 4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

| Crush Factor | Maximum Crush (inches) | Calculated KE Speed (mph) | Calculated Error (mph) | Calculated Error (%) |
|---|---|---|---|---|
| 21 | 23.0 | 34.7 | 0.0 | 0.1 |

**4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.0**

CF = (mph * mph) / (30 * max crush in feet), dimensionless

**4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test**

# Available Test Results
## Front Impact Test Summary

Report Filter Settings

Year Range: 2000 - 2005
Make: CHEVROLET
Model: IMPALA

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 4141 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 20.8 | 29.6 | 256.8 | 60.8 | 542.3 | 88.0 | 16.9 |
| 2831 | 1998 BUICK CENTURY FOUR DOOR SEDAN | 5.0 | 19.7 | 29.9 | 268.6 | 67.9 | 531.3 | 97.9 | 18.1 |
| 3524 | 2001 CHEVROLET MONTE CARLO TWO DOOR C... | 5.0 | 23.2 | 35.5 | 277.3 | 73.0 | 526.8 | 98.9 | 21.7 |
| 3471 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 23.2 | 34.9 | 279.0 | 71.9 | 541.0 | 98.0 | 21.0 |
| 3053 | 1999 BUICK CENTURY FOUR DOOR SEDAN | 5.0 | 22.4 | 34.9 | 283.7 | 75.7 | 531.5 | 103.1 | 21.8 |
| 2821 | 1998 OLDSMOBILE INTRIGUE FOUR DOOR SEDAN | 5.0 | 21.0 | 34.9 | 302.3 | 86.0 | 531.5 | 117.2 | 23.1 |
| 5204 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 18.1 | 29.6 | 307.7 | 83.3 | 567.9 | 120.7 | 19.3 |
| 3843 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 16.9 | 29.8 | 321.5 | 94.3 | 548.3 | 136.2 | 21.0 |
| 4775 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 20.4 | 34.7 | 325.6 | 95.1 | 557.6 | 129.7 | 23.7 |
| 4317 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 12.1 | 24.9 | 351.3 | 115.8 | 532.7 | 181.2 | 20.6 |
| 3637 | 2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 16.9 | 34.7 | 373.4 | 131.4 | 530.8 | 179.4 | 28.5 |
| 2855 | 1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 17.7 | 29.6 | 386.6 | 107.3 | 696.2 | 155.3 | 19.8 |
| 3786 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 12.9 | 30.0 | 413.5 | 160.1 | 534.0 | 230.8 | 27.8 |
| 2877 | 1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 9.2 | 25.2 | 465.2 | 205.0 | 527.9 | 318.8 | 27.7 |
| 3798 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 11.3 | 24.8 | 465.8 | 162.6 | 667.3 | 255.1 | 21.7 |
| | **Average (AVG)** | | | | **338.6** | **106.0** | **557.8** | **154.0** | **22.2** |
| | **Minimum (MIN)** | | | | **256.8** | **60.8** | **526.8** | **88.0** | **16.9** |
| | **Maximum (MAX)** | | | | **465.8** | **205.0** | **696.2** | **318.8** | **28.5** |
| | **Standard Deviation (STDev-sample)** | | | | **68.7** | **41.8** | **51.9** | **67.8** | **3.5** |
| | **Number of Tests (n)** | | | **15** | | | | | |

# Available Test Results
## Front Impact Test Summary

Report Filter Settings

Year Range: 2000 - 2005
Make: CHEVROLET
Model: IMPALA

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | Closing Speed (mph) | Vehicle Stiffness A | Vehicle Stiffness B | Vehicle Width Values G | Vehicle Width Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 2877 | 1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 19.9 | 25.2 | 214.4 | 43.5 | 527.9 | 67.7 | 12.8 |
| 4141 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 24.7 | 29.6 | 216.5 | 43.2 | 542.3 | 62.5 | 14.2 |
| 3524 | 2001 CHEVROLET MONTE CARLO TWO DOOR C... | 5.0 | 28.5 | 35.5 | 225.8 | 48.4 | 526.8 | 65.6 | 17.7 |
| 2831 | 1998 BUICK CENTURY FOUR DOOR SEDAN | 5.0 | 23.2 | 29.9 | 227.7 | 48.8 | 531.3 | 70.4 | 15.4 |
| 3053 | 1999 BUICK CENTURY FOUR DOOR SEDAN | 5.0 | 27.4 | 34.9 | 232.5 | 50.8 | 531.5 | 69.3 | 17.8 |
| 3471 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 27.1 | 34.9 | 238.5 | 52.6 | 541.0 | 71.6 | 18.0 |
| 2821 | 1998 OLDSMOBILE INTRIGUE FOUR DOOR SEDAN | 5.0 | 24.1 | 34.9 | 263.4 | 65.3 | 531.5 | 89.0 | 20.2 |
| 3843 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 20.6 | 29.8 | 264.3 | 63.7 | 548.3 | 92.0 | 17.2 |
| 5204 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 20.7 | 29.6 | 269.6 | 64.0 | 567.9 | 92.7 | 16.9 |
| 2888 | 1998 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 15.2 | 24.7 | 272.9 | 70.8 | 525.7 | 111.4 | 16.1 |
| 4775 | 2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 23.1 | 34.7 | 286.9 | 73.8 | 557.6 | 100.7 | 20.9 |
| 4317 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 13.5 | 24.9 | 313.4 | 92.2 | 532.7 | 144.3 | 18.3 |
| 3798 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 16.7 | 24.8 | 317.3 | 75.4 | 667.3 | 118.3 | 14.8 |
| 3637 | 2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 19.1 | 34.7 | 330.0 | 102.6 | 530.8 | 140.0 | 25.2 |
| 2855 | 1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN | 5.0 | 19.5 | 29.6 | 351.4 | 88.7 | 696.2 | 128.3 | 18.0 |
| 3786 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 14.2 | 30.0 | 374.9 | 131.6 | 534.0 | 189.7 | 25.2 |
| 3648 | 2001 CHEVROLET IMPALA FOUR DOOR SEDAN | 5.0 | 17.6 | 35.0 | 452.2 | 154.1 | 663.6 | 209.8 | 27.8 |
| | **Average (AVG)** | | | | **285.4** | **74.7** | **562.1** | **107.3** | **18.6** |
| | **Minimum (MIN)** | | | | **214.4** | **43.2** | **525.7** | **62.5** | **12.8** |
| | **Maximum (MAX)** | | | | **452.2** | **154.1** | **696.2** | **209.8** | **27.8** |
| | **Standard Deviation (STDev-sample)** | | | | **64.7** | **31.2** | **55.7** | **43.7** | **4.1** |
| | **Number of Tests (n)** | | | **17** | | | | | |

# Expert VIN DeCoder®



Version Number 3.2.0

DeCoded VIN: 1G8ZE1592RZ162012

| | |
|---|---|
| Model: | 1994 Saturn Saturn SC1 2 Door Coupe |
| Engine Size: | 1.9 L/ 109 cu.in. |
| Engine Description: | Inline 4 Cylinder WITH Dual Overhead Cam |
| Horse Power: | 180 @ 7600 rpm |
| Torque: | 130 lb-ft at 6800 rpm |
| Injection System: | Throttle Body Fuel Injection (TBFI) |
| PSI: | 44-50 psi |
| Ignition: | Electronic |
| Manufacturer: | Geo/Chevrolet |
| Assembly Plant: | Spring Hill, TN. |
| Drive Wheels: | This is a Front Wheel Drive vehicle w/ Passive (Automatic) Seatbelts + Driver Air Bag |

The First through Third characters (1G8) indicate a Saturn Car made in the U.S.A.

The Fourth and Fifth characters (ZE) indicate a Saturn SC1

The Sixth character (1) indicate a 2 Door Coupe

The Seventh character (5) indicate Passive (Automatic) Seatbelts + Driver Air Bag

The Eighth character (9) indicate the OEM engine: 1.9 L/ 109 cu.in., L4, DOHC

The Ninth character (the check digit) is entered as 2.
The VIN appears Valid, the calculated value is 2.

The Tenth character (R) indicate the model year 1994

The Eleventh character (Z) indicate the vehicle was made in the assembly plant in Spring Hill, TN.

The Twelfth through Seventeenth characters (162012) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.3.0



JEREMY S DAILY PHD PE
TUCRRC
800 TUCKER DRIVE
TULSA OK 74104-9700

5/16/2013

## 1994 SATURN SC1 2 DOOR COUPE

| | | | | |
|---|---|---|---|---|
| Curb Weight: | 2305 | lbs. | 1046 | kg. |
| Curb Weight Distribution - Front: | 61 | % Rear: | 39 | % |
| Gross Vehicle Weight Rating: | 3093 | lbs. | 1403 | kg. |
| Number of Tires on Vehicle: | 4 | | | |
| Drive Wheels: | FRONT | | | |

| Horizontal Dimensions | Inches | Feet | Meters |
|---|---|---|---|
| Total Length | 173 | 14.42 | 4.39 |
| Wheelbase: | 99 | 8.25 | 2.51 |
| Front Bumper to Front Axle: | 43 | 3.58 | 1.09 |
| Front Bumper to Front of Front Well: | 27 | 2.25 | 0.69 |
| Front Bumper to Front of Hood: | 7 | 0.58 | 0.18 |
| Front Bumper to Base of Windshield: | 50 | 4.17 | 1.27 |
| Front Bumper to Top of Windshield: | 81 | 6.75 | 2.06 |
| Rear Bumper to Rear Axle: | 31 | 2.58 | 0.79 |
| Rear Bumper to Rear of Rear Well: | 21 | 1.75 | 0.53 |
| Rear Bumper to Rear of Trunk: | | | |
| Rear Bumper to Base of Rear Window: | | | |

| Width Dimensions | | | |
|---|---|---|---|
| Maximum Width: | 68 | 5.67 | 1.73 |
| Front Track: | 57 | 4.75 | 1.45 |
| Rear Track: | 56 | 4.67 | 1.42 |

| Vertical Dimensions | | | |
|---|---|---|---|
| Height: | 51 | 4.25 | 1.30 |
| Ground to - | | | |
| Front Bumper (Top) | 18 | 1.50 | 0.46 |
| Headlight - center | 24 | 2.00 | 0.61 |
| Hood - top front: | 27 | 2.25 | 0.69 |
| Base of Windshield | 34 | 2.83 | 0.86 |
| Rear Bumper - top: | 25 | 2.08 | 0.64 |
| Trunk - top rear: | | | |
| Base of Rear Window: | | | |

## 1994 SATURN SC1 2 DOOR COUPE

### Interior Dimensions

| | Inches | Feet | Meters |
|---|---|---|---|
| Front Seat Shoulder Width | 54 | 4.50 | 1.37 |
| Front Seat to Headliner | 38 | 3.17 | 0.97 |
| Front Leg Room - seatback to floor (max) | 43 | 3.58 | 1.09 |
| Rear Seat Shoulder Width | 51 | 4.25 | 1.30 |
| Rear Seat to Headliner | 35 | 2.92 | 0.89 |
| Front Leg Room - seatback to floor (min) | 27 | 2.25 | 0.69 |

Seatbelts: 3pt - front and rear

Airbags: DRIVER SIDE AIRBAGS

### Steering Data

| | | | |
|---|---|---|---|
| Turning Circle (Diameter) | 432 | 36.00 | 10.97 |
| Steering Ratio: 15.77:1 | | | |
| Wheel Radius: | 13 | 1.08 | 0.33 |
| Tire Size (OEM): 175-70R14 | | | |

### Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ALL WHEEL ABS - OPTIONAL

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):

d = 136.0 ft  t = 3.1 sec  a = -28.4 ft/sec²  G-force = -0.88

Acceleration:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 to 30mph | t = | 3.0 | sec | a = | 14.7 | ft/sec² | G-force = 0.46 |
| 0 to 60mph | t = | 8.4 | sec | a = | 10.5 | ft/sec² | G-force = 0.33 |
| 45 to 65mph | t = | 5.1 | sec | a = | 5.8 | ft/sec² | G-force = 0.18 |

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1991 - 1994

## 1994 SATURN SC1 2 DOOR COUPE

### Other Information

| | | |
|---|---|---|
| Tip-Over Stability Ratio = | 1.36 | Stable |
| NHTSA Star Rating (calculated) | | **** |

### Center of Gravity (No Load):

| | | |
|---|---|---|
| Inches behind front axle | = | 38.61 |
| Inches in front of rear axle | = | 60.39 |
| Inches from side of vehicle | = | 34.00 |
| Inches from ground | = | 20.83 |
| Inches from front corner | = | 88.41 |
| Inches from rear corner | = | 97.51 |
| Inches from front bumper | = | 81.61 |
| Inches from rear bumper | = | 91.39 |

### Moments of Inertia Approximations (No Load):

| | | | |
|---|---|---|---|
| Yaw Moment of Inertia | = | 1168.15 | lb*ft*sec² |
| Pitch Moment of Inertia | = | 1132.95 | lb*ft*sec² |
| Roll Moment of Inertia | = | 264.90 | lb*ft*sec² |

### Front Profile Information

| | | | |
|---|---|---|---|
| Angle Front Bumper to Hood Front | = | 52.1 | deg |
| Angle Front of Hood to Windshield Base | = | 9.2 | deg |
| Angle Front of Hood to Windshield Top | = | 16.6 | deg |
| Angle of Windshield | = | 25.8 | deg |
| Angle of Steering Tires at Max Turn | = | 26.3 | deg |

### First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

| | | | |
|---|---|---|---|
| KE Equivalent Speed (Front/Rear/Side) | = | 21 | CF |
| Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only) | = | 27 | CF |

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

4N6XPRT StifCalcs - Selected Vehicle: 1994 SATURN SC

File Print Reports Settings Help Reg To: TUCRRC StifCalcs Version: 3.2.0

Basic Vehicle Search | NHTSA Test Selection | Advanced Vehicle Search | Force Balance

Available Test | Test Information | Occupant Information | Vehicle Information | Stiffness Calcs

# Available Tests in the NHTSA database for a 1991 - 1996 SATURN SC

Similar Vehicles Searched Year Range (1991 - 1996)

**Frontal Test(s)**

**No Front Tests: 1991 - 1996**

**Rear Test(s)**

**No Rear Tests: 1991 - 1996**

**Side Test(s)**

**No Side Tests: 1991 - 1996**

# Available Test Results
## Side Impact Test Summary

## Report Filter Settings

Year Range: 1965 - 2013

Wheelbase Range: 98-100
Vehicle Weight Range: 2800-3200

| Test Number | Vehicle Info | No Damage Speed (mph) | Average Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 2117 | 1995 NISSAN 240 SX TWO DOOR COUPE | 2.0 | 8.4 | 23.1 | 82.2 | 103.8 | 32.6 | 124.3 | 25.6 |
| 2667 | 1998 FORD ESCORT ZX2 TWO DOOR COUPE | 2.0 | 8.7 | 27.1 | 104.8 | 150.3 | 36.6 | 175.2 | 33.5 |
| 3017 | 1999 DAEWOO LANOS THREE DOOR HATCHBACK | 2.0 | 7.3 | 23.5 | 117.7 | 173.4 | 40.0 | 207.2 | 30.2 |
| 2379 | 1996 SUBARU IMPREZA TWO DOOR SEDAN | 2.0 | 8.7 | 23.4 | 118.9 | 146.4 | 48.3 | 175.1 | 25.2 |
| 3293 | 2000 DAEWOO LANOS THREE DOOR HATCHBACK | 2.0 | 6.7 | 23.2 | 129.7 | 206.4 | 40.7 | 247.1 | 32.4 |
| 2364 | 1996 MITSUBISHI ECLIPSE TWO DOOR COUPE | 2.0 | 9.6 | 22.9 | 143.0 | 156.1 | 65.5 | 187.3 | 21.9 |
| 6833 | 2010 HYUNDAI ACCENT THREE DOOR HATCHBACK | 2.0 | 8.2 | 27.5 | 161.4 | 249.5 | 52.2 | 290.2 | 36.7 |
| 2505 | 1997 TOYOTA CELICA THREE DOOR HATCHBACK | 2.0 | 4.3 | 23.4 | 369.2 | 915.3 | 74.5 | 1094.7 | 50.7 |
| | **Average (AVG)** | | | | **153.4** | **262.6** | **48.8** | **312.6** | **32.0** |
| | **Minimum (MIN)** | | | | **82.2** | **103.8** | **32.6** | **124.3** | **21.9** |
| | **Maximum (MAX)** | | | | **369.2** | **915.3** | **74.5** | **1094....** | **50.7** |
| | **Standard Deviation (STDev-sample)** | | | | **90.4** | **267.3** | **14.7** | **319.9** | **9.0** |
| | **Number of Tests (n)** | | | **8** | | | | | |

# Available Test Results
## Side Impact Test Summary

## Report Filter Settings

Year Range: 1965 - 2013

Wheelbase Range: 98-100
Vehicle Weight Range: 2800-3200

| Test Number | Vehicle Info | No Damage Speed (mph) | Max Crush (inch) | KEES (mph) | Indention Stiffness A | Indention Stiffness B | Length Values G | Length Values Kv | Crush Factor |
|---|---|---|---|---|---|---|---|---|---|
| 2117 | 1995 NISSAN 240 SX TWO DOOR COUPE | 2.0 | 14.7 | 23.1 | 46.7 | 33.5 | 32.6 | 40.2 | 14.5 |
| 2667 | 1998 FORD ESCORT ZX2 TWO DOOR COUPE | 2.0 | 16.4 | 27.1 | 56.0 | 42.9 | 36.6 | 50.0 | 17.9 |
| 3017 | 1999 DAEWOO LANOS THREE DOOR HATCHBACK | 2.0 | 13.5 | 23.5 | 63.7 | 50.7 | 40.0 | 60.6 | 16.3 |
| 3293 | 2000 DAEWOO LANOS THREE DOOR HATCHBACK | 2.0 | 11.8 | 23.2 | 73.5 | 66.2 | 40.7 | 79.3 | 18.3 |
| 2379 | 1996 SUBARU IMPREZA TWO DOOR SEDAN | 2.0 | 12.4 | 23.4 | 83.4 | 72.0 | 48.3 | 86.1 | 17.6 |
| 2364 | 1996 MITSUBISHI ECLIPSE TWO DOOR COUPE | 2.0 | 12.3 | 22.9 | 111.5 | 95.0 | 65.5 | 114.0 | 17.1 |
| 6833 | 2010 HYUNDAI ACCENT THREE DOOR HATCHBACK | 2.0 | 10.5 | 27.5 | 127.1 | 154.8 | 52.2 | 180.0 | 28.9 |
| 2505 | 1997 TOYOTA CELICA THREE DOOR HATCHBACK | 2.0 | 10.2 | 23.4 | 155.3 | 162.0 | 74.5 | 193.8 | 21.3 |
| | **Average (AVG)** | | | | **89.7** | **84.6** | **48.8** | **100.5** | **19.0** |
| | **Minimum (MIN)** | | | | **46.7** | **33.5** | **32.6** | **40.2** | **14.5** |
| | **Maximum (MAX)** | | | | **155.3** | **162.0** | **74.5** | **193.8** | **28.9** |
| | **Standard Deviation (STDev-sample)** | | | | **38.1** | **49.3** | **14.7** | **58.1** | **4.4** |
| | **Number of Tests (n)** | | | **8** | | | | | |

# 2000 CHEVROLET IMPALA - Front Impact

| | |
|---|---|
| Curb Weight (pounds): | 3389 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 3389 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 5.0 |
| Energy Crush Depth (inches): | 4.00 |
| Damage Length (inches): | 57.0 |
| Crush Profile Measurements: | 3 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 2284.67 |

**"Known" Stifness Values**

| | A | B |
|---|---|---|
| Average | 338.6 | 106.0 |
| Minimum | 256.8 | 60.8 |
| Maximum | 465.8 | 205.0 |
| Std. Devation | 68.7 | 41.8 |

| | | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|---|
| C1 (inches) | 6.00 | 25.00 | 100.00 | 2.17 | 216.67 | 10.42 | 1041.67 |
| C2 (inches) | 2.00 | 32.00 | 128.00 | 2.17 | 277.33 | 50.67 | 6485.33 |
| C3 (inches) | 6.00 | | | | | | |
| C4 (inches) | | | | | | | |
| C5 (inches) | | | | | | | |
| C6 (inches) | | | | | | | |
| C7 (inches) | | | | | | | |
| C8 (inches) | | | | | | | |
| C9 (inches) | | | | | | | |
| C10 (inches) | | | | | | | |

Average Crush (inches): 4.00

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | Closing Speed (MPH) |
|---|---|---|---|---|---|---|---|
| Minimum | 256.8 | 60.8 | 14250.00 | 9958.16 | 9.4 | 12.2 | 30.1 |
| Avg - 2 Std. Deviations | 201.2 | 22.4 | 8287.80 | 9037.05 | 8.9 | 10.0 | 24.7 |
| Avg - 1 Std. Deviations | 269.9 | 64.2 | 15010.95 | 10465.85 | 9.6 | 12.5 | 30.9 |
| Average | 338.6 | 106.0 | 21734.10 | 13365.87 | 10.9 | 14.7 | 36.4 |
| Avg + 1 Std. Deviations | 407.3 | 147.8 | 28457.25 | 16488.87 | 12.1 | 16.7 | 41.3 |
| Avg + 2 Std. Deviations | 476.0 | 189.6 | 35180.40 | 19687.38 | 13.2 | 18.5 | 45.6 |
| Maximum | 465.8 | 205.0 | 36645.30 | 19803.04 | 13.2 | 18.8 | 46.4 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 2.17 | $k^2$ | 3125.87 |
| Damage Centroid Depth (y) (inches) | 33.01 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 228.00 | | |

# 1994 SATURN SC1 - Side Impact

| | |
|---|---|
| Curb Weight (pounds): | 2305 |
| Occupant + Cargo Weight (pounds): | 0 |
| Total Weight (pounds): | 2305 |
| Angle Coll Force to Normal (degrees): | 0.0 |
| No Damage Speed (mph): | 2.0 |
| Energy Crush Depth (inches): | 20.04 |
| Damage Length (inches): | 101.0 |
| Crush Profile Measurements: | 6 |

**PDOF**

| | |
|---|---|
| Lever Arm Distance (inches): | 0.00 |
| Yaw Moment of Inertia (lb-ft-sec$^2$) | 1168.15 |

| | | Unequal Spacing (inches) | Zone Area (inches$^2$) | Zone Depth(x) (inches) | Area Depth(x) (inches$^2$) | Zone Depth(y) (inches) | Area Depth(y) (inches$^2$) |
|---|---|---|---|---|---|---|---|
| C1 (inches) | 4.50 | 19.00 | 180.50 | 5.19 | 936.54 | 11.17 | 2015.58 |
| C2 (inches) | 14.50 | 16.00 | 308.00 | 9.82 | 3024.67 | 24.66 | 7594.67 |
| C3 (inches) | 24.00 | 10.00 | 265.00 | 13.29 | 3521.67 | 25.16 | 6666.67 |
| C4 (inches) | 29.00 | 22.00 | 693.00 | 15.78 | 10937.67 | 77.29 | 53562.67 |
| C5 (inches) | 34.00 | 34.00 | 578.00 | 11.33 | 6550.67 | 147.33 | 85158.67 |
| C6 (inches) | 0.00 | | | | | | |
| C7 (inches) | | | | | | | |
| C8 (inches) | | | | | | | |
| C9 (inches) | | | | | | | |
| C10 (inches) | | | | | | | |

Average Crush (inches): 20.04

## Results

| | A | B | Average Force (pounds) | Damage Energy (ft*lbs) | KE Speed (mph) | Delta V (mph) | bsub1 |
|---|---|---|---|---|---|---|---|
| Minimum | 30.3 | 12.6 | 14250.00 | 31577.62 | 20.3 | 17.9 | 14.6 |
| Avg - 2 Std. Deviations | 22.7 | 7.1 | 8287.80 | 18824.54 | 15.7 | 14.7 | 10.9 |
| Avg - 1 Std. Deviations | 31.2 | 13.3 | 15010.95 | 33197.12 | 20.8 | 18.4 | 15.0 |
| Average | 37.9 | 19.6 | 21734.10 | 47455.50 | 24.9 | 21.7 | 18.2 |
| Avg + 1 Std. Deviations | 43.6 | 25.9 | 28457.25 | 61650.61 | 28.3 | 24.6 | 20.9 |
| Avg + 2 Std. Deviations | 48.7 | 32.3 | 35180.40 | 75804.00 | 31.4 | 27.2 | 23.4 |
| Maximum | 49.7 | 33.7 | 36645.30 | 78883.57 | 32.0 | 27.6 | 23.9 |

| | | | |
|---|---|---|---|
| Damage Centroid Depth (x) (inches) | 12.33 | $k^2$ | 2349.88 |
| Damage Centroid Depth (y) (inches) | 76.56 | Eff. Mass Ratio (gamma) | 1.00 |
| Area of Damage (inches$^2$): | 2024.50 | | |

**4N6XPRT Systems**
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

**Web Site: http://www.4n6xprt.com**

**E-Mail: 4n6@4n6xprt.com**

Dear Conference Attendee,

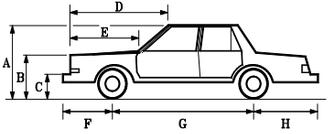
We at 4N6XPRT Systems in conjunction with the Tulsa University Crash Reconstruction Research Consortium (TUCRRC) were pleased to be able to provide you with the preceding data for the crash test vehicles.

Information regarding the Services available to you through 4N6XPRT Systems, as well as the Programs used to create the data report follows this page.

We look forward to providing you similar information in the near future.

Sincerely,

Daniel W. Vomhof III
Daniel W. Vomhof, Ph.D.




# Expert AutoStats®

Expert AutoStats® is a program that has over 42,000 cars, pick-ups, vans, and utility vehicles that range in years from the 1940's to the present. Expert AutoStats® has specifications that can assist in reconstructing accidents when the data for the vehicle is unavailable or the vehicle is too severely damaged to get correct measurements.

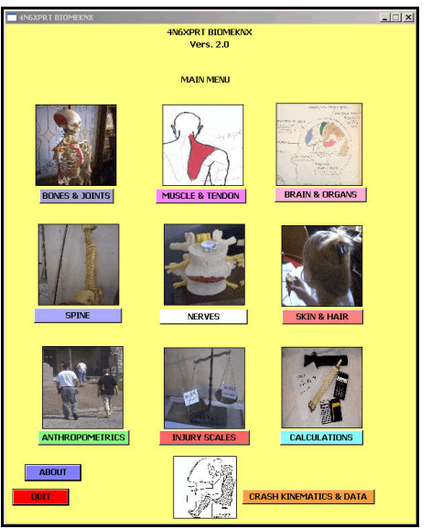
For many vehicles mid-1960's to present, data such as bumper height, front and rear overhang, hood height, etc., are also included.

Model | Data Page 1 | Data Page 2 | Data Page 3 | Printer | File Output | DXF Output

2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN

| Horizontal Dimensions | | | Vertical Dimensions | | |
|---|---|---|---|---|---|
| Length | 212 | in. | Height | 58 | in. |
| Wheelbase | 115 | in. | Ground to: | | |
| Front Bumper to Front Axle | 43 | in. | Front Bumper (Top) | 23 | in. |
| Front Bumper to Front of Hood | 8 | in. | Headlight - Center | 27 | in. |
| Front Bumper to Base of Windshield | 65 | in. | Hood - Top Front | 31 | in. |
| Front Bumper to Top of Windshield | 91 | in. | Base of Windshield | 39 | in. |
| Front Bumper to Front Wheel Well | 26 | in. | Rear Bumper (Top) | 25 | in. |
| Rear Bumper to Rear of Trunk | 8 | in. | Trunk - Top Rear | 39 | in. |
| Rear Bumper to Base of Rear Window | 38 | in. | Base of Rear Window | 40 | in. |
| Rear Bumper to Rear Well | 38 | in. | **Weight Dimensions** | | |
| Rear Bumper to Rear Axle | 54 | in. | Curb Weight | 4184 | lbs. |
| **Depth Dimensions** | | | Curb Weight Distribution: | | |
| Width | 78 | in. | Front = | 56 | % |
| Front Track | 63 | in. | Rear = | 44 | % |
| Rear Track | 66 | in. | Gross Vehicle Weight Rating | 5500 | lbs. |

# 4N6XPRT BioMeknx®




Collecting the Biomechanical data of importance to the Accident Investigator into one easily accessible reference location

Biomechanics is the application of physics to describe, evaluate, or model living tissue and biological materials. Originally it was the application of the part of physics known as Mechanics to living systems. This is the same portion of physics which is used as the basis for much of accident reconstruction.

Biomechanics is important in many aspects of forensic work from vehicle accident reconstruction to slip-trip-stumble-fall cases. This particular program contains modules containing information on a variety of biomechanics and injury modalities, physical data found in the literature for failure of bone and tissue, calculation modules to evaluate individual specific parameters, and definitions and terminology used in the literature and found in medical reports.

4N6XPRT BioMeknx® is a program designed for the accident investigator. The BioMeknx program incorporates information from a number of different sources, as well as over 30 years of reconstruction experience. 4N6XPRT BioMeknx™ compiles into one source a number of items of information to assist in reconstructing accidents by tying in the human component more tightly without the need to be a BioMechanics expert. Identification of body location, body part illustrations, failure threshold limits, definitions of terms, calculation modules for body link lengths, weights, stride lengths, and formulas for other types of calculations are only some of the material included in the program.

To gather into your library the material included in the 4N6XPRT BioMeknx™, you would need a minimum of 10-15 Anatomy and Physiology, Human Factors, and Biomechanics books, as well as conduct over 50 hours of internet research.

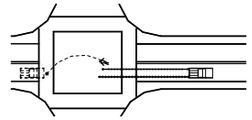
**3FAPP1280MR117253**

# Expert VIN DeCoder®

Expert VIN DeCoder® is a program that "DeCodes" the 17 character VIN number for Cars, Vans, Pickups, and Utility vehicles manufactured from 1981 to the present.

Cars/Vans/Utility/Lt. Trucks Modules: 1981 to Present

| | |
|---|---|
| Ford | Chevrolet/Geo |
| Mercury/Lincoln | Pontiac / Buick / Oldsmobile |
| Chrysler/AMC/Jeep | Cadillac/Saturn |
| European Import | Asian Import |



# 4N6XPRT Ped & Bike Calcs®

The **4N6XPRT Ped & Bike Calcs®)** program is a program that provides FIRST ESTIMATE calculations to evaluate the speed of a vehicle involved in striking a pedestrian or bicyclist, IF Vehicle, scene, and pedestrian {or pedestrian and bicycle in a vehicle-bike accident} measurements are available. This program may also be used when skateboards or roller skates are involved.


>>>Calculate Time given D & V<<<
Enter Distance (in feet) : 45
Enter Velocity (in mph) : 6

# Expert Qwic Calcs®

Expert Qwic Calcs® quickly provides answers to questions important in vehicle collision litigation. The user inputs data in response to relevant questions, Expert Qwic Clacs® performs the mathematical calculations required. Both the input data and the calculated result are then displayed, and may be "dumped" to a printer.

When the law enforcement accident report gives insufficient information to do a full - blown accident reconstruction, Expert Qwic Calcs® may be used to "scope out"the parameters of speeds, times, and distances to determine these relationships in a vehicle accident.

# Expert TireStuf®

The Expert TireStuf® program is a Menu Driven program which has 19 modules explaining the various tire size designation systems, the information which MAY be in the DOT tire number, the DOT mandated Tire Grading system, Lug Nut Tightening and Tire Rotation schemes, Mix and Match precautions, a glossary of Tire Terms, and Addresses of a few of the sources of additional information on tires and rims.

Also included is a calculation of the number of revolutions in one mile given the tire dimensions.


# 4N6XPRT StifCalcs®

4N6XPRT StifCalcs®. Is a program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet in order to obtain Stiffness Values!

In addition to the NHTSA Crash Test data, the program includes a "Similar Vehicle List Reader" which allows quick retrieval of the data for the desired and "similar" vehicle(s). This will drive the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module which allows the creation of "Class" vehicles.

## WITHOUT THE INTERNET the user can:

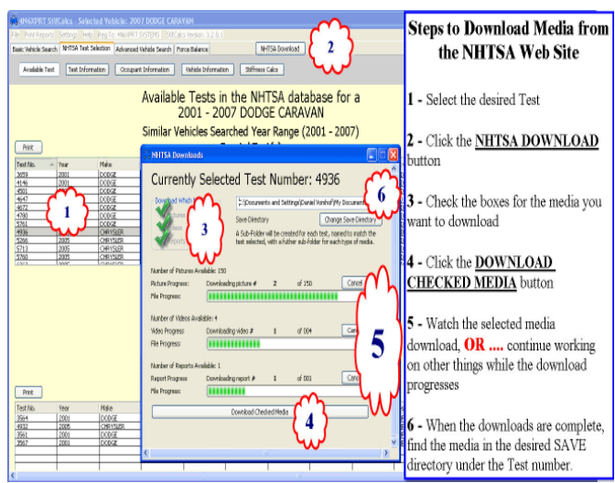
★ Lookup individual tests and get basic front, side, and rear **STIFFNESS VALUES** from these tests. The values are based on the reported crush depths and lengths within each test.
★ Obtain Similar Vehicle group summary STIFFNESS data with Statistical measures.
★ Create "CLASS" vehicles and get summary STIFFNESS data with Statistical measures.

**FRONTAL STATISTICAL MEASURES EXAMPLE:**

| | | Vehicle Width | | | |
|---|---|---|---|---|---|
| | | Stiffness Values | | | |
| | | A | B | G | Kv |
| Average (AVG) | | 305.7 | 93.5 | 523.6 | 143.1 |
| Minimum (MIN) | | 115.0 | 13.2 | 465.2 | 23.5 |
| Maximum (MAX) | | 461.6 | 200.0 | 614.1 | 387.3 |
| Standard Deviation (STDev-sample) | | 73.4 | 38.4 | 36.2 | 72.8 |
| Number of Tests (n) | 53 | | | | |

## WITH THE INTERNET the user can:

★ **RESEARCH** and **easily download** the **PICTURES**, **VIDEOS**, and **REPORTS** available for individual tests




**Steps to Download Media from the NHTSA Web Site**

**1** - Select the desired Test

**2** - Click the NHTSA DOWNLOAD button

**3** - Check the boxes for the media you want to download

**4** - Click the DOWNLOAD CHECKED MEDIA button

**5** - Watch the selected media download, **OR ....** continue working on other things while the download progresses

**6** - When the downloads are complete, find the media in the desired SAVE directory under the Test number.

Please use this order form when ordering. Due to conditions and rising costs beyond our control, Shipping & Handling for program orders must be paid per the included schedule.

Contact Name:_____

Title:_____

Company/Organization:_____

Street:_____

City: _____ State: _____ Zip: _____

Phone: (_____)_____ FAX: (_____)_____

**E-Mail:** _____

PAYMENT BY: Check____ Money Order____ Govt. Purchase Order____

for Credit Card Orders, **please circle Credit Card type: Am. Express / Visa / MasterCard**, then complete the following:

Card Number: _____Expiration Date ( MM/YY):____/____

Security code (card ID) on **back of** Visa/MasterCard card or **front of** American Express Card:


←Visa/MasterCard | Security | American Express →


Address for where the **credit card bill is sent**: _____

*( This is the address that the credit card bill would go to, not where we would send the data or product to )*

Zip for where the **credit card bill is sent**:_____

*( This is the zip code that the credit card bill would go to, not where we would send the data or product to )*

PROGRAM ORDER FORM:

*(Pricing effective as of 1/11/13 - prices subject to change without notice)*

| | | |
|---|---|---|
| Expert AutoStats®: | $ 625.00 * | $_____ |
| 4N6XPRT BioMeknx®: | $ 495.00 * | $_____ |
| 4N6XPRT Ped & Bike Calcs®: | $ 375.00 * | $_____ |
| Expert Qwic Calcs®: | $ 275.00 * | $_____ |
| Expert TireStuf®: | $ 85.00 * | $_____ |
| 4N6XPRT StifCalcs®: | $ 650.00 * | $_____ |
| Expert VIN DeCoder®: | $ 550.00 * | $_____ |
| | | ====== |
| | **SUB-TOTAL** | $_____ |
| Handling **: | | $_____ |

***( Cash or Check with order = $5.00, Credit Card = $10.00 , Govt. Purchase Order = $15.00 )***

Notarized Affidavit Filing Requirement $_____

***( $25.00 per required Notarized Signature )***

*Normal delivery is via electronic download*

☐ - Deliver via electronic download link (e-mail address required) $ 0.00

☐ - Deliver on USB - **additional cost of $35.00 / disk / program** $_____

====== 

**SUB-TOTAL** $_____

California shipping addresses add **8.75%** sales tax $_____

(*California orders delivered electronically **DO NOT** owe sales tax*)

**TOTAL $_____**

## Individual Vehicle Data FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**
***Please circle ALL OPTIONS that apply***

YEAR & MAKE:_____

MODEL:_____

If you are requesting **VIN DeCoder & AutoStats** please also provide:

Vehicle Type:Car - Pickup - Utility - Van
No. of Doors:2/3/4/5
Car Body Style:Coupe/Conv./Sedan/Wagon
DRIVE WHEELS: 4x2 / 4x4
PICKUPS:Dual Rear Wheel - Std. / Extra / Super / Crew Cab - Short Bed / Long Bed
VANS:Cargo / Passenger - Short / Long Wheelbase

VIN Information

___ ___ ___ ___ ___ ___ ___ ___ ___
1 2 3 4 5 6 7 8 9

___ ___ ___ ___ ___ ___ ___ ___
10 11 12 13 14 15 16 17

**NHTSA Crash Test Information**
Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____

Authorized signature: _____

# Individual Vehicle Data Search Service®

**Charges & Services**

**Individual Vehicle Specifications**
**$40.00-First vehicle***, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

**Medium/Heavy Truck Specifications**
**$40.00-First vehicle***, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

**Motorcycle Specifications (1970+)**
**$40.00-First cycle***, $35.00/Additional cycles*,
$20.00/Additional Similar Model*

**NHTSA Crash Test Results**
**$40.00 per test** - Includes A, B, & G values
Calculations are based on the test results

**Individual Vehicle Specifications**

Now you can get the Expert AutoStats® data for the vehicles in your case ***QUICKLY, EASILY***, and ***ECONOMICALLY***, instead of guessing, or begging a printout from a friend.

Our vehicle database includes dimensions on over 42,000 Cars, Vans, Lt. Pickups, and Utility Vehicles covering 1945 to the present.

Minimum Vehicle specifications include:

| | |
|---|---|
| Overall Length | Curb Weight |
| Overall Width | Weight Distribution |
| Overall Height | Front/Rear Track |
| Wheelbase | CG Location |

Model years with **N**o **S**ignificant **D**imensional **C**hanges VIN DeCoding when VIN is provided Information available

Mid-60's to present **also includes** (*when available*)

| | |
|---|---|
| Front/Rear Overhang | Bumper Heights |
| Hood height | Turning Circle |
| Bumper-to-hood | Ground-to-hood |

Dimensions are given in both Imperial and metric (SI) units. Motorcycle specifications will be similar to the Vehicle specifications with appropriate changes where applicable.

**NHTSA Crash Test Results**

Test results include: General Test information, Barrier Data when provided, Vehicle Data as reported by the testing organization, Occupant (Dummy) data when provided, and A-B-G Stiffness calculations based on the test results.

# 4N6XPRT Systems®

**Providing Vehicle dimensional data, VIN DeCoding, and NHTSA Crash Test Results as a service to the Litigation community, in the form of:**

***Expert Systems Software Programs for Litigation***

**Expert AutoStats®**
**4N6XPRT StifCalcs®**
**4N6XPRT BioMeknx®**
**4N6XPRT Ped & Bike Calcs®**
**Expert Qwic Calcs®**
**Expert TireStuf®**
**Expert VIN DeCoder®**

***Vehicle Data Service***

## Individual Vehicle Data Search Service®


8387 University Avenue, Suite P
La Mesa, CA 91942-9342

Phone: 1-800-266-9778
Fax: **(619) 464-2206**
E-Mail: **4n6@4n6xprt.com**

Web: **http://www.4n6xprt.com**

**Expert VIN DeCoder®**

Expert VIN DeCoder® is a program that "DeCodes" the 17 character VIN number for vehicles manufactured from 1981 to the present.

Modules: 1981 to Present
Control Module - One Required per Set

Ford Cars (includes Festiva & Merkur)
Mercury/Lincoln Cars
Ford vans/Utility/Lt. Trucks

Chevrolet/Geo Cars
Pontiac/GM of Canada Cars
Oldsmobile Cars
Buick Cars
Cadillac/Saturn Cars
General Motors Vans/Utility/Lt. Trucks

Chrysler/AMC/Jeep Cars
Chrysler/Jeep Vans/Utility/Lt. Trucks

European Import Cars/Vans/Utility/Lt. Trucks
Asian Import Cars/Vans/Utility/Lt. Trucks

**SYSTEM REQUIREMENTS**

Expert VIN DeCoder® has been tested on a wide variety of IBM laptop and desktop clones ranging from 8088 through Pentium® chips. A math co-processor chip is NOT required. Expert VIN DeCoder® has also been tested under the various versions of MS-DOS 3.0 thru 7.0, DrDOS 6.0, and PC DOS 7.0. It also works as a DOS program under Windows 3.x, Windows, 95, Windows 98, Windows NT, OS/2 2.x, OS/2 Warp, and various versions of LINUX.

A variety of dot matrix printers emulating the EPSON series have been used with no difficulty. The output is also compatible with the Hewlett-Packard II, IIP, III and IIIP Laser printers. Expert VIN DeCoder® works with monochrome and color monitors.

As of April 1995 the 4N6XPRT Systems® programs Expert AutoStats®, Expert Qwic Calcs®, Expert TireStuf®, 4N6XPRT Ped & Bike Calcs®, and Expert VIN DeCoder® are accessible from within RECTEC.

PLEASE PRINT

Contact Name:_____
Company/Dept:_____
Mailing Address:_____
City:_____State:____Zip:_____
Phone: _____
Fax: _____
E-Mail:_____

Expert VIN DeCoder®
_____ (copies) x $550.00 . . . . . = $_____
Handling **: $_____
***( Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00 )***
Notarized Affidavit Filing Requirement $_____
***( $25.00 per required Notarized Signature )***

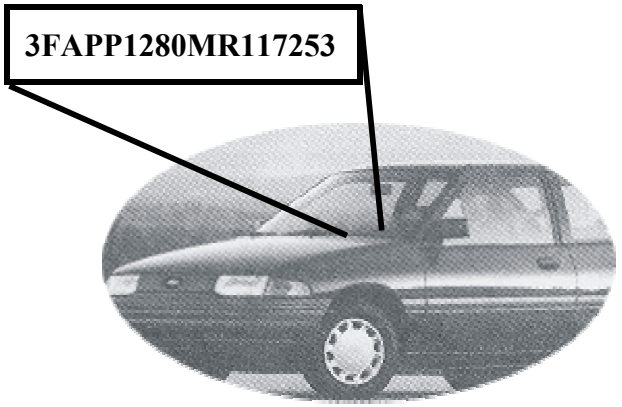
***Normal delivery is via electronic download***
☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ Please deliver on USB at an
**additional cost of $35.00 per disk** $_____
**SUB-TOTAL = $_____**
CA Addresses add 8.75% sales tax . . . . = $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)
**TOTAL = $_____**

Enclosed is:
Check*/Money Order:___ Credit Card:___ P.O.:___
Please make check*/M.O./P.O. payable to:
**4N6XPRT Systems®**
**Credit Card Orders:**
MasterCard:___ Visa:___ Am.Ex.:___
Card #:_____
Expires: _____
Name on Card: _____
Signature: _____
Billing Add. #: _____
Billing Zip: _____

Mail to: 4N6XPRT Systems®
8387 University Avenue
La Mesa, CA 91942-9342
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

*Orders will be shipped Priority Mail within 10 working days of receipt of order.*
*Prices subject to change WITHOUT NOTICE.*
** Checks MUST be drawn from a bank in the U.S.A.*

# Expert VIN DeCoder®




User Friendly Software to provide interpretation of the 17 character VIN Number on Cars, Lt. Pickups, Utility Vehicles, and Vans.

**4N6XPRT Systems®**
Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942-9342

**Web: http://www.4n6xprt.com**
**E-Mail: VIN@4n6xprt.com**

**1-800-266-9778**

**Expert VIN DeCoder® example**

---

**INPUT:**

1) Enter VIN Numbers to be DeCoded: 3FAPP1280MR117253

---

**3FA PP128 0 MR 117253**

2) Is this the VIN Number to be DeCoded (Y/N)? **Y**

---

**OUTPUT:**

EXPERT VIN DeCoder

The VIN Number is 3FA PP128 0 MR 117253

The vehicle should be a 1991 Ford
The model: Escort 2/3-door Hatchback GT
The assembly plant: Hermosillo, Mexico
The 4 passenger vehicle had : Passive (Automatic) Front Belts

The OEM engine was: In-line 4 cylinder with Double Overhead Cam
Engine Displacement/Type = 1.8 L/ 112 cu.in. L4, DOHC
Brake Horsepower (SAE) = 127 @ 6500 rpm
Torque (SAE) = 114 lb-ft at 4500 rpm
Engine manufacturer = Mazda

The fuel distribution system: Electronic Fuel Injection (EFI)
Fuel pump/line pressure = 35-45 psi
The ignition system = electronic

This is a Front Wheel Drive vehicle.

The first three characters {3, F, A} indicates that the vehicle
was a Ford made in Mexico

The fourth character {P} indicates the vehicle had
Passive (Automatic) Front Belts

The fifth character {P} indicates it was a Passenger Car

The sixth with the seventh character {12} indicates a
Escort 2/3-door Hatchback GT

The eighth character {8} indicates the OEM engine :
1.8 L/ 112 cu.in. L4, DOHC

The 9th Character { the Check Digit } is 0
The calculated Check Digit value is 0

The tenth character {M} indicates the Model Year was 1991

The eleventh character {R} indicates it was made
at the assembly plant in Hermosillo, Mexico

The twelveth through the seventeenth characters { 117253 } is
the Serial Number unique to this vehicle.

01-01-2001 S/N:930114VD01201 Reg. User: 4N6XPRT SYSTEMS

## Expert AutoStats®

The Expert AutoStats® program contains data on more than 42,000 cars, pick-ups, vans, and utility vehicles that range in years from the 1940's to the present. The Expert AutoStats® base information can assist in reconstructing accidents when the data for the vehicle is unavailable or the vehicle is too severely damaged to get correct measurements. The program is currently relied upon by over 700 private and 300 Government entities within the United States for this very purpose. Additionally, for many vehicles mid-1960's to present, data such as bumper height, front and rear overhang, hood height, etc., are also included.

As of April 1995 the 4N6XPRT Systems® programs Expert AutoStats®, Expert Qwic Calcs®, Expert TireStuf®, and Expert VIN DeCoder® are accessible from within RECTEC.

### SYSTEM REQUIREMENTS

Expert AutoStats® has been tested on a wide variety of IBM laptop and desktop clones ranging from 8088 through Pentium® chips. A math co-processor chip is NOT required. Expert AutoStats® has also been tested under the various versions of MS-DOS 3.0 thru 7.0, DrDOS 6.0, and PC DOS 7.0. It also works as a DOS program under Windows 3.x, Windows, 95, Windows 98, Windows NT, Windows Me, Windows 2000, Windows XP, Windows Vista, OS/2 2.x, OS/2 Warp, and various versions of LINUX.

A variety of dot matrix printers emulating the EPSON series have been used with no difficulty. The output is also compatible with the Hewlett-Packard II, IIP, III and IIIP Laser printers and Hewlett-Packard Desk Jet inkjet printers. Expert AutoStats® works with monochrome and color monitors.

### PLEASE PRINT

Contact Name: _____
Company/Dept: _____
Mailing Address: _____
City:State:Zip: _____
Phone: _____
Fax: _____
E-Mail: _____

AutoStats® _____ (copies) x $625.00 . . . = $_____
Handling **: $_____
***( Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00 )***
Notarized Affidavit Filing Requirement $_____
***( $25.00 per required Notarized Signature )***

***Normal delivery is via electronic download***

☐ - Deliver via electronic download link (e-mail address required) $ 0.00
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**TOTAL = $_____**

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Please make check*/M.O./P.O. payable to:
**4N6XPRT Systems®**
**Credit Card Orders:**
MasterCard:___ Visa:___ Am.Ex.:___
Card #: _____
Expires: _____Sec.Code:_____
Name on Card: _____
Signature: _____
Billing Add. : _____
Billing Zip: _____

Mail to: 4N6XPRT Systems®
8387 University Avenue
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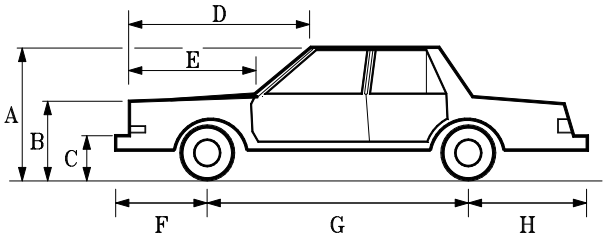
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

*Orders will be shipped Priority Mail within 10 working days of receipt of order.*
*Prices subject to change WITHOUT NOTICE.*
** Checks MUST be drawn from a bank in the U.S.A.*

# Expert AutoStats®




Over 42,000 cars, pick-ups, vans, and utility vehicles 1940's to the present are represented.

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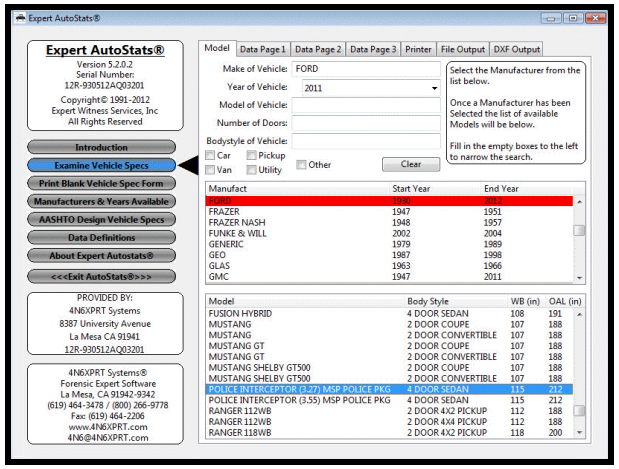
**Web: http://www.4n6xprt.com**
**E-Mail: autostats@4n6xprt.com**

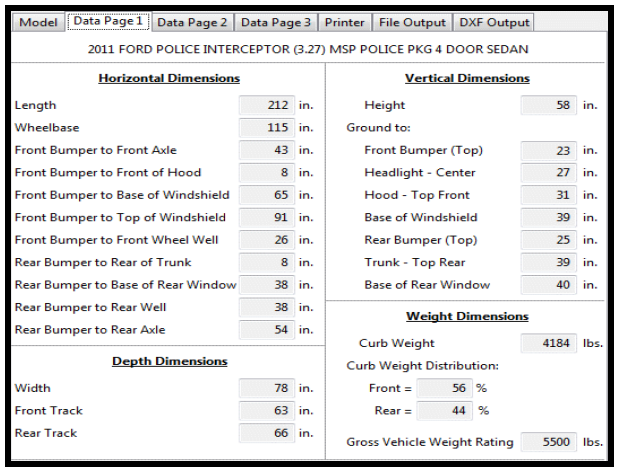
1-800-266-9778

## Select Your Vehicle



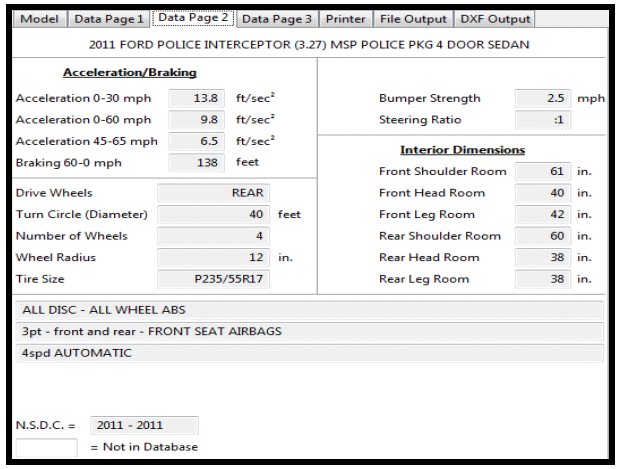

After typing in the Make, Year, and Type of vehicle, you are presented with the vehicles which are available for that year.

## Screen 1



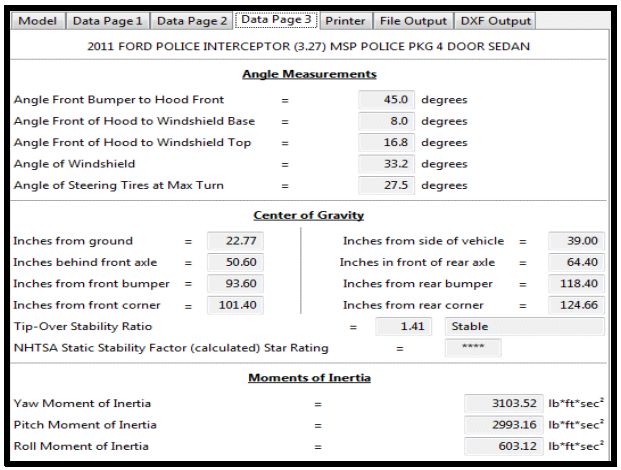

The first screen of data contains exterior dimensions and weight data. Length, Height, Wheelbase, Width, and Weight Distribution are published dimensions. Curb Weight is an average of published curb weights for the given vehicle. Detail dimensions such as the bumper heights and Front Bumper to Front of Hood are measurements obtained by our staff from actual vehicles.

## Screen 2



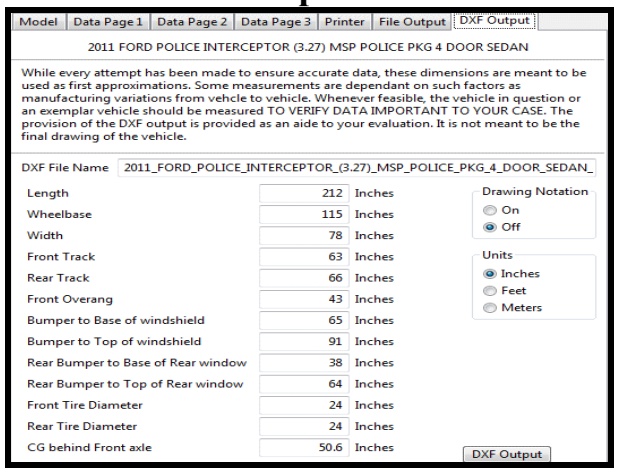

The second screen of data contains interior dimensions and various performance data. The data contained in the second screen comes from various published sources.

## Screen 3



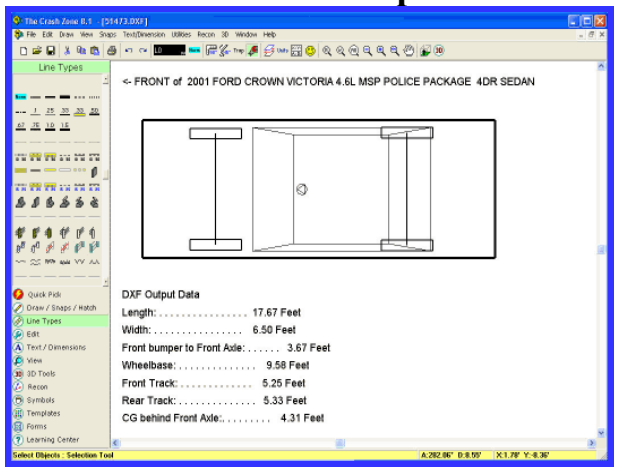

The third and last screen contains a number of calculated items of information which may be of use depending upon the type of case, the other software that you use, and the questions which need to be answered.

## DXF Output Screen




From within the Expert AutoStats program you have the ability to output the data to a 2-D DXF file for importation into your CAD Scene Drawings. The screen below shows an import of the DXF file with Text into the CAD Zone program.

## CADZONE Import



## 4N6XPRT StifCalcs®

Introducing ..... 4N6XPRT StifCalcs®. A program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet in order to obtain Stiffness Values!

In addition to the NHTSA Crash Test data, the program includes a "Similar Vehicle Reader". Initially developed in cooperation with Greg Anderson and maintained by 4N6XPRT Systems starting with the 2013 version, the reader allows quick retrieval of vehicles similar to the desired vehicle. The Reader drives the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module which allows the creation of "CLASS" vehicles.

**STIFFNESS DATA**, based on the selected test or test grouping is automatically calculated based on the reported crush depths and widths for front, side, and rear tests.

The User can - **WITHOUT the need for the internet:**

★ Lookup individual tests and get basic front, side, or rear (as appropriate to the test) **STIFFNESS VALUES** from the selected test. The values are based on the reported crush depths and lengths within each test.

### SYSTEM REQUIREMENTS

4N6XPRT StifCalcs® is a MS-Windows program designed to work under a 32 **or** 64-bit ( 2000/XP/Vista/7) Windows System.

★ Obtain Similar Vehicle group summary **STIFFNESS VALUES** with Statistical measures.

★ Create "CLASS" vehicles and get summary **STIFFNESS VALUES** with Statistical measures.

### FRONTAL STATISTICAL MEASURES EXAMPLE:

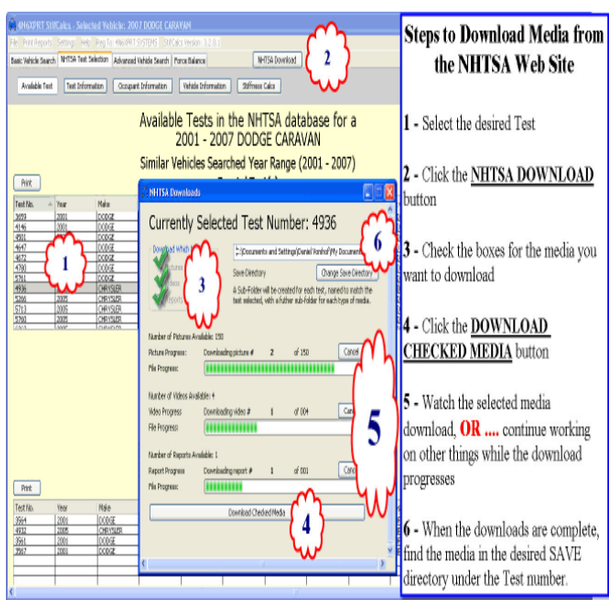
| | | Vehicle Width | Stiffness Values | | |
|---|---|---|---|---|---|
| | | | A | B | G | Kv |
| Average (AVG) | | | 305.7 | 93.5 | 523.6 | 143.1 |
| Minimum (MIN) | | | 115.0 | 13.2 | 465.2 | 23.5 |
| Maximum (MAX) | | | 461.6 | 200.0 | 614.1 | 387.3 |
| Standard Deviation (STDev-sample) | | | 73.4 | 38.4 | 36.2 | 72.8 |
| Number of Tests (n) | 53 | | | | | |

**WITH an internet connection** the User will also be able to -

★ **RESEARCH** and **easily download** the

**PICTURES**,
**VIDEOS**,
and
**REPORTS**

that are available for the individual tests




**PLEASE PRINT**

Contact Name: _____
Company/Dept: _____
Mailing Address: _____
City:State:Zip: _____
Phone: _____
Fax: _____
E-Mail: _____
(E-mail address required for electronic delivery)

StifCalcs®_____ (copies) x $650.00 . . = $_____
Handling **: $_____
*( Check with order = $5.00, Credit Card = $10.00 , Govt. P.O. = $15.00 )*
Notarized Affidavit Filing Requirement $_____
*( $25.00 per required Notarized Signature )*

***Normal delivery is via electronic download***
☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ Please deliver on USB at an
**additional cost of $35.00 per disk** $_____
**SUB-TOTAL = $_____**
CA Addresses add 8.75% sales tax . . . = $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)

**TOTAL = $_____**

Enclosed is:
Check/M. O. :___ Credit Card:___ P.O.:___

Please make check/M.O./P.O. payable to:
**4N6XPRT Systems®**

**Credit Card Orders:**
MasterCard:___ Visa:___ Am.Ex.:___
Card #: _____
Expires: _____
Name on Card: _____
Signature: _____
Billing Add. #: _____
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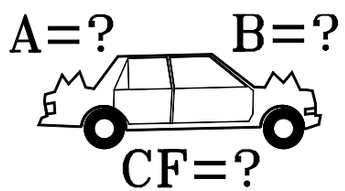
Mail to: 4N6XPRT Systems®
8387 University Avenue
La Mesa, CA 91942-9342

Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

*Orders within the U.S. will be shipped Priority Mail or via E-mail attachment within 10 working days of receipt of order.*
*All prices are in U.S. Dollars, and subject to change **WITHOUT NOTICE.***
*Orders outside of U.S.A. shipped via E-Mail attachment **ONLY**.*

# 4N6XPRT StifCalcs®




Quick, Convenient, Easy access to the NHTSA Crash Test data on your own MS-Windows computer without the need for an internet connection.

**4N6XPRT Systems®**
Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942-9342

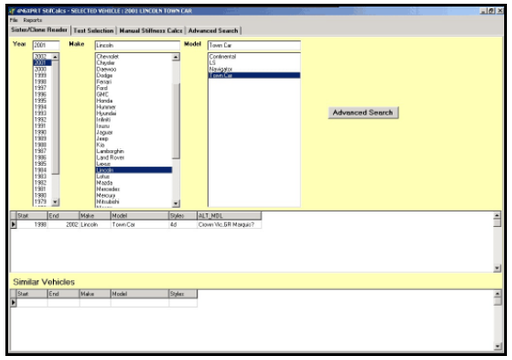
**Web: http://www.4n6xprt.com**
**E-Mail: stifcalcs@4n6xprt.com**

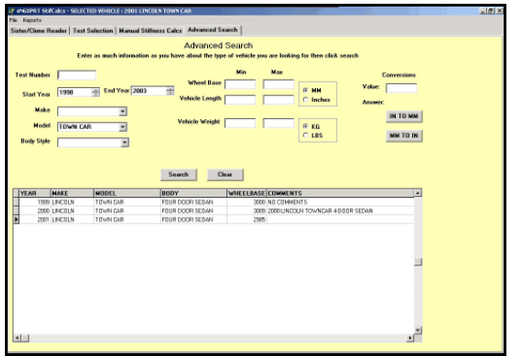
1-800-266-9778

# BASIC VEHICLE CRASH TEST SEARCH

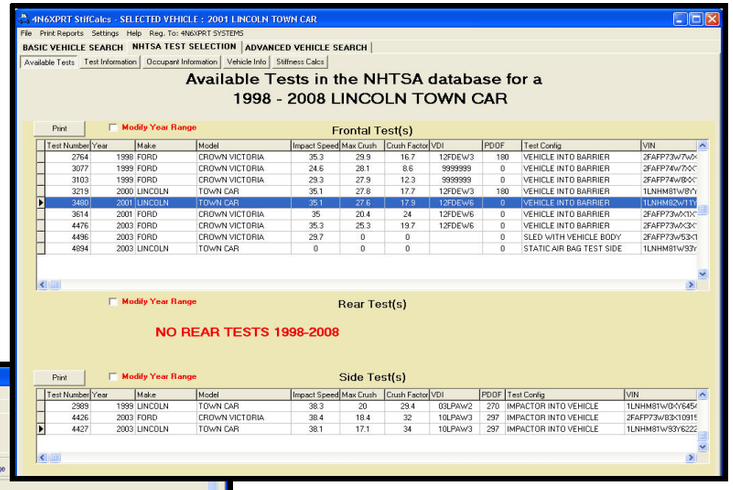
Select the desired vehicle through our **SIMILAR VEHICLE READER**

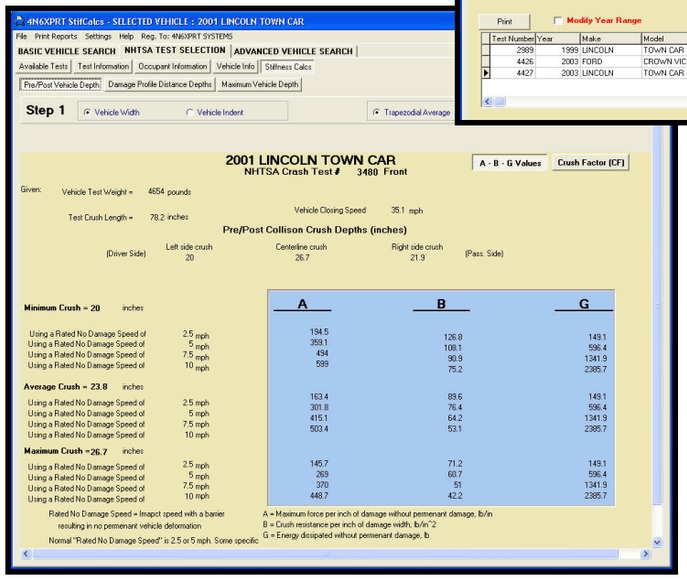
.





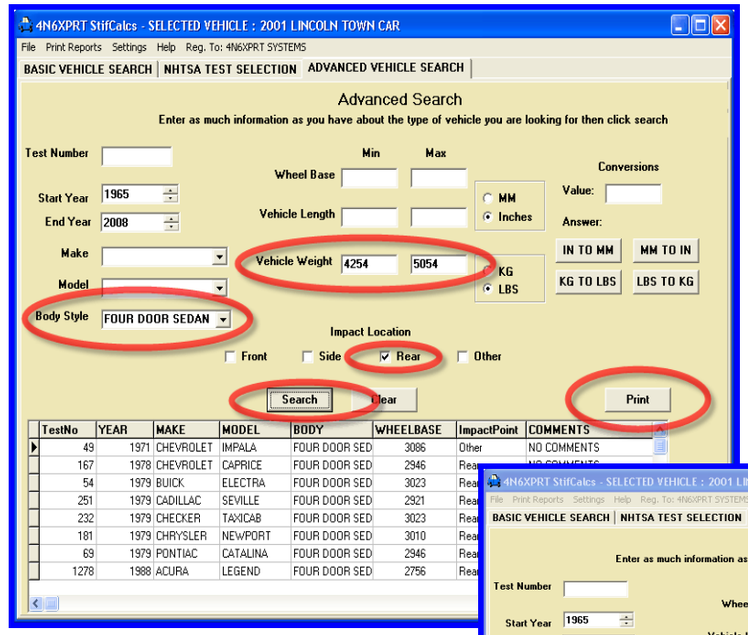
Once the desired vehicle is found/selected, click on the Test Selection tab. From here, select the test to be viewed



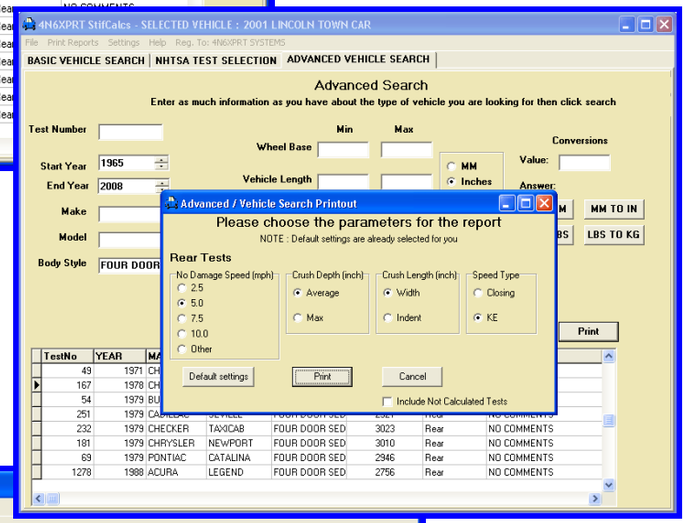




Once a test is selected, the available data for the Test, Occupant(s), Vehicle(s), and Stiffness data can be viewed. The stiffness values are automatically generated from the available test data.

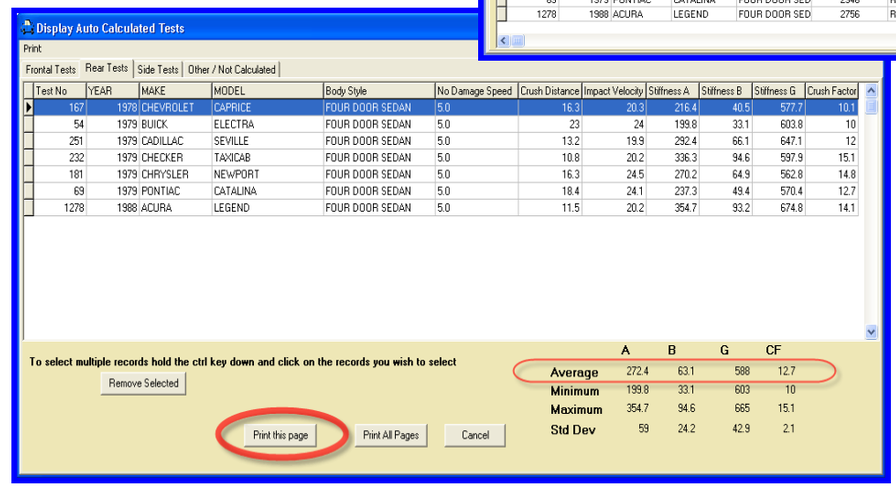
# "CLASS" VEHICLE CRASH TEST SEARCH




Using the **ADVANCED SEARCH** tab, you can also create a **CLASS** of vehicle for when there are no tests available for the specific vehicle and test type. To create a class of REAR IMPACT stiffness values for the Lincoln, first set the **weight range**, **body style**, and **test type**, then **search** the database, when you have a sufficient number of tests (that is, more than one or two) that have been found, click the PRINT button:




Now Set your calculation parameters - **No Damage Speed - Crush Depth - Indentation (Crush) Length** - and **Speed**, then view your results, and if desired, print them to hard copy




The program will calculate the **AVERAGE, MINIMUM, MAXIMUM,** and **Standard Deviation** of the Stiffness Values calculated based upon the parameters you set in the preceding step.

# 4N6XPRT Systems

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La Mesa, CA 91942-9342

**FED Tax ID No.: 95-3121248**

Phone: 1- 800-266-9778
Fax: (619) 464-2206

**Web Site:** ***http://www.4n6xprt.com***

**E-Mail:** ***4n6@4n6xprt.com***

## 2013 ORDER FORM

**Expert AutoStats® - Expert VIN DeCoder® - 4N6XPRT StifCalcs® - 4N6XPRT BioMeknx™**
**Expert Qwic Calcs® - Expert TireStuf® - 4N6XPRT Ped & Bike Calcs®**

Please use this order form when ordering your programs. Due to conditions and rising costs beyond our control, Shipping & Handling must be paid per the included schedule.

Contact Name: _____
Title: _____
Company/Organization: _____
Street: _____
City: _____ State: _____ Zip: _____
Phone: (_____)_____ FAX: (_____)_____
**E-Mail:** _____

| | | |
|---|---|---|
| Expert AutoStats®: | $ 625.00 * | $_____ |
| 4N6XPRT BioMeknx™: | $ 495.00 * | $_____ |
| 4N6XPRT Ped & Bike Calcs®: | $ 375.00 * | $_____ |
| Expert Qwic Calcs®: | $ 275.00 * | $_____ |
| Expert TireStuf®: | $ 85.00 * | $_____ |
| 4N6XPRT StifCalcs®**:** | $ 650.00 * | $_____ |
| Expert VIN DeCoder®: | $ 550.00 * | $_____ |
| | | ====== |
| | **SUB-TOTAL** | $_____ |

Handling **: *( Cash or Check with order = **$5.00**, Credit Card = **$10.00** , Govt. Purchase Order = **$15.00** )* $_____
Notarized Affidavit filing requirement - **$25.00 per required notarized signature**: $_____

***Normal delivery will be via email of a download link to a self extracting zip file***

☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ - Please deliver on USB at an **additional cost of $35.00 per program** $_____

| | |
|---|---|
| | ====== |
| **SUB-TOTAL** | $_____ |
| California shipping addresses add **8.75%** sales tax | $_____ |
| (*California orders delivered by e-mail attachment **DO NOT** owe sales tax*) | |
| | ====== |
| **TOTAL** | $_____ |

Enclosed is:
Check____ Money Order____ Purchase Order____ Credit Card: Visa_____ Master Card_____ American Express_____

Card #_____ Expires_____ SecCode _____
Billing Add. :_____ Billing Zip: _____
Name on Card:_____ Signature: _____

### *PLEASE NOTE*

-- Orders cannot be shipped without correct Shipping & Handling included.
-- California orders cannot be shipped without sales tax included.
-- Written Purchase Orders must be received in office before shipping.

* *Prices are subject to change without notice. Call for Multi-program and package purchase discounts.*
** *Orders will be shipped within 10 working days. Other shipping methods may cost extra. The Handling charge listed is for the first program,* ***add $5.00 per additional program*** *ordered at the same time and shipped to the same address.*

Please make checks, money orders or Purchase Orders Payable to: **4N6XPRT Systems®**
You may call or fax your order to us if paying by credit card.

# 4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

**FED Tax ID No.: 95-3121248**

Phone: 1- 800-266-9778
Fax: (619) 464-2206

**Web Site: http://www.4n6xprt.com**

**E-Mail: 4n6@4n6xprt.com**


Dear Customer,

Due to the governments desire ( both U.S. & California ) to "protect us" we will need the following information from you in order to process your credit card(s). Please complete this form and return it with your order.

Card type: Am. Express / Visa / MasterCard
Card Number: _____
Expiration Date ( MM/YY): ____/____


←Visa/MasterCard American Express →


Security code (card ID) on back of Visa/MasterCard card or front of American Express Card:

Address for where the **credit card bill is sent**:

_____

*( This is the address number - for instance, ours would be **8387 University Avenue** - that the credit card bill would go to, not where we would send the data or product to )*

City/State/Zip for where the **credit card bill is sent**:

_____

*( - for instance, ours would be **La Mesa, CA 91941** - that the credit card bill would go to, not where we would send the data or product to )*

Authorized signature: _____

We appreciate your cooperation in supplying us with this information and understanding that it is being required of us to obtain the information.

Sincerely,

Daniel W. Vomhof III
General Manager/Technical Support

## SERVICE

You may make your request by phone or fax. Our fax machine is on 24 hours, 7 days a week, and can be reached at (619) 464-2206. A request may be made by e-mail, however, BE AWARE that we DO NOT check our e-mail every day.

Upon receiving your request, we will research you request and **fax the information to you at NO ADDITIONAL CHARGE!** Normal response time is one working day or less. Your hard copy will follow in the mail.

Please include the information on the following page when requesting your Individual Vehicle Data Search. Please also be sure to provide a Visa, MasterCard, or American Express number, name as it appears on the card, Expiration date, and the billing address # and Zip.

*Pricing is for multiple vehicles on same Order/Request. Similar Vehicles may be required when it is not possible to determine the exact model of vehicle requested, based upon the information provided.

## FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

***Please circle <u>ALL OPTIONS</u> that apply***

YEAR & MAKE:

_____

MODEL:_____

If you are requesting
**VIN DeCoder & AutoStats**
please also provide the following information:

| | |
|---|---|
| No. of Doors: | 2/3/4/5 |
| Body Style: | Coupe/Conv./Sedan/Wagon |
| SUV & P/U: | 4x2 / 4x4 / Dual Rear Wheel |
| PICKUPS: | Std. / Extra / Super / Crew Cab |
| | Short Bed / Long Bed |
| VANS: | Cargo / Passenger |
| | Short / Long Wheelbase |

VIN Information

| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

| ___ | ___ | ___ | ___ | ___ | ___ | ___ | ___ |
|---|---|---|---|---|---|---|---|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |

**<u>NHTSA Crash Test Information</u>**
Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

PAYMENT INFORMATION
Visa/MasterCard / American Express:

_____

Expires: _____ / _____

Name & Address:

_____

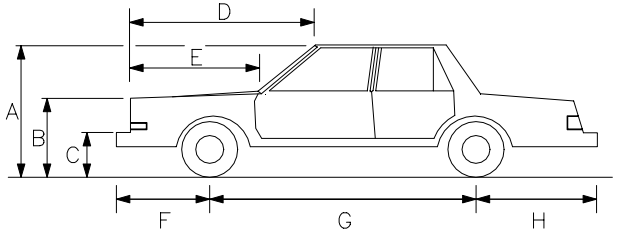
_____

_____

_____

Case Reference Name/Number:_____

# Individual Vehicle Data Search Service®




Providing Vehicle dimensional data, VIN DeCoding, and NHTSA Crash Test Results as a service to the Litigation community.

**Phone: (619) 464-3478 / 1-800-266-9778**

**FAX: (619) 464-2206**

**4N6XPRT Systems®**
Forensic Expert Software
8387 University Avenue, Suite P
La Mesa, CA 91941-3842

Web: http://www.4n6xprt.com
E-Mail: ivdss@4n6xprt.com

## VIN DeCoding Information

How often have you been confronted with the following on a Traffic Collision Report - "87 Ford, 4 door, Blue"? We have the answer to the problem of determining WHICH Ford 4 door model this was!

We will DeCode the VIN number and provide you with the information contained within that VIN number

Information generally includes:

| | |
|---|---|
| Year | OEM Engine |
| Make | Displacement/Type |
| Model | Rated Horsepower |
| Drive Wheels | Rated Torque |
| Rated Pass. Load | Iginition System |
| Plant of Manufacture | Fuel Line Pressure |

Also (*when provided by VIN*)

Gross Vehicle Weight Transmission

A DMV search for a vehicle identification from the registration will typically cost less than $10.00 and will give the VIN number, Make, and Year of vehicle. However, to also obtain the vehicle Model requires a "Manual Search" which will typically cost $30.00/vehicle/year searched.

With our service, you will be able to find out the model of vehicle as well as all of the other information mentioned above. This information will be faxed to you, typically in less than one working day, and the hard copy will follow in the mail.

Allow us to help you have all the information you require in your next Accident, Personal Injury, Criminal, Domestic, or Product Liability case.

## Individual Vehicle Specifications

Now you can get the Expert AutoStats® data for the vehicles in your case ***QUICKLY, EASILY***, and ***ECONOMICALLY***, instead of guessing, or begging a printout from a friend.

Our vehicle database includes dimensions on over 35,000 Cars, Vans, Lt. Pickups, and Utility Vehicles covering 1945 to the present.

Minimum Vehicle specifications include:

| | |
|---|---|
| Overall Length | Curb Weight |
| Overall Width | Weight Distribution |
| Overall Height | Front/Rear Track |
| Wheelbase | CG Location |

Model yeasr with **N**o **S**ignificant **D**imensional **C**hanges
VIN DeCoding when VIN is provided Information available

Mid-60's to present **also includes** (*when available*)

| | |
|---|---|
| Fron/Reart Overhang | Bumper Heights |
| Hood height | Turning Circle |
| Bumper-to-hood | Ground-to-hood |

Dimensions are given in both Imperial and metric (SI) units. Motorcycle specifications will be similar to the Vehicle specifications with appropriate changes where applicable.

While the VIN number contains much information, it does not contain everything needed to identify a particular vehicle in every situation. Therefore, we would appreciate you providing as much of the information on the order form as possible.

If you are not sure of the specific model, we will provide dimensions on the similar model vehicles matching the provided data for a small additional cost per model*.

# Individual Vehicle Data Search Service® Charges & Services

## Individual Vehicle Specifications

**$40.00-First vehicle***, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

## Medium/Heavy Truck Specifications

**$40.00-First vehicle***, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

## Motorcycle Specifications (1970+)

**$40.00-First cycle***, $35.00/Additional cycles*,
$20.00/Additional Similar Model*

## NHTSA Crash Test Results

**$40.00 per test** - Includes A, B, & G values
Calculations are based on the test results

# NHTSA Crash Test Results

Test results include: General Test information, Barrier Data when provided, Vehicle Data as reported by the testing organization, Occupant (Dummy) data when provided, and A-B-G Stiffness calculations based on the test results.

You may make your request by phone or fax. Our fax machine is on 24 hours/day and can be reached at

**(619) 464-2206**

# Individual Vehicle Data Search Service® Charges & Services

You may make your request by phone or fax. Our fax machine is on 24 hours/day and can be reached at

## (619) 464-2206

### Individual Vehicle Specifications

**$40.00-First vehicle***, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

### Medium/Heavy Truck Specifications

**$40.00-First vehicle***, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

### Motorcycle Specifications (1970+)

**$40.00-First cycle***, $35.00/Additional cycles*, $20.00/Additional Similar Model*

### NHTSA Crash Test Results

**$40.00 per test** - Includes A, B, & G values
Calculations are based on the test results

Contact Name & Address:

_____
_____
_____
_____

Phone: (_____) _____
Fax: (_____) _____

PAYMENT INFORMATION
Visa/MasterCard / American Express:

_____
Expires: _____ / _____
Credit Card billing address and Zip:
Address:_____
Zip: _____
Security Code # _____

## FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

***Please circle ALL OPTIONS that apply***

YEAR & MAKE:
_____
MODEL: _____

If you are requesting
**VIN DeCoder & AutoStats**
please also provide:

| | |
|---|---|
| No. of Doors: | 2/3/4/5 |
| Body Style: | Coupe/Conv./Sedan/Wagon |
| SUV - P/U: | 4x2 / 4x4 / Dual Rear Wheel |
| PICKUPS: | Std. / Extra / Super / Crew Cab |
| | Short Bed / Long Bed |
| VANS: | Cargo / Passenger |
| | Short / Long Wheelbase |

VIN Information

__ __ __ __ __ __ __ __ __
1 2 3 4 5 6 7 8 9

__ __ __ __ __ __ __ __
10 11 12 13 14 15 16 17

### NHTSA Crash Test Information

YEAR & MAKE:
_____
MODEL: _____

Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____


## FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

***Please circle ALL OPTIONS that apply***

YEAR & MAKE:
_____
MODEL: _____

If you are requesting
**VIN DeCoder & AutoStats**
please also provide:

| | |
|---|---|
| No. of Doors: | 2/3/4/5 |
| Body Style: | Coupe/Conv./Sedan/Wagon |
| SUV - P/U: | 4x2 / 4x4 / Dual Rear Wheel |
| PICKUPS: | Std. / Extra / Super / Crew Cab |
| | Short Bed / Long Bed |
| VANS: | Cargo / Passenger |
| | Short / Long Wheelbase |

VIN Information

__ __ __ __ __ __ __ __ __
1 2 3 4 5 6 7 8 9

__ __ __ __ __ __ __ __
10 11 12 13 14 15 16 17

### NHTSA Crash Test Information

YEAR & MAKE:
_____
MODEL: _____

Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____