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

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 41,000 different vehicles and 203 different manufacturers spanning more than 50 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 91941-3842

(619) 464-3478 / (800) 266-9778 / FAX: (619) 464-2206

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 3.0.2.4

DeCoded VIN: 2C3KA43RX6H363759

Model:	2006 Chrysler 300 LX 4-Door Sedan
Engine Size:	2.7 L/ 167 cu.in.
Engine Description:	V-6 cylinder with Dual Overhead Cam
Horse Power:	200 @ 5800 rpm
Torque:	190 lb-ft @ 4850 rpm
Injection System:	Multi-Port Fuel Injection (MFI)
PSI:	58 psi
Ignition:	Electronic
Manufacturer:	Chrysler
Assembly Plant:	Brampton, Ontario, Canada
Drive Wheels:	This is a Rear Wheel Drive vehicle

The First through Third characters (2C3) indicate a Chrysler Passenger Car made in Canada

The Fourth character (K) indicates Dual Front Air Bags, Manual Belts

The Fifth and Sixth characters (A4) indicate a 300 LX

The Seventh character (3) indicates a 4-Door Sedan

The Eighth character (R) indicates the OEM engine: 2.7 L/ 167 cu.in., L4, DOHC

The Ninth character (the check digit) is entered as X.
The VIN appears Valid, the calculated value is 10. (The display Character should be X)

The Tenth character (6) indicates the model year 2006

The Eleventh character (H) indicates the vehicle was made in the assembly plant in Brampton, Ontario, Canada

The Twelfth through Seventeenth characters (363759) indicate the Serial Number and are unique to this vehicle.

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN:	2C3KA43RX6H206197
Model:	2006 Chrysler 300 LX 4-Door Sedan
Engine Size:	2.7 L/ 167 cu.in.
Engine Description:	V-6 cylinder with Dual Overhead Cam
Horse Power:	200 @ 5800 rpm
Torque:	190 lb-ft @ 4850 rpm
Injection System:	Multi-Port Fuel Injection (MFI)
PSI:	58 psi
Ignition:	Electronic
Manufacturer:	Chrysler
Assembly Plant:	Brampton, Ontario, Canada
Drive Wheels:	This is a Rear Wheel Drive vehicle

The First through Third characters (2C3) indicate a Chrysler Passenger Car made in Canada

The Fourth character (K) indicates Dual Front Air Bags, Manual Belts

The Fifth and Sixth characters (A4) indicate a 300 LX

The Seventh character (3) indicates a 4-Door Sedan

The Eighth character (R) indicates the OEM engine: 2.7 L/ 167 cu.in., L4, DOHC

The Ninth character (the check digit) is entered as X.
The VIN appears Valid, the calculated value is 10. (The display Character should be X)

The Tenth character (6) indicates the model year 2006

The Eleventh character (H) indicates the vehicle was made in the assembly plant in Brampton, Ontario, Canada

The Twelfth through Seventeenth characters (206197) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2006 CHRYSLER 300 4 DOOR SEDAN

Curb Weight:	3726	lbs.	1690	kg.
Curb Weight Distribution - Front:	53	% Rear:	47	%
Gross Vehicle Weight Rating:	4950	lbs.	2245	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	REAR			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	197	16.42	5.00
Wheelbase:	120	10.00	3.05
Front Bumper to Front Axle:	33	2.75	0.84
Front Bumper to Front of Front Well:	16	1.33	0.41
Front Bumper to Front of Hood:	4	0.33	0.10
Front Bumper to Base of Windshield:	50	4.17	1.27
Front Bumper to Top of Windshield:	75	6.25	1.91
Rear Bumper to Rear Axle:	44	3.67	1.12
Rear Bumper to Rear of Rear Well:	25	2.08	0.64
Rear Bumper to Rear of Trunk:	9	0.75	0.23
Rear Bumper to Base of Rear Window:	24	2.00	0.61
Width Dimensions			
Maximum Width:	74	6.17	1.88
Front Track:	63	5.25	1.60
Rear Track:	63	5.25	1.60
Vertical Dimensions			
Height:	58	4.83	1.47
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	28	2.33	0.71
Hood - top front:	32	2.67	0.81
Base of Windshield	40	3.33	1.02
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 CHRYSLER 300 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)	45	3.75	1.14
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)	25	2.08	0.64

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	468	39.00	11.89
Steering Ratio:	16.10:1		
Wheel Radius:	13	1.08	0.33
Tire Size (OEM):	P215/65R17		

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 = 129.0 ft t = 2.9 sec a = -30.0 ft/sec² G-force = -0.93

Acceleration:

0 to 30mph	t =	2.7	sec	a =	16.3	ft/sec²	G-force = 0.51
0 to 60mph	t =	8.0	sec	a =	11.0	ft/sec²	G-force = 0.34
45 to 65mph	t =	4.5	sec	a =	6.5	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 = 2005 - 2007

2006 CHRYSLER 300 4 DOOR SEDAN

Other Information

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

Center of Gravity (No Load):

Inches behind front axle	=	56.40
Inches in front of rear axle	=	63.60
Inches from side of vehicle	=	37.00
Inches from ground	=	22.77
Inches from front corner	=	96.75
Inches from rear corner	=	113.78
Inches from front bumper	=	89.40
Inches from rear bumper	=	107.60

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2631.78	lb*ft*sec²
Pitch Moment of Inertia	=	2539.74	lb*ft*sec²
Roll Moment of Inertia	=	520.68	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	71.6	deg
Angle Front of Hood to Windshield Base	=	9.9	deg
Angle Front of Hood to Windshield Top	=	18.7	deg
Angle of Windshield	=	32.6	deg
Angle of Steering Tires at Max Turn	=	29.4	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

#6532

2009 DODGE CHALLENGER

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2006 CHRYSLER 300**

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

Year Range	Make	Model	Body Styles	Wheelbase
2005 - 2010	CHRYSLER	300		119, 133
Remarks: Loosely based on Mercedes E-Class				
2005 - 2008	DODGE	MAGNUM	SW	120
Remarks: Loosely based on Mercedes E-Class				
2006 - 2010	DODGE	CHARGER	2D, 3D, 4D	120, 133
Remarks: Loosely based on Mercedes E-Class				
2008 - 2010	DODGE	CHALLENGER	2D	99.6, 133
Remarks: Shortened Chrysler 300 Chassis				

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 #	6532	NHTSA Test Reference Guide Version #	V5				
Test Date	2008-10-01	Contract #	DTNH22-06-D-00028				
Contract/Study Title	NCAP - 2009 DODGE CHALLENGER SE 2-DOOR SEDAN						
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	
			0	mm	0.0	inches	
		Closing Speed	56.5	Km/Hr	35.11	MPH	
Test Performer	MGA RESEARCH						
Test Reference #	BT08100101						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	21 C	69.8 F	Total Number of Curves	102			
Data Recorder Type	OTHER	Data Link	OTHER				
Test Commentary	DTS TDAS PRO ON BOARD DAS						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	LOAD CELL BARRIER					
Barrier Commentary						

2009 DODGE CHALLENGER LEFT FRONT SEAT OCCUPANT

Test #	6532		
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 065		
Occupant Modification			
Occupant Description			
Occupant Commentary	HEAD TO HEADREST		

Head

Head to -

Windshielder Header	451	mm	17.8	inches	Head Injury Criteria (HIC)	186	
WindShield	694	mm	27.3	inches	HIC Lower Time Interval (ms)	52.4	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	88.4	
Side Header	240	mm	9.4	inches			
Side Window	361	mm	14.2	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	543	mm	21.4	inches	Arm to Door	151	mm	5.9	inches
Steering Wheel	319	mm	12.6	inches	Hip to Door	152	mm	6.0	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)	38

Lap Belt Peak Load	7125	Newtons	1601.8	pound Force
Shoulder Belt Peak Load	4326	Newtons	972.5	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	184	mm	7.2	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-1637	Newtons	-368.0	pounds Force
Right Femur Peak Load	-5055	Newtons	-1136.4	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2009 DODGE CHALLENGER LEFT FRONT SEAT OCCUPANT

Test #	6532					
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 065
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO HEADREST

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	PRIMARY
Restraint # 2	FRONTAL AIRBAG
Mounted	STEERING WHEEL
Deployment	DEPLOYED PROPERLY
Restraint Commentary	SECONDARY

2009 DODGE CHALLENGER RIGHT FRONT SEAT OCCUPANT

Test #	6532		
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 066		
Occupant Modification			
Occupant Description			
Occupant Commentary	HEAD TO HEADREST		

Head

Head to -

Windshielder Header	432	mm	17.0	inches	Head Injury Criteria (HIC)	569	
WindShield	654	mm	25.7	inches	HIC Lower Time Interval (ms)	74.1	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	110.1	
Side Header	236	mm	9.3	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	479	mm	18.9	inches	Arm to Door	176	mm	6.9	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	144	mm	5.7	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)	36

Lap Belt Peak Load	5709	Newtons	1283.4	pound Force
Shoulder Belt Peak Load	5272	Newtons	1185.2	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	0	mm	0.0	inches

Left Femur Peak Load	-2622	Newtons	-589.5	pounds Force
Right Femur Peak Load	-2883	Newtons	-648.1	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2009 DODGE CHALLENGER RIGHT FRONT SEAT OCCUPANT

Test #	6532					
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 066
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO HEADREST

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	PRIMARY
Restraint # 2	FRONTAL AIRBAG
Mounted	DASH PANEL - UNSPECIFIED
Deployment	DEPLOYED PROPERLY
Restraint Commentary	SECONDARY

Vehicle 1 2009 DODGE CHALLENGER

Test #	6532		
VIN	2B3LJ44V69H502481	NHTSA Test Vehicle Number	1
Year	2009	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CHALLENGER	Steering Column Collapse Mechanism	UNKNOWN
Body	TWO DOOR SEDAN		
Engine	V6 INLINE FRONT		
Displacement	3.5 Liter	Transmission	AUTOMATIC - REAR WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	5010	mm	197.2	inches	CG behind Front Axle	1452	mm	57.2	inches
Vehicle Width	1917	mm	75.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2950	mm	116.1	inches	Total Length of Indentation	1326	mm	52.2	inches
Vehicle Test Weight	1892	KG	4170	pounds	Maximum Static Crush Depth	632	mm	24.9	inches
					Pre-Impact Speed	57	kph	35.1	mph

Vehicle Damage Index 12FDEW6 | Principal Direction of Force 0

Damage Profile Distance Measurements

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

DPD 1	503	mm	19.8	inches
DPD 2	557	mm	21.9	inches
DPD 3	584	mm	23.0	inches
DPD 4	594	mm	23.4	inches
DPD 5	541	mm	21.3	inches
DPD 6	499	mm	19.6	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	193.6	inches	173.8	inches	19.8	inches
	4918	mm	4415	mm	503	mm
Centerline	197.2	inches	172.4	inches	24.9	inches
	5010	mm	4378	mm	632	mm
Right Bumper Corner	193.6	inches	174.0	inches	19.6	inches
	4918	mm	4419	mm	499	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 2009 DODGE CHALLENGER

Test #	6532		
VIN	2B3LJ44V69H502481	NHTSA Test Vehicle Number	1
Year	2009	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CHALLENGER	Steering Column Collapse Mechanism	UNKNOWN
Body	TWO DOOR SEDAN		
Engine	V6 INLINE FRONT		
Displacement	3.5 Liter	Transmission	AUTOMATIC - REAR WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	5010	mm	197.2	inches	CG behind Front Axle	1452	mm	57.2	inches
Vehicle Width	1917	mm	75.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2950	mm	116.1	inches	Total Length of Indentation	1326	mm	52.2	inches
Vehicle Test Weight	1892	KG	4170	pounds	Maximum Static Crush Depth	632	mm	24.9	inches
					Pre-Impact Speed	57	kph	35.1	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							
				5010	197.2	4378	172.4				
				Engine Block							
				598	23.5	598	23.5				
4918	193.6	4415	173.8	Front Bumper Corner				4918	193.6	4419	174.0
				Front of Engine							
				4288	168.8	4100	161.4				
3885	153.0	3838	151.1	Firewall				3885	153.0	3830	150.8
				3834	150.9	0	0.0				
3213	126.5	3221	126.8	Upper Leading Edge of Door				3213	126.5	3225	127.0
3314	130.5	3309	130.3	Lower Leading Edge of Door				3308	130.2	3314	130.5
3320	130.7	3313	130.4	Bottom of 'A' Post				3320	130.7	3307	130.2
1976	77.8	1976	77.8	Upper Trailing Edge of Door				1974	77.7	1979	77.9
2047	80.6	2043	80.4	Lower Trailing Edge of Door				2047	80.6	2046	80.6
				Steering Column							
				2851	112.2	2877	113.3				
				Center of Seering Column to 'A' Post (Horizontal)							
				378	14.9	376	14.8				
				Center of Steering Column to Headliner (Vertical)							
				380	15.0	383	15.1				

2009 DODGE CHALLENGER

NHTSA Crash Test - #6532 - Front Impact

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

Test Vehicle Weight = 4170 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 75.5 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	19.8	24.9	19.6	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.6 inches					142.1
Using a Rated No Damage Speed of	2.5 mph	184.2	122.6	138.4	
Using a Rated No Damage Speed of	5.0 mph	340.2	104.5	553.7	
Using a Rated No Damage Speed of	7.5 mph	467.9	87.9	1245.8	
Using a Rated No Damage Speed of	10.0 mph	567.4	72.7	2214.8	
Average Crush = 22.3 inches					109.8
Using a Rated No Damage Speed of	2.5 mph	161.9	94.7	138.4	
Using a Rated No Damage Speed of	5.0 mph	299.0	80.7	553.7	
Using a Rated No Damage Speed of	7.5 mph	411.3	67.9	1245.8	
Using a Rated No Damage Speed of	10.0 mph	498.7	56.2	2214.8	
Maximum Crush = 24.9 inches					88.1
Using a Rated No Damage Speed of	2.5 mph	145.0	76.0	138.4	
Using a Rated No Damage Speed of	5.0 mph	267.8	64.8	553.7	
Using a Rated No Damage Speed of	7.5 mph	368.3	54.5	1245.8	
Using a Rated No Damage Speed of	10.0 mph	446.7	45.0	2214.8	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.9	36.2	1.0	2.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 19.8

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

2009 DODGE CHALLENGER

NHTSA Crash Test - #6532 - Front Impact

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

Test Vehicle Weight = 4170 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 52.2 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	19.8	24.9	19.6	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.6 inches					205.5
Using a Rated No Damage Speed of	2.5 mph	266.3	177.2	200.1	
Using a Rated No Damage Speed of	5.0 mph	491.8	151.1	800.5	
Using a Rated No Damage Speed of	7.5 mph	676.5	127.1	1801.1	
Using a Rated No Damage Speed of	10.0 mph	820.3	105.1	3201.9	
Average Crush = 22.3 inches					158.7
Using a Rated No Damage Speed of	2.5 mph	234.1	136.9	200.1	
Using a Rated No Damage Speed of	5.0 mph	432.3	116.7	800.5	
Using a Rated No Damage Speed of	7.5 mph	594.6	98.1	1801.1	
Using a Rated No Damage Speed of	10.0 mph	721.0	81.2	3201.9	
Maximum Crush = 24.9 inches					127.3
Using a Rated No Damage Speed of	2.5 mph	209.7	109.8	200.1	
Using a Rated No Damage Speed of	5.0 mph	387.2	93.6	800.5	
Using a Rated No Damage Speed of	7.5 mph	532.5	78.7	1801.1	
Using a Rated No Damage Speed of	10.0 mph	645.7	65.1	3201.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.9	36.2	1.0	2.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 19.8

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

2009 DODGE CHALLENGER

NHTSA Crash Test - #6532 - Front Impact

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

Test Vehicle Weight = 4170 pounds
Vehicle Closing Speed = 35.1 MPH
Test Crush Length = 75.5 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	19.8	21.9	23.0	23.4	21.3	19.6	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.6 inches					142.1
Using a Rated No Damage Speed of	2.5mph	184.2	122.6	138.4	
Using a Rated No Damage Speed of	5.0mph	340.2	104.5	553.7	
Using a Rated No Damage Speed of	7.5mph	467.9	87.9	1245.8	
Using a Rated No Damage Speed of	10.0mph	567.4	72.7	2214.8	
Average Crush = 21.9 inches					113.8
Using a Rated No Damage Speed of	2.5mph	164.9	98.2	138.4	
Using a Rated No Damage Speed of	5.0mph	304.5	83.7	553.7	
Using a Rated No Damage Speed of	7.5mph	418.8	70.4	1245.8	
Using a Rated No Damage Speed of	10.0mph	507.8	58.2	1540.3	
Maximum Crush = 23.4 inches					99.7
Using a Rated No Damage Speed of	2.5mph	154.3	86.0	138.4	
Using a Rated No Damage Speed of	5.0mph	285.0	73.3	553.7	
Using a Rated No Damage Speed of	7.5mph	392.0	61.7	1245.8	
Using a Rated No Damage Speed of	10.0mph	475.3	51.0	2214.8	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	23.4	35.0	-0.1	-0.2

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.1

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

2009 DODGE CHALLENGER

NHTSA Crash Test - #6532 - Front Impact

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

Test Vehicle Weight = 4170 pounds
Vehicle Closing Speed = 35.1 MPH
Test Crush Length = 52.2 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	19.8	21.9	23.0	23.4	21.3	19.6	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.6 inches					205.5
Using a Rated No Damage Speed of	2.5mph	266.3	177.2	200.1	
Using a Rated No Damage Speed of	5.0mph	491.8	151.1	800.5	
Using a Rated No Damage Speed of	7.5mph	676.5	127.1	1801.1	
Using a Rated No Damage Speed of	10.0mph	820.3	105.1	3201.9	
Average Crush = 21.9 inches					164.6
Using a Rated No Damage Speed of	2.5mph	238.4	142.0	200.1	
Using a Rated No Damage Speed of	5.0mph	440.2	121.0	800.5	
Using a Rated No Damage Speed of	7.5mph	605.5	101.8	1801.1	
Using a Rated No Damage Speed of	10.0mph	734.2	84.2	2226.7	
Maximum Crush = 23.4 inches					144.1
Using a Rated No Damage Speed of	2.5mph	223.1	124.4	200.1	
Using a Rated No Damage Speed of	5.0mph	412.0	106.0	800.5	
Using a Rated No Damage Speed of	7.5mph	566.7	89.1	1801.1	
Using a Rated No Damage Speed of	10.0mph	687.1	73.7	3201.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	23.4	35.0	-0.1	-0.2

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.1

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

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 2005 - 2010
Make: CHRYSLER
Model: 300

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
5130	2005 CHRYSLER 300 FOUR DOOR SEDAN	5.0	22.7	35.1	297.2	78.7	561.3	107.0	21.7
5535	2005 CHRYSLER 300 FOUR DOOR SEDAN	5.0	15.8	34.7	455.5	171.1	606.3	233.6	30.4
6176	2007 DODGE CHARGER FOUR DOOR SEDAN	5.0	13.6	24.7	318.4	92.2	549.6	144.9	18.0
6532	2009 DODGE CHALLENGER TWO DOOR SEDAN	5.0	21.9	35.1	305.0	84.0	553.7	114.2	22.5
	Average (AVG)				**344.0**	**106.5**	**567.7**	**149.9**	**23.1**
	Minimum (MIN)				**297.2**	**78.7**	**549.6**	**107.0**	**18.0**
	Maximum (MAX)				**455.5**	**171.1**	**606.3**	**233.6**	**30.4**
	Standard Deviation (STDev-sample)				**74.8**	**43.4**	**26.2**	**58.2**	**5.2**
	Number of Tests (n)			**4**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 2005 - 2010
Make: CHRYSLER
Model: 300

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Width Values G	Width Values Kv	Crush Factor
5130	2005 CHRYSLER 300 FOUR DOOR SEDAN	5.0	26.7	35.1	252.9	57.0	561.3	77.5	18.4
5534	2005 CHRYSLER 300 FOUR DOOR SEDAN	5.0	12.0	24.9	401.0	132.6	606.3	207.5	20.6
5535	2005 CHRYSLER 300 FOUR DOOR SEDAN	5.0	17.6	34.7	409.8	138.5	606.3	189.1	27.4
6176	2007 DODGE CHARGER FOUR DOOR SEDAN	5.0	16.8	24.7	258.6	60.9	549.6	95.6	14.6
6532	2009 DODGE CHALLENGER TWO DOOR SEDAN	5.0	24.9	35.1	268.0	64.9	553.7	88.2	19.8
	Average (AVG)				**318.1**	**90.8**	**575.4**	**131.6**	**20.2**
	Minimum (MIN)				**252.9**	**57.0**	**549.6**	**77.5**	**14.6**
	Maximum (MAX)				**409.8**	**138.5**	**606.3**	**207.5**	**27.4**
	Standard Deviation (STDev-sample)				**80.0**	**41.0**	**28.5**	**61.6**	**4.7**
	Number of Tests (n)			**5**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 1G2WP52K12F200655

Model:	2002 Pontiac Grand Prix GT 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:	Fairfax II, KS
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (1G2) indicate a Pontiac Car made in the U.S.A.

The Fourth and Fifth characters (WP) indicate a Grand Prix GT

The Sixth character (5) indicates a 4 Door Sedan

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

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

The Ninth character (the check digit) is entered as 1.
The VIN appears Invalid, the calculated value is 9.

The Tenth character (2) indicates the model year 2002

The Eleventh character (F) indicates the vehicle was made in the assembly plant in Fairfax II, KS

The Twelfth through Seventeenth characters (200655) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

5/7/2011

2002 PONTIAC GRAND PRIX 4 DOOR SEDAN

Curb Weight:	3414	lbs.	1549	kg.
Curb Weight Distribution - Front:	65	% Rear:	35	%
Gross Vehicle Weight Rating:	4362	lbs.	1979	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	197	16.42	5.00
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:	6	0.50	0.15
Front Bumper to Base of Windshield:	52	4.33	1.32
Front Bumper to Top of Windshield:	85	7.08	2.16
Rear Bumper to Rear Axle:	44	3.67	1.12
Rear Bumper to Rear of Rear Well:	31	2.58	0.79
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	28	2.33	0.71
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:	55	4.58	1.40
Ground to -			
Front Bumper (Top)	21	1.75	0.53
Headlight - center	25	2.08	0.64
Hood - top front:	26	2.17	0.66
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	26	2.17	0.66
Trunk - top rear:	37	3.08	0.94
Base of Rear Window:	41	3.42	1.04

2002 PONTIAC GRAND PRIX 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	59	4.92	1.50
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	57	4.75	1.45
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	30	2.50	0.76

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

Steering Data

Turning Circle (Diameter)	480	40.00	12.19
Steering Ratio:	:1		
Wheel Radius:			
Tire Size (OEM):	P205/70R15		

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 =	2.4	sec	a =	18.3	ft/sec²	G-force = 0.57
0 to 60mph	t =	6.9	sec	a =	12.8	ft/sec²	G-force = 0.40
45 to 65mph	t =	2.7	sec	a =	10.9	ft/sec²	G-force = 0.34

Transmission Type: 4spd AUTOMATIC

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

N.S.D.C = 1997 - 2003

2002 PONTIAC GRAND PRIX 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.41	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	38.85
Inches in front of rear axle	=	72.15
Inches from side of vehicle	=	36.50
Inches from ground	=	21.59
Inches from front corner	=	88.71
Inches from rear corner	=	121.75
Inches from front bumper	=	80.85
Inches from rear bumper	=	116.15

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2310.42	lb*ft*sec²
Pitch Moment of Inertia	=	2230.86	lb*ft*sec²
Roll Moment of Inertia	=	464.52	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	39.8	deg
Angle Front of Hood to Windshield Base	=	12.3	deg
Angle Front of Hood to Windshield Top	=	18.9	deg
Angle of Windshield	=	27.3	deg
Angle of Steering Tires at Max Turn	=	26.5	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®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2002 PONTIAC GRAND PRIX**

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
			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	2.5 mph	215.2	166.1	139.4	
Using a Rated No Damage Speed of	5.0 mph	397.0	141.4	557.6	
Using a Rated No Damage Speed of	7.5 mph	545.5	118.6	1254.6	
Using a Rated No Damage Speed of	10.0 mph	660.5	97.8	2230.4	
Average Crush = 20.3 inches					130.6
Using a Rated No Damage Speed of	2.5 mph	177.0	112.4	139.4	
Using a Rated No Damage Speed of	5.0 mph	326.6	95.7	557.6	
Using a Rated No Damage Speed of	7.5 mph	448.7	80.3	1254.6	
Using a Rated No Damage Speed of	10.0 mph	543.4	66.2	2230.4	
Maximum Crush = 23.0 inches					101.7
Using a Rated No Damage Speed of	2.5 mph	156.3	87.6	139.4	
Using a Rated No Damage Speed of	5.0 mph	288.3	74.5	557.6	
Using a Rated No Damage Speed of	7.5 mph	396.1	62.5	1254.6	
Using a Rated No Damage Speed of	10.0 mph	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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact 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	2.5 mph	280.1	216.2	181.4	
Using a Rated No Damage Speed of	5.0 mph	516.7	184.0	725.7	
Using a Rated No Damage Speed of	7.5 mph	709.9	154.3	1632.9	
Using a Rated No Damage Speed of	10.0 mph	859.7	127.3	2902.8	
Average Crush = 20.3 inches					169.9
Using a Rated No Damage Speed of	2.5 mph	230.4	146.3	181.4	
Using a Rated No Damage Speed of	5.0 mph	425.1	124.5	725.7	
Using a Rated No Damage Speed of	7.5 mph	584.0	104.4	1632.9	
Using a Rated No Damage Speed of	10.0 mph	707.2	86.2	2902.8	
Maximum Crush = 23.0 inches					132.4
Using a Rated No Damage Speed of	2.5 mph	203.4	114.0	181.4	
Using a Rated No Damage Speed of	5.0 mph	375.2	97.0	725.7	
Using a Rated No Damage Speed of	7.5 mph	515.5	81.4	1632.9	
Using a Rated No Damage Speed of	10.0 mph	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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact 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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact 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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact 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: 1997 - 2003
Make: PONTIAC
Model: GRAND PRIX

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
2821	1998 OLDSMOBILE INTRIGUE FOUR DOOR SEDAN	5.0	21.0	34.9	302.3	86.0	531.5	117.2	23.1
2831	1998 BUICK CENTURY FOUR DOOR SEDAN	5.0	19.7	29.9	268.6	67.9	531.3	97.9	18.1
2855	1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	17.7	29.6	386.6	107.3	696.2	155.3	19.8
2877	1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	9.2	25.2	465.2	205.0	527.9	318.8	27.7
3053	1999 BUICK CENTURY FOUR DOOR SEDAN	5.0	22.4	34.9	283.7	75.7	531.5	103.1	21.8
3471	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	23.2	34.9	279.0	71.9	541.0	98.0	21.0
3524	2001 CHEVROLET MONTE CARLO TWO DOOR C...	5.0	23.2	35.5	277.3	73.0	526.8	98.9	21.7
3637	2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	16.9	34.7	373.4	131.4	530.8	179.4	28.5
3786	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	12.9	30.0	413.5	160.1	534.0	230.8	27.8
3798	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	11.3	24.8	465.8	162.6	667.3	255.1	21.7
3843	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	16.9	29.8	321.5	94.3	548.3	136.2	21.0
4141	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	20.8	29.6	256.8	60.8	542.3	88.0	16.9
4317	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	12.1	24.9	351.3	115.8	532.7	181.2	20.6
4775	2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	20.4	34.7	325.6	95.1	557.6	129.7	23.7
5204	2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	18.1	29.6	307.7	83.3	567.9	120.7	19.3
	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: 1997 - 2003
Make: PONTIAC
Model: GRAND PRIX

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
2821	1998 OLDSMOBILE INTRIGUE FOUR DOOR SEDAN	5.0	24.1	34.9	263.4	65.3	531.5	89.0	20.2
2831	1998 BUICK CENTURY FOUR DOOR SEDAN	5.0	23.2	29.9	227.7	48.8	531.3	70.4	15.4
2855	1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	19.5	29.6	351.4	88.7	696.2	128.3	18.0
2877	1997 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	19.9	25.2	214.4	43.5	527.9	67.7	12.8
2888	1998 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	15.2	24.7	272.9	70.8	525.7	111.4	16.1
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
3524	2001 CHEVROLET MONTE CARLO TWO DOOR C...	5.0	28.5	35.5	225.8	48.4	526.8	65.6	17.7
3637	2001 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	19.1	34.7	330.0	102.6	530.8	140.0	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
3786	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	14.2	30.0	374.9	131.6	534.0	189.7	25.2
3798	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	16.7	24.8	317.3	75.4	667.3	118.3	14.8
3843	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	20.6	29.8	264.3	63.7	548.3	92.0	17.2
4141	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	24.7	29.6	216.5	43.2	542.3	62.5	14.2
4317	2001 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	13.5	24.9	313.4	92.2	532.7	144.3	18.3
4775	2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	23.1	34.7	286.9	73.8	557.6	100.7	20.9
5204	2004 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	20.7	29.6	269.6	64.0	567.9	92.7	16.9
	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 3.0.2.4

DeCoded VIN:	1FMYU03Z97KB60860
Model:	2007 Ford Escape XLT 4x2 4-Door SUV
Engine Size:	2.3L / 137 cu.in.
Engine Description:	Inline 4 cylinder with Dual Overhead Cam
Horse Power:	153 @ 5800 rpm
Torque:	152 lb-ft at 4250 rpm
Injection System:	Sequential Fuel Injection (SFI)
PSI:	39 psi
Ignition:	electronic
Manufacturer:	Ford
Assembly Plant:	Kansas City, MO
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (1FM) indicate a Ford Multi-Purpose Vehicle (MPV) made in the U.S.A.

The Fourth character (Y) indicates a GVWR of 4001-5000 lbs.

The Fifth through Seventh characters (U03) indicate an Escape XLT 4x2 and a 4-Door SUV

The Eighth character (Z) indicates the OEM engine: 2.3L / 137 cu.in., L4, DOHC

The Ninth character (the check digit) is entered as 9.
The VIN appears Valid, the calculated value is 9.

The Tenth character (7) indicates the model year 2007

The Eleventh character (K) indicates the vehicle was made in the assembly plant in Kansas City, MO

The Twelfth through Seventeenth characters (B60860) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

5/7/2011

2007 FORD ESCAPE 4 DOOR 4X2 UTILITY

Curb Weight:	3247 lbs.		1473	kg.
Curb Weight Distribution - Front:	58 %	Rear:	42	%
Gross Vehicle Weight Rating:	4179 lbs.		1896	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	173	14.42	4.39
Wheelbase:	103	8.58	2.62
Front Bumper to Front Axle:	34	2.83	0.86
Front Bumper to Front of Front Well:	17	1.42	0.43
Front Bumper to Front of Hood:	6	0.50	0.15
Front Bumper to Base of Windshield:	47	3.92	1.19
Front Bumper to Top of Windshield:	72	6.00	1.83
Rear Bumper to Rear Axle:	36	3.00	0.91
Rear Bumper to Rear of Rear Well:	21	1.75	0.53
Rear Bumper to Rear of Trunk:	5	0.42	0.13
Rear Bumper to Base of Rear Window:	7	0.58	0.18
Width Dimensions			
Maximum Width:	70	5.83	1.78
Front Track:	61	5.08	1.55
Rear Track:	61	5.08	1.55
Vertical Dimensions			
Height:	68	5.67	1.73
Ground to -			
Front Bumper (Top)	28	2.33	0.71
Headlight - center	34	2.83	0.86
Hood - top front:	37	3.08	0.94
Base of Windshield	46	3.83	1.17
Rear Bumper - top:	28	2.33	0.71
Trunk - top rear:	41	3.42	1.04
Base of Rear Window:	48	4.00	1.22

2007 FORD ESCAPE 4 DOOR 4X2 UTILITY

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
Front Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (max)	42	3.50	1.07
Rear Seat Shoulder Width	55	4.58	1.40
Rear Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (min)	36	3.00	0.91

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + OPTIONAL SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	456	38.00	11.58
Steering Ratio: 16.60:1			
Wheel Radius:	14	1.17	0.36
Tire Size (OEM): P235/70R16			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ALL WHEEL 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 =	3.7	sec	a =	11.9	ft/sec²	G-force = 0.37
0 to 60mph	t =	10.2	sec	a =	8.6	ft/sec²	G-force = 0.27
45 to 65mph	t =	6.7	sec	a =	4.4	ft/sec²	G-force = 0.14

Transmission Type: AUTOMATIC

Notes:

Federal Bumper Standard Requirements: No Requirement

N.S.D.C = 2005 - 2007

2007 FORD ESCAPE 4 DOOR 4X2 UTILITY

Other Information

Tip-Over Stability Ratio =	1.12	Reasonably Stable
NHTSA Star Rating (calculated)		**

Center of Gravity (No Load):

Inches behind front axle	=	43.26
Inches in front of rear axle	=	59.74
Inches from side of vehicle	=	35.00
Inches from ground	=	27.13
Inches from front corner	=	84.82
Inches from rear corner	=	101.94
Inches from front bumper	=	77.26
Inches from rear bumper	=	95.74

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2001.41	lb*ft*sec²
Pitch Moment of Inertia	=	1979.64	lb*ft*sec²
Roll Moment of Inertia	=	479.34	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	56.3	deg
Angle Front of Hood to Windshield Base	=	12.4	deg
Angle Front of Hood to Windshield Top	=	23.7	deg
Angle of Windshield	=	38.7	deg
Angle of Steering Tires at Max Turn	=	25.9	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

#3645

2001 FORD ESCAPE

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2007 FORD ESCAPE**

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

Year Range	Make	Model	Body Styles	Wheelbase
2001 - 2010	FORD	ESCAPE	SW, SUV	103.1
Remarks: BASED ON CONTOUR CHASSIS				
2001 - 2010	MAZDA	TRIBUTE	SW	103.1
Remarks: BASED ON FORD CONTOUR				
2005 - 2010	MERCURY	MARINER	SW	103.1
Remarks: BASED ON CONTOUR CHASSIS				

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 #	3645	NHTSA Test Reference Guide Version #	V5				
Test Date	2001-03-12	Contract #	DTNH22-01-D-12005				
Contract/Study Title	NCAP - 2001 FORD ESCAPE 4WD						
Test Objective(s)	VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE DATA						
Test Type	TEST PROCEDURE DEVELOPMENT	Configuration	VEHICLE INTO BARRIER				
Impact Angle	0	Side Impact Point	0	mm	0.0	inches	
			0	mm	0.0	inches	
		Closing Speed	56.3	Km/Hr	34.98	MPH	
Test Performer	MGA RESEARCH						
Test Reference #	BT01031201						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	21 C	69.8 F	Total Number of Curves	48			
Data Recorder Type	OTHER	Data Link	OTHER				
Test Commentary	EME ON BOARD DAS 3200						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	LOAD CELL BARRIER					
Barrier Commentary						

2001 FORD ESCAPE RIGHT REAR SEAT OCCUPANT

Test #	3645		
Vehicle #	1	Sex	NOT APPLICABLE
Location	RIGHT REAR SEAT	Age	0
Position	NOT APPLICABLE	Height	0 mm 0.0 inches
Type	CHILD DUMMY	Weight	0.0 kg 0 pounds
Size	3 YEAR OLD CHILD		
Calibration Method	PART 572		
Occupant Manufacturer	FIRST TECHNOLOGY S/N 142C		
Occupant Modification			
Occupant Description			
Occupant Commentary			

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	912	
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	61.2	
Seatback	803	mm	31.6	inches	HIC Upper Time Interval (ms)	97.2	
Side Header	0	mm	0.0	inches			
Side Window	0	mm	0.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): NONE

Second Contact Region (Head):

Chest

Chest to -

Dash	0	mm	0.0	inches	Arm to Door	0	mm	0.0	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	0	mm	0.0	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	408	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	44.3

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 0 mm 0.0 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):

2001 FORD ESCAPE RIGHT REAR SEAT OCCUPANT

Test #	3645					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	RIGHT REAR SEAT	Age	0			
Position	NOT APPLICABLE	Height	0	mm	0.0	inches
Type	CHILD DUMMY	Weight	0.0	kg	0	pounds
Size	3 YEAR OLD CHILD					

Calibration Method	PART 572
Occupant Manufacturer	FIRST TECHNOLOGY S/N 142C
Occupant Modification	
Occupant Description	
Occupant Commentary	

Restraints

Restraint # 1	CHILD RESTRAINT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	COSCO TRIAD LATCH
Restraint # 2	CHILD RESTRAINT
Mounted	NOT APPLICABLE
Deployment	NOT APPLICABLE
Restraint Commentary	COSCO TRIAD LATCH

2001 FORD ESCAPE LEFT REAR SEAT OCCUPANT

Test #	3645		
Vehicle #	1	Sex	NOT APPLICABLE
Location	LEFT REAR SEAT	Age	0
Position	NOT APPLICABLE	Height	0 mm 0.0 inches
Type	CHILD DUMMY	Weight	0.0 kg 0 pounds
Size	3 YEAR OLD CHILD		
Calibration Method	PART 572		
Occupant Manufacturer	FIRST TECHNOLOGY S/N 139		
Occupant Modification			
Occupant Description			
Occupant Commentary			

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	759	
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	62.9	
Seatback	803	mm	31.6	inches	HIC Upper Time Interval (ms)	98.9	
Side Header	0	mm	0.0	inches			
Side Window	0	mm	0.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): NONE

Second Contact Region (Head):

Chest

Chest to -

Dash	0	mm	0.0	inches	Arm to Door	0	mm	0.0	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	0	mm	0.0	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	408	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	46

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 0 mm 0.0 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):

2001 FORD ESCAPE LEFT REAR SEAT OCCUPANT

Test #	3645					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	LEFT REAR SEAT	Age	0			
Position	NOT APPLICABLE	Height	0	mm	0.0	inches
Type	CHILD DUMMY	Weight	0.0	kg	0	pounds
Size	3 YEAR OLD CHILD					

Calibration Method	PART 572
Occupant Manufacturer	FIRST TECHNOLOGY S/N 139
Occupant Modification	
Occupant Description	
Occupant Commentary	

Restraints

Restraint # 1	CHILD RESTRAINT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	COSCO TRIAD
Restraint # 2	CHILD RESTRAINT
Mounted	NOT APPLICABLE
Deployment	NOT APPLICABLE
Restraint Commentary	COSCO TRIAD

Vehicle 1 2001 FORD ESCAPE

Test #	3645		
VIN	1FMYU04141KA45163	NHTSA Test Vehicle Number	1
Year	2001	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	ESCAPE	Steering Column Collapse Mechanism	UNKNOWN
Body	UTILITY VEHICLE		
Engine	V6 TRANSVERSE FRONT		
Displacement	3 Liter	Transmission	AUTOMATIC - FOUR WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	4246	mm	167.2	inches	CG behind Front Axle	1103	mm	43.4	inches
Vehicle Width	1730	mm	68.1	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2620	mm	103.1	inches	Total Length of Indentation	1510	mm	59.4	inches
Vehicle Test Weight	1794	KG	3954	pounds	Maximum Static Crush Depth	510	mm	20.1	inches
					Pre-Impact Speed	56	kph	35.0	mph

Vehicle Damage Index: 12FDEW6

Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	261	mm	10.3	inches
DPD 2	416	mm	16.4	inches
DPD 3	481	mm	18.9	inches
DPD 4	492	mm	19.4	inches
DPD 5	446	mm	17.6	inches
DPD 6	291	mm	11.5	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	162.8	inches	152.6	inches	10.3	inches
	4136	mm	3875	mm	261	mm
Centerline	167.2	inches	147.1	inches	20.1	inches
	4246	mm	3736	mm	510	mm
Right Bumper Corner	162.8	inches	151.3	inches	11.5	inches
	4134	mm	3843	mm	291	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 2001 FORD ESCAPE

Test #	3645		
VIN	1FMYU04141KA45163	NHTSA Test Vehicle Number	1
Year	2001	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	ESCAPE	Steering Column Collapse Mechanism	UNKNOWN
Body	UTILITY VEHICLE		
Engine	V6 TRANSVERSE FRONT		
Displacement	3 Liter	Transmission	AUTOMATIC - FOUR WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	4246	mm	167.2	inches	CG behind Front Axle	1103	mm	43.4	inches
Vehicle Width	1730	mm	68.1	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2620	mm	103.1	inches	Total Length of Indentation	1510	mm	59.4	inches
Vehicle Test Weight	1794	KG	3954	pounds	Maximum Static Crush Depth	510	mm	20.1	inches
					Pre-Impact Speed	56	kph	35.0	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							
				4246	167.2	3736	147.1				
				Engine Block							
				495	19.5	495	19.5				
4136	162.8	3875	152.6	Front Bumper Corner				4134	162.8	3843	151.3
				Front of Engine							
				3680	144.9	3464	136.4				
3316	130.6	3225	127.0	Firewall				3311	130.4	3173	124.9
				3291	129.6	3183	125.3				
2885	113.6	2867	112.9	Upper Leading Edge of Door				2884	113.5	2872	113.1
2834	111.6	2811	110.7	Lower Leading Edge of Door				2831	111.5	2824	111.2
2825	111.2	2802	110.3	Bottom of 'A' Post				2827	111.3	2802	110.3
1834	72.2	1824	71.8	Upper Trailing Edge of Door				1836	72.3	1825	71.9
1852	72.9	1833	72.2	Lower Trailing Edge of Door				1850	72.8	1842	72.5
				Steering Column							
				2417	95.2	2399	94.4				
				Center of Seering Column to 'A' Post (Horizontal)							
				425	16.7	525	20.7				
				Center of Steering Column to Headliner (Vertical)							
				515	20.3	613	24.1				

2001 FORD ESCAPE

NHTSA Crash Test - #3645 - Front Impact

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

Test Vehicle Weight = 3954 pounds
Vehicle Closing Speed = 35.0 mph
Test Crush Length = 68.1 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	10.3	20.1	11.5	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 10.3 inches					536.9
Using a Rated No Damage Speed of	2.5 mph	366.9	462.9	145.4	
Using a Rated No Damage Speed of	5.0 mph	677.4	394.4	581.8	
Using a Rated No Damage Speed of	7.5 mph	931.4	331.4	1309.0	
Using a Rated No Damage Speed of	10.0 mph	1128.9	273.8	2327.1	
Average Crush = 15.5 inches					237.1
Using a Rated No Damage Speed of	2.5 mph	243.8	204.4	145.4	
Using a Rated No Damage Speed of	5.0 mph	450.2	174.2	581.8	
Using a Rated No Damage Speed of	7.5 mph	618.9	146.3	1309.0	
Using a Rated No Damage Speed of	10.0 mph	750.2	120.9	2327.1	
Maximum Crush = 20.1 inches					141.0
Using a Rated No Damage Speed of	2.5 mph	188.0	121.6	145.4	
Using a Rated No Damage Speed of	5.0 mph	347.1	103.6	581.8	
Using a Rated No Damage Speed of	7.5 mph	477.3	87.0	1309.0	
Using a Rated No Damage Speed of	10.0 mph	578.5	71.9	2327.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.1	32.5	-2.5	-7.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.4

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

2001 FORD ESCAPE

NHTSA Crash Test - #3645 - Front Impact

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

Test Vehicle Weight = 3954 pounds
Vehicle Closing Speed = 35.0 mph
Test Crush Length = 59.4 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	10.3	20.1	11.5	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 10.3 inches					615.1
Using a Rated No Damage Speed of	2.5 mph	420.4	530.3	166.6	
Using a Rated No Damage Speed of	5.0 mph	776.1	451.8	666.5	
Using a Rated No Damage Speed of	7.5 mph	1067.1	379.6	1499.7	
Using a Rated No Damage Speed of	10.0 mph	1293.4	313.7	2666.1	
Average Crush = 15.5 inches					271.6
Using a Rated No Damage Speed of	2.5 mph	279.4	234.2	166.6	
Using a Rated No Damage Speed of	5.0 mph	515.7	199.5	666.5	
Using a Rated No Damage Speed of	7.5 mph	709.1	167.6	1499.7	
Using a Rated No Damage Speed of	10.0 mph	859.5	138.5	2666.1	
Maximum Crush = 20.1 inches					161.5
Using a Rated No Damage Speed of	2.5 mph	215.4	139.3	166.6	
Using a Rated No Damage Speed of	5.0 mph	397.7	118.7	666.5	
Using a Rated No Damage Speed of	7.5 mph	546.8	99.7	1499.7	
Using a Rated No Damage Speed of	10.0 mph	662.8	82.4	2666.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.1	32.5	-2.5	-7.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.4

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

2001 FORD ESCAPE

NHTSA Crash Test - #3645 - Front Impact

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

Test Vehicle Weight = 3954 pounds
Vehicle Closing Speed = 35.0 MPH
Test Crush Length = 68.1 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	10.3	16.4	18.9	19.4	17.6	11.5	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 10.3 inches					536.9
Using a Rated No Damage Speed of	2.5mph	366.9	462.9	145.4	
Using a Rated No Damage Speed of	5.0mph	677.4	394.4	581.8	
Using a Rated No Damage Speed of	7.5mph	931.4	331.4	1309.0	
Using a Rated No Damage Speed of	10.0mph	1128.9	273.8	2327.1	
Average Crush = 16.6 inches					206.7
Using a Rated No Damage Speed of	2.5mph	227.7	178.2	145.4	
Using a Rated No Damage Speed of	5.0mph	420.3	151.8	581.8	
Using a Rated No Damage Speed of	7.5mph	577.9	127.6	1309.0	
Using a Rated No Damage Speed of	10.0mph	700.5	105.4	1615.7	
Maximum Crush = 19.4 inches					151.3
Using a Rated No Damage Speed of	2.5mph	194.8	130.5	145.4	
Using a Rated No Damage Speed of	5.0mph	359.7	111.2	581.8	
Using a Rated No Damage Speed of	7.5mph	494.5	93.4	1309.0	
Using a Rated No Damage Speed of	10.0mph	599.4	77.2	2327.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	19.4	31.9	-3.1	-9.6

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 25.2

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

2001 FORD ESCAPE

NHTSA Crash Test - #3645 - Front Impact

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

Test Vehicle Weight = 3954 pounds
Vehicle Closing Speed = 35.0 MPH
Test Crush Length = 59.4 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	10.3	16.4	18.9	19.4	17.6	11.5	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 10.3 inches					615.1
Using a Rated No Damage Speed of	2.5mph	420.4	530.3	166.6	
Using a Rated No Damage Speed of	5.0mph	776.1	451.8	666.5	
Using a Rated No Damage Speed of	7.5mph	1067.1	379.6	1499.7	
Using a Rated No Damage Speed of	10.0mph	1293.4	313.7	2666.1	
Average Crush = 16.6 inches					236.8
Using a Rated No Damage Speed of	2.5mph	260.9	204.2	166.6	
Using a Rated No Damage Speed of	5.0mph	481.6	174.0	666.5	
Using a Rated No Damage Speed of	7.5mph	662.1	146.2	1499.7	
Using a Rated No Damage Speed of	10.0mph	802.5	120.8	1851.1	
Maximum Crush = 19.4 inches					173.4
Using a Rated No Damage Speed of	2.5mph	223.2	149.5	166.6	
Using a Rated No Damage Speed of	5.0mph	412.1	127.4	666.5	
Using a Rated No Damage Speed of	7.5mph	566.6	107.0	1499.7	
Using a Rated No Damage Speed of	10.0mph	686.7	88.4	2666.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	19.4	31.9	-3.1	-9.6

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 25.2

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: 2001 - 2010
Make: FORD
Model: ESCAPE

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width G	Vehicle Width Kv	Crush Factor
3593	2001 FORD ESCAPE UTILITY VEHICLE	5.0	17.1	35.0	401.0	140.6	571.7	191.4	28.6
3645	2001 FORD ESCAPE UTILITY VEHICLE	5.0	16.6	35.0	419.8	151.4	581.8	206.2	29.5
3646	2001 FORD ESCAPE UTILITY VEHICLE	5.0	16.5	35.1	412.4	150.7	564.3	204.9	29.9
3784	2001 FORD ESCAPE OTHER	5.0	13.8	30.0	416.0	150.4	575.2	216.8	26.0
3817	2001 FORD ESCAPE UTILITY VEHICLE	5.0	11.6	24.9	385.4	131.5	564.8	206.1	21.2
3848	2001 FORD ESCAPE UTILITY VEHICLE	5.0	15.4	29.7	367.8	117.7	574.5	170.2	22.9
4137	2001 FORD ESCAPE FIVE DOOR HATCHBACK	5.0	14.3	29.5	341.4	117.4	496.5	170.2	24.4
4321	2001 FORD ESCAPE UTILITY VEHICLE	5.0	10.8	24.9	412.4	152.8	556.5	239.1	23.1
4952	2005 FORD ESCAPE UTILITY VEHICLE	5.0	19.5	35.0	355.2	109.0	578.4	148.4	25.1
5152	2005 FORD ESCAPE OTHER	5.0	8.5	24.8	487.5	226.1	525.6	354.8	28.8
5968	2008 FORD ESCAPE UTILITY VEHICLE	5.0	15.6	34.9	470.8	180.4	614.5	245.8	31.2
6078	2008 FORD ESCAPE UTILITY VEHICLE	5.0	15.6	34.6	461.1	175.4	606.1	239.6	30.8
6476	2009 FORD ESCAPE UTILITY VEHICLE	5.0	20.4	34.9	356.7	104.4	609.0	142.3	23.8
6662	2009 FORD ESCAPE UTILITY VEHICLE	5.0	14.3	24.8	341.7	94.5	617.6	148.3	17.2
	Average (AVG)				**402.1**	**143.0**	**574.0**	**206.0**	**25.9**
	Minimum (MIN)				**341.4**	**94.5**	**496.5**	**142.3**	**17.2**
	Maximum (MAX)				**487.5**	**226.1**	**617.6**	**354.8**	**31.2**
	Standard Deviation (STDev-sample)				**47.4**	**35.2**	**33.6**	**55.2**	**4.1**
	Number of Tests (n)			**14**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 2001 - 2010
Make: FORD
Model: ESCAPE

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
3593	2001 FORD ESCAPE UTILITY VEHICLE	5.0	18.5	35.0	371.3	120.6	571.7	164.2	26.5
3645	2001 FORD ESCAPE UTILITY VEHICLE	5.0	20.1	35.0	347.5	103.8	581.8	141.3	24.4
3646	2001 FORD ESCAPE UTILITY VEHICLE	5.0	21.1	35.1	322.0	91.9	564.3	124.9	23.4
3784	2001 FORD ESCAPE OTHER	5.0	16.4	30.0	350.5	106.8	575.2	153.9	21.9
3817	2001 FORD ESCAPE UTILITY VEHICLE	5.0	13.2	24.9	339.1	101.8	564.8	159.5	18.7
3848	2001 FORD ESCAPE UTILITY VEHICLE	5.0	17.2	29.7	329.2	94.3	574.5	136.3	20.5
4137	2001 FORD ESCAPE FIVE DOOR HATCHBACK	5.0	16.8	29.5	290.3	84.9	496.5	123.0	20.8
4179	2001 FORD ESCAPE FIVE DOOR HATCHBACK	5.0	13.5	24.9	290.8	85.5	494.3	133.9	18.3
4321	2001 FORD ESCAPE UTILITY VEHICLE	5.0	14.4	24.9	308.5	85.5	556.5	133.9	17.3
4952	2005 FORD ESCAPE UTILITY VEHICLE	5.0	20.7	35.0	334.3	96.6	578.4	131.5	23.6
5152	2005 FORD ESCAPE OTHER	5.0	12.0	24.8	347.7	115.0	525.6	180.4	20.5
5968	2008 FORD ESCAPE UTILITY VEHICLE	5.0	17.6	34.9	418.6	142.6	614.5	194.2	27.8
6078	2008 FORD ESCAPE UTILITY VEHICLE	5.0	17.4	34.6	413.3	140.9	606.1	192.5	27.6
6297	2008 FORD ESCAPE UTILITY VEHICLE	5.0	18.4	34.8	359.1	116.1	555.1	158.4	26.3
6299	2008 FORD ESCAPE UTILITY VEHICLE	5.0	19.2	37.2	372.4	124.9	555.1	166.7	28.8
6476	2009 FORD ESCAPE UTILITY VEHICLE	5.0	21.5	34.9	338.5	94.1	609.0	128.2	22.6
6662	2009 FORD ESCAPE UTILITY VEHICLE	5.0	15.3	24.8	319.3	82.5	617.6	129.5	16.1
	Average (AVG)				**344.3**	**105.2**	**567.1**	**150.1**	**22.7**
	Minimum (MIN)				**290.3**	**82.5**	**494.3**	**123.0**	**16.1**
	Maximum (MAX)				**418.6**	**142.6**	**617.6**	**194.2**	**28.8**
	Standard Deviation (STDev-sample)				**35.9**	**18.9**	**36.2**	**23.3**	**3.9**
	Number of Tests (n)			**17**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 2FAFP72W76X101360

Model:	2006 Ford Crown Victoria 4 door Sedan
Engine Size:	4.6 L/ 281 cu.in.
Engine Description:	V-8 cylinder with Overhead Cam
Horse Power:	220 @ 4750 rpm
Torque:	265 lb-ft @ 3250 rpm
Injection System:	Sequential Port Fuel Injection (SEFI)
PSI:	35-45 psi
Ignition:	electronic
Manufacturer:	Ford
Assembly Plant:	St. Thomas, Ontario
Drive Wheels:	This is a Rear Wheel Drive vehicle

The First through Third characters (2FA) indicate a Ford Passenger Car made in Canada

The Fourth character (F) indicates Manual Seatbelts + Driver/Passenger Front Air Bags

The Fifth through Seventh characters (P72) indicate a Crown Victoria and a 4 door Sedan

The Eighth character (W) indicates the OEM engine: 4.6 L/ 281 cu.in., V8, OHC

The Ninth character (the check digit) is entered as 7.
The VIN appears Valid, the calculated value is 7.

The Tenth character (6) indicates the model year 2006

The Eleventh character (X) indicates the vehicle was made in the assembly plant in St. Thomas, Ontario

The Twelfth through Seventeenth characters (101360) indicate the Serial Number and are unique to this vehicle.

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 2FAFP72W66X101317

Model:	2006 Ford Crown Victoria 4 door Sedan
Engine Size:	4.6 L/ 281 cu.in.
Engine Description:	V-8 cylinder with Overhead Cam
Horse Power:	220 @ 4750 rpm
Torque:	265 lb-ft @ 3250 rpm
Injection System:	Sequential Port Fuel Injection (SEFI)
PSI:	35-45 psi
Ignition:	electronic
Manufacturer:	Ford
Assembly Plant:	St. Thomas, Ontario
Drive Wheels:	This is a Rear Wheel Drive vehicle

The First through Third characters (2FA) indicate a Ford Passenger Car made in Canada

The Fourth character (F) indicates Manual Seatbelts + Driver/Passenger Front Air Bags

The Fifth through Seventh characters (P72) indicate a Crown Victoria and a 4 door Sedan

The Eighth character (W) indicates the OEM engine: 4.6 L/ 281 cu.in., V8, OHC

The Ninth character (the check digit) is entered as 6.
The VIN appears Valid, the calculated value is 6.

The Tenth character (6) indicates the model year 2006

The Eleventh character (X) indicates the vehicle was made in the assembly plant in St. Thomas, Ontario

The Twelfth through Seventeenth characters (101317) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2006 FORD CROWN VICTORIA 4 DOOR SEDAN

Curb Weight:	4057 lbs.		1840 kg.	
Curb Weight Distribution -	Front: 56 %		Rear: 44 %	
Gross Vehicle Weight Rating:	5500 lbs.		2495 kg.	
Number of Tires on Vehicle:	4			
Drive Wheels:	REAR			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	212	17.67	5.38
Wheelbase:	115	9.58	2.92
Front Bumper to Front Axle:	43	3.58	1.09
Front Bumper to Front of Front Well:	26	2.17	0.66
Front Bumper to Front of Hood:	8	0.67	0.20
Front Bumper to Base of Windshield:	65	5.42	1.65
Front Bumper to Top of Windshield:	91	7.58	2.31
Rear Bumper to Rear Axle:	54	4.50	1.37
Rear Bumper to Rear of Rear Well:	38	3.17	0.97
Rear Bumper to Rear of Trunk:	8	0.67	0.20
Rear Bumper to Base of Rear Window:	38	3.17	0.97
Width Dimensions			
Maximum Width:	78	6.50	1.98
Front Track:	63	5.25	1.60
Rear Track:	66	5.50	1.68
Vertical Dimensions			
Height:	57	4.75	1.45
Ground to -			
Front Bumper (Top)	23	1.92	0.58
Headlight - center	27	2.25	0.69
Hood - top front:	31	2.58	0.79
Base of Windshield	39	3.25	0.99
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	39	3.25	0.99
Base of Rear Window:	40	3.33	1.02

2006 FORD CROWN VICTORIA 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	61	5.08	1.55
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	60	5.00	1.52
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	40	3.33	1.02

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

Steering Data

Turning Circle (Diameter)	480	40.00	12.19
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

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 140.0 ft t = 3.2 sec a = -27.6 ft/sec² G-force = -0.86

Acceleration:

0 to 30mph	t =	2.8	sec	a =	15.7	ft/sec²	G-force = 0.49
0 to 60mph	t =	8.0	sec	a =	11.0	ft/sec²	G-force = 0.34
45 to 65mph	t =	5.1	sec	a =	5.8	ft/sec²	G-force = 0.18

Transmission Type: 4spd AUTOMATIC

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

N.S.D.C = 2003 - 2009

2006 FORD CROWN VICTORIA 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.44	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	50.60
Inches in front of rear axle	=	64.40
Inches from side of vehicle	=	39.00
Inches from ground	=	22.37
Inches from front corner	=	101.40
Inches from rear corner	=	124.66
Inches from front bumper	=	93.60
Inches from rear bumper	=	118.40

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2972.71	lb*ft*sec²
Pitch Moment of Inertia	=	2867.43	lb*ft*sec²
Roll Moment of Inertia	=	580.26	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	45.0	deg
Angle Front of Hood to Windshield Base	=	8.0	deg
Angle Front of Hood to Windshield Top	=	16.1	deg
Angle of Windshield	=	31.6	deg
Angle of Steering Tires at Max Turn	=	27.5	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

#5803

2006 FORD OTHER

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2006 FORD CROWN VICTORIA**

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

Year Range	Make	Model	Body Styles	Wheelbase
1998 - 2010	LINCOLN	TOWN CAR	2D, 4D	117.4
Remarks: Could use Crown Victoria/Grand Marquis - same basic RWD Chassis, longer WB				
2003 - 2010	FORD	CROWN VICTORIA	4D	114.7, 133
Remarks: REVISED "STIFFER FRAME"				
2003 - 2010	MERCURY	GRAND MARQUIS	2D, 4D, SW	114.7
Remarks: ALSO MARAUDER				

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 #	**5803**	NHTSA Test Reference Guide Version #	**V5**				
Test Date	**2005-12-14**	Contract #	**06-6008**				
Contract/Study Title	**RESEARCH COLLISION TEST**						
Test Objective(s)	**FRONTAL CRASH**						
Test Type	**RESEARCH SAFETY VEHICLE TEST**	Configuration	**VEHICLE INTO BARRIER**				
Impact Angle	**0**	Side Impact Point	**9999**	mm	**0.0**	inches	
			9999	mm	**0.0**	inches	
		Closing Speed	**56.7**	Km/Hr	**35.22**	MPH	
Test Performer	**TRANSPORT CANADA**						
Test Reference #	**TC06-207**						
Test Track Surface	**CONCRETE**	Condition	**DRY**				
Ambient Temperature	**21** C	**69.8** F	Total Number of Curves	**347**			
Data Recorder Type	**OTHER**	Data Link	**OTHER**				
Test Commentary	**NO COMMENTS**						

Fixed Barrier Information

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

2006 FORD OTHER LEFT FRONT SEAT OCCUPANT

Test #	5803		
Vehicle #	1	Sex	FEMALE
Location	LEFT FRONT SEAT	Age	99
Position	FORWARD OF CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	OTHER		
Occupant Manufacturer	FIRST TECHNOLOGY		
Occupant Modification	UNMODIFIED		
Occupant Description	S/N : 105		
Occupant Commentary	LAST CALIBRATION DATE : 31/OCT/05		

Head

Head to -

Windshielder Header	268	mm	10.6	inches	Head Injury Criteria (HIC)	330	
WindShield	652	mm	25.7	inches	HIC Lower Time Interval (ms)	51	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	87	
Side Header	270	mm	10.6	inches			
Side Window	360	mm	14.2	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	AIR BAG						
Second Contact Region (Head)							

Chest

Chest to -

Dash	9999	mm	0.0	inches	Arm to Door	133	mm	5.2	inches
Steering Wheel	238	mm	9.4	inches	Hip to Door	174	mm	6.9	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index	9999	Pelvic Peak Lateral Acceleration (g's)	9
Thoracic Trauma Index	9	Thorax Peak Acceleration (g's)	55.4

Lap Belt Peak Load	5370	Newtons	1207.2	pound Force
Shoulder Belt Peak Load	3981	Newtons	895.0	pound Force
First Contact Region (Chest/Abdomen)	AIR BAG			
Second Contact Region (Chest/Abdomen)	NONE			

Legs

Knees to Dash	60	mm	2.4	inches	Knees to Seatback	9999	mm	0.0	inches

Left Femur Peak Load	-1257	Newtons	-282.6	pounds Force
Right Femur Peak Load	-2124	Newtons	-477.5	pounds Force
First Contact Region (Legs)	DASHPANEL			
Second Contact Region (Legs)				

2006 FORD OTHER LEFT FRONT SEAT OCCUPANT

Test #	5803					
Vehicle #	1	Sex	FEMALE			
Location	LEFT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	FIRST TECHNOLOGY
Occupant Modification	UNMODIFIED
Occupant Description	S/N : 105
Occupant Commentary	LAST CALIBRATION DATE : 31/OCT/05

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS
Restraint # 2	AIR BAG
Mounted	STEERING WHEEL
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS

2006 FORD OTHER RIGHT FRONT SEAT OCCUPANT

Test #	5803		
Vehicle #	1	Sex	FEMALE
Location	RIGHT FRONT SEAT	Age	99
Position	FORWARD OF CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	OTHER		
Occupant Manufacturer	FIRST TECHNOLOGY		
Occupant Modification	UNMODIFIED		
Occupant Description	S/N : 104		
Occupant Commentary	LAST CALIBRATION DATE : 21/NOV/05		

Head

Head to -

Windshielder Header	284	mm	11.2	inches	Head Injury Criteria (HIC)	427	
WindShield	663	mm	26.1	inches	HIC Lower Time Interval (ms)	52.1	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	88.1	
Side Header	275	mm	10.8	inches			
Side Window	367	mm	14.4	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	AIR BAG						
Second Contact Region (Head)							

Chest

Chest to -

Dash	410	mm	16.1	inches	Arm to Door	184	mm	7.2	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	177	mm	7.0	inches
Seatback	9999	mm	0.0	inches					
Chest Severity Index	9999				Pelvic Peak Lateral Acceleration (g's)	9			
Thoracic Trauma Index	9				Thorax Peak Acceleration (g's)	51.6			
Lap Belt Peak Load	5358	Newtons	1204.5	pound Force					
Shoulder Belt Peak Load	3706	Newtons	833.1	pound Force					
First Contact Region (Chest/Abdomen)	AIR BAG								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	45	mm	1.8	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-1582	Newtons	-355.6	pounds Force					
Right Femur Peak Load	-1986	Newtons	-446.5	pounds Force					
First Contact Region (Legs)	DASHPANEL								
Second Contact Region (Legs)									

2006 FORD OTHER RIGHT FRONT SEAT OCCUPANT

Test #	5803					
Vehicle #	1	Sex	FEMALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	FIRST TECHNOLOGY
Occupant Modification	UNMODIFIED
Occupant Description	S/N : 104
Occupant Commentary	LAST CALIBRATION DATE : 21/NOV/05

Restraints

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

2006 FORD OTHER RIGHT REAR SEAT OCCUPANT

Test #	5803		
Vehicle #	1	Sex	FEMALE
Location	RIGHT REAR SEAT	Age	99
Position	NOT APPLICABLE	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	OTHER		
Occupant Manufacturer	FIRST TECHNOLOGY		
Occupant Modification	UNMODIFIED		
Occupant Description	S/N : 103		
Occupant Commentary	LAST CALIBRATION DATE : 10/NOV/05		

Head

Head to -

Windshielder Header	9999	mm	0.0	inches	Head Injury Criteria (HIC)	919	
WindShield	9999	mm	0.0	inches	HIC Lower Time Interval (ms)	65	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	101	
Side Header	9999	mm	0.0	inches			
Side Window	9999	mm	0.0	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	NONE						
Second Contact Region (Head)							

Chest

Chest to -

Dash	9999	mm	0.0	inches	Arm to Door	9999	mm	0.0	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	9999	mm	0.0	inches
Seatback	9999	mm	0.0	inches					
Chest Severity Index	9999				Pelvic Peak Lateral Acceleration (g's)	9			
Thoracic Trauma Index	9				Thorax Peak Acceleration (g's)	62.1			
Lap Belt Peak Load	8630	Newtons	1940.1	pound Force					
Shoulder Belt Peak Load	6281	Newtons	1412.0	pound Force					
First Contact Region (Chest/Abdomen)	NONE								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	9999	mm	0.0	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-1764	Newtons	-396.6	pounds Force					
Right Femur Peak Load	-2053	Newtons	-461.5	pounds Force					
First Contact Region (Legs)	NONE								
Second Contact Region (Legs)									

2006 FORD OTHER RIGHT REAR SEAT OCCUPANT

Test #	5803					
Vehicle #	1	Sex	FEMALE			
Location	RIGHT REAR SEAT	Age	99			
Position	NOT APPLICABLE	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	FIRST TECHNOLOGY
Occupant Modification	UNMODIFIED
Occupant Description	S/N : 103
Occupant Commentary	LAST CALIBRATION DATE : 10/NOV/05

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS
Restraint # 2	SEAT BACK
Mounted	OTHER
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS

2006 FORD OTHER LEFT REAR SEAT OCCUPANT

Test #	5803						
Vehicle #	1			Sex	FEMALE		
Location	LEFT REAR SEAT			Age	99		
Position	NOT APPLICABLE			Height	999	mm	39.3 inches
Type	HYBRID III DUMMY			Weight	999.0	kg	2202 pounds
Size	5 PERCENTILE						
Calibration Method	OTHER						
Occupant Manufacturer	FIRST TECHNOLOGY						
Occupant Modification	UNMODIFIED						
Occupant Description	S/N : 111						
Occupant Commentary	LAST CALIBRATION DATE : 10/NOV/05						

Head

Head to -

Windshielder Header	9999	mm	0.0	inches	Head Injury Criteria (HIC)	731	
WindShield	9999	mm	0.0	inches	HIC Lower Time Interval (ms)	66.2	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	102.2	
Side Header	9999	mm	0.0	inches			
Side Window	9999	mm	0.0	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	NONE						
Second Contact Region (Head)							

Chest

Chest to -

Dash	9999	mm	0.0	inches	Arm to Door	9999	mm	0.0	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	9999	mm	0.0	inches
Seatback	9999	mm	0.0	inches					
Chest Severity Index	9999				Pelvic Peak Lateral Acceleration (g's)	9			
Thoracic Trauma Index	9				Thorax Peak Acceleration (g's)	53.6			
Lap Belt Peak Load	8503	Newtons	1911.6	pound Force					
Shoulder Belt Peak Load	5747	Newtons	1292.0	pound Force					
First Contact Region (Chest/Abdomen)	NONE								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	9999	mm	0.0	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-2983	Newtons	-670.6	pounds Force					
Right Femur Peak Load	-2958	Newtons	-665.0	pounds Force					
First Contact Region (Legs)	NONE								
Second Contact Region (Legs)									

2006 FORD OTHER LEFT REAR SEAT OCCUPANT

Test #	5803					
Vehicle #	1	Sex	FEMALE			
Location	LEFT REAR SEAT	Age	99			
Position	NOT APPLICABLE	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	FIRST TECHNOLOGY
Occupant Modification	UNMODIFIED
Occupant Description	S/N : 111
Occupant Commentary	LAST CALIBRATION DATE : 10/NOV/05

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS
Restraint # 2	SEAT BACK
Mounted	OTHER
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS

Vehicle 1 2006 FORD OTHER

Test #	5803		
VIN	3FAFP07ZX6R106402	NHTSA Test Vehicle Number	1
Year	2006	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	OTHER	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.3 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	06-207 FORD FUSION		

Vehicle Length	4832	mm	190.2	inches	CG behind Front Axle	1277	mm	50.3	inches
Vehicle Width	1835	mm	72.2	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2727	mm	107.4	inches	Total Length of Indentation	1501	mm	59.1	inches
Vehicle Test Weight	1750	KG	3857	pounds	Maximum Static Crush Depth	9999	mm	0.0	inches
					Pre-Impact Speed	57	kph	35.2	mph

Vehicle Damage Index: 9999999 — Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	375	mm	14.8	inches
DPD 2	546	mm	21.5	inches
DPD 3	619	mm	24.4	inches
DPD 4	618	mm	24.3	inches
DPD 5	598	mm	23.5	inches
DPD 6	327	mm	12.9	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	186.5	inches	164.9	inches	21.7	inches
	4738	mm	4188	mm	550	mm
Centerline	190.2	inches	166.1	inches	24.1	inches
	4832	mm	4220	mm	612	mm
Right Bumper Corner	186.6	inches	164.3	inches	22.3	inches
	4739	mm	4173	mm	566	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
NOT APPLICABLE	99.0	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 2006 FORD OTHER

Test #	5803		
VIN	3FAFP07ZX6R106402	NHTSA Test Vehicle Number	1
Year	2006	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	OTHER	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.3 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	06-207 FORD FUSION		

Vehicle Length	4832	mm	190.2	inches	CG behind Front Axle	1277	mm	50.3	inches
Vehicle Width	1835	mm	72.2	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2727	mm	107.4	inches	Total Length of Indentation	1501	mm	59.1	inches
Vehicle Test Weight	1750	KG	3857	pounds	Maximum Static Crush Depth	9999	mm	0.0	inches
					Pre-Impact Speed	57	kph	35.2	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 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	4832	190.2	4220	166.1				
				Engine Block	212	8.3	1106	43.5				
4738	186.5	4188	164.9	Front Bumper Corner					4739	186.6	4173	164.3
				Front of Engine	4146	163.2	3726	146.7				
3524	138.7	3473	136.7	Firewall					3527	138.9	3427	134.9
					3723	146.6	0	0.0				
3335	131.3	3336	131.3	Upper Leading Edge of Door					3337	131.4	3334	131.3
3316	130.6	3316	130.6	Lower Leading Edge of Door					3329	131.1	3326	130.9
3291	129.6	3292	129.6	Bottom of 'A' Post					3297	129.8	3293	129.6
2276	89.6	2276	89.6	Upper Trailing Edge of Door					2282	89.8	2277	89.6
2317	91.2	2318	91.3	Lower Trailing Edge of Door					2322	91.4	2319	91.3
				Steering Column	2857	112.5	2893	113.9				
				Center of Seering Column to 'A' Post (Horizontal)	415	16.3	411	16.2				
				Center of Steering Column to Headliner (Vertical)	450	17.7	459	18.1				

2006 FORD OTHER

NHTSA Crash Test - #5803 - Front Impact

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

Test Vehicle Weight = 3857 pounds
Vehicle Closing Speed = 35.2 mph
Test Crush Length = 72.2 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	21.7	24.1	22.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 21.7 inches					112.7
Using a Rated No Damage Speed of	2.5 mph	161.3	97.3	133.8	
Using a Rated No Damage Speed of	5.0 mph	298.0	83.0	535.0	
Using a Rated No Damage Speed of	7.5 mph	410.1	69.8	1203.8	
Using a Rated No Damage Speed of	10.0 mph	497.4	57.8	2140.1	
Average Crush = 23.0 inches					100.4
Using a Rated No Damage Speed of	2.5 mph	152.2	86.6	133.8	
Using a Rated No Damage Speed of	5.0 mph	281.2	73.9	535.0	
Using a Rated No Damage Speed of	7.5 mph	386.9	62.2	1203.8	
Using a Rated No Damage Speed of	10.0 mph	469.3	51.5	2140.1	
Maximum Crush = 24.1 inches					91.4
Using a Rated No Damage Speed of	2.5 mph	145.3	78.9	133.8	
Using a Rated No Damage Speed of	5.0 mph	268.4	67.3	535.0	
Using a Rated No Damage Speed of	7.5 mph	369.2	56.6	1203.8	
Using a Rated No Damage Speed of	10.0 mph	447.9	46.9	2140.1	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.1	35.6	0.4	1.0

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.6

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

2006 FORD OTHER

NHTSA Crash Test - #5803 - Front Impact

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

Test Vehicle Weight = 3857 pounds
Vehicle Closing Speed = 35.2 mph
Test Crush Length = 59.1 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	21.7	24.1	22.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 21.7 inches					137.8
Using a Rated No Damage Speed of	2.5 mph	197.2	119.0	163.5	
Using a Rated No Damage Speed of	5.0 mph	364.3	101.5	654.1	
Using a Rated No Damage Speed of	7.5 mph	501.3	85.4	1471.7	
Using a Rated No Damage Speed of	10.0 mph	608.1	70.7	2616.3	
Average Crush = 23.0 inches					122.7
Using a Rated No Damage Speed of	2.5 mph	186.1	105.9	163.5	
Using a Rated No Damage Speed of	5.0 mph	343.8	90.3	654.1	
Using a Rated No Damage Speed of	7.5 mph	473.0	76.0	1471.7	
Using a Rated No Damage Speed of	10.0 mph	573.8	62.9	2616.3	
Maximum Crush = 24.1 inches					111.8
Using a Rated No Damage Speed of	2.5 mph	177.6	96.4	163.5	
Using a Rated No Damage Speed of	5.0 mph	328.1	82.3	654.1	
Using a Rated No Damage Speed of	7.5 mph	451.4	69.2	1471.7	
Using a Rated No Damage Speed of	10.0 mph	547.6	57.3	2616.3	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.1	35.6	0.4	1.0

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.6

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

2006 FORD OTHER

NHTSA Crash Test - #5803 - Front Impact

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

Test Vehicle Weight = 3857 pounds
Vehicle Closing Speed = 35.2 MPH
Test Crush Length = 72.2 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	14.8	21.5	24.4	24.3	23.5	12.9	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.9 inches					319.0
Using a Rated No Damage Speed of	2.5mph	271.4	275.4	133.8	
Using a Rated No Damage Speed of	5.0mph	501.3	234.9	535.0	
Using a Rated No Damage Speed of	7.5mph	689.8	197.6	1203.8	
Using a Rated No Damage Speed of	10.0mph	836.8	163.6	2140.1	
Average Crush = 21.5 inches					114.9
Using a Rated No Damage Speed of	2.5mph	162.8	99.1	133.8	
Using a Rated No Damage Speed of	5.0mph	300.8	84.6	535.0	
Using a Rated No Damage Speed of	7.5mph	413.9	71.1	1203.8	
Using a Rated No Damage Speed of	10.0mph	502.1	58.9	1490.5	
Maximum Crush = 24.4 inches					89.2
Using a Rated No Damage Speed of	2.5mph	143.5	77.0	133.8	
Using a Rated No Damage Speed of	5.0mph	265.1	65.7	535.0	
Using a Rated No Damage Speed of	7.5mph	364.7	55.2	1203.8	
Using a Rated No Damage Speed of	10.0mph	442.4	45.7	2140.1	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.4	35.8	0.6	1.6

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

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

2006 FORD OTHER

NHTSA Crash Test - #5803 - Front Impact

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

Test Vehicle Weight = 3857 pounds
Vehicle Closing Speed = 35.2 MPH
Test Crush Length = 59.1 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	14.8	21.5	24.4	24.3	23.5	12.9	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.9 inches					390.0
Using a Rated No Damage Speed of	2.5mph	331.8	336.6	163.5	
Using a Rated No Damage Speed of	5.0mph	612.9	287.2	654.1	
Using a Rated No Damage Speed of	7.5mph	843.3	241.6	1471.7	
Using a Rated No Damage Speed of	10.0mph	1023.0	200.0	2616.3	
Average Crush = 21.5 inches					140.4
Using a Rated No Damage Speed of	2.5mph	199.1	121.2	163.5	
Using a Rated No Damage Speed of	5.0mph	367.7	103.4	654.1	
Using a Rated No Damage Speed of	7.5mph	506.0	87.0	1471.7	
Using a Rated No Damage Speed of	10.0mph	613.8	72.0	1822.2	
Maximum Crush = 24.4 inches					109.0
Using a Rated No Damage Speed of	2.5mph	175.4	94.1	163.5	
Using a Rated No Damage Speed of	5.0mph	324.0	80.3	654.1	
Using a Rated No Damage Speed of	7.5mph	445.8	67.5	1471.7	
Using a Rated No Damage Speed of	10.0mph	540.8	55.9	2616.3	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.4	35.8	0.6	1.6

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

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: 2003 - 2010
Make: FORD
Model: CROWN VICTORIA

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
3219	2000 LINCOLN TOWN CAR FOUR DOOR SEDAN	5.0	26.8	35.1	263.7	59.2	587.0	80.5	18.4
3480	2001 LINCOLN TOWN CAR FOUR DOOR SEDAN	5.0	24.7	35.1	290.3	70.7	596.3	96.1	19.9
4476	2003 FORD CROWN VICTORIA FOUR DOOR SEDAN	5.0	23.0	35.3	318.1	83.9	603.6	113.8	21.7
5803	2006 FORD OTHER FOUR DOOR SEDAN	5.0	21.5	35.2	300.6	84.5	535.0	114.7	23.1
	Average (AVG)				**293.2**	**74.6**	**580.5**	**101.3**	**20.8**
	Minimum (MIN)				**263.7**	**59.2**	**535.0**	**80.5**	**18.4**
	Maximum (MAX)				**318.1**	**84.5**	**603.6**	**114.7**	**23.1**
	Standard Deviation (STDev-sample)				**22.8**	**12.1**	**31.1**	**16.3**	**2.1**
	Number of Tests (n)			**4**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 2003 - 2010
Make: FORD
Model: CROWN VICTORIA

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
3219	2000 LINCOLN TOWN CAR FOUR DOOR SEDAN	5.0	27.8	35.1	254.0	54.9	587.0	74.7	17.7
3480	2001 LINCOLN TOWN CAR FOUR DOOR SEDAN	5.0	27.6	35.1	260.6	56.9	596.3	77.4	17.9
4476	2003 FORD CROWN VICTORIA FOUR DOOR SEDAN	5.0	25.3	35.3	289.4	69.4	603.6	94.1	19.7
5803	2006 FORD OTHER FOUR DOOR SEDAN	5.0	24.4	35.2	265.4	65.8	535.0	89.4	20.4
	Average (AVG)				**267.4**	**61.8**	**580.5**	**83.9**	**18.9**
	Minimum (MIN)				**254.0**	**54.9**	**535.0**	**74.7**	**17.7**
	Maximum (MAX)				**289.4**	**69.4**	**603.6**	**94.1**	**20.4**
	Standard Deviation (STDev-sample)				**15.4**	**7.0**	**31.1**	**9.3**	**1.3**
	Number of Tests (n)			**4**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: KMHWF35H54A067682

Model:	2004 Hyundai Sonata 4-Door Sedan
Engine Size:	2.7 L/ cu.in.
Engine Description:	V6 cylinder with Overhead Cam
Horse Power:	172 @ 6000 rpm
Torque:	181 lb-ft at 4000 rpm
Injection System:	MultiPoint Fuel Injection (MPFI)
PSI:	48 psi
Ignition:	electronic
Manufacturer:	Hyundai
Assembly Plant:	Asan, Korea
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (KMH) indicate a Hyundai Vehicle made in Korea

The Fourth character (W) indicates a Sonata

The Fifth character (F) indicates a GL series

The Sixth character (3) indicates a 4-Door Sedan

The Seventh character (5) indicates Manual Belts w/ Dual Front Air Bags

The Eighth character (H) indicates the OEM engine: 2.7 L/ cu.in., V6, OHC

The Ninth character (the check digit) is entered as 5.
The VIN appears Valid, the calculated value is 5.

The Tenth character (4) indicates the model year 2004

The Eleventh character (A) indicates the vehicle was made in the assembly plant in Asan, Korea

The Twelfth through Seventeenth characters (067682) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:

4N6XPRT Systems

8387 University Avenue

La Mesa CA 91941

5/7/2011

2004 HYUNDAI SONATA (V6) 4 DOOR SEDAN

Curb Weight:	3223	lbs.	1462	kg.
Curb Weight Distribution - Front:	61	% Rear:	39	%
Gross Vehicle Weight Rating:	4233	lbs.	1920	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	187	15.58	4.75
Wheelbase:	106	8.83	2.69
Front Bumper to Front Axle:	38	3.17	0.97
Front Bumper to Front of Front Well:	23	1.92	0.58
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:	79	6.58	2.01
Rear Bumper to Rear Axle:	43	3.58	1.09
Rear Bumper to Rear of Rear Well:	28	2.33	0.71
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	26	2.17	0.66
Width Dimensions			
Maximum Width:	72	6.00	1.83
Front Track:	60	5.00	1.52
Rear Track:	59	4.92	1.50
Vertical Dimensions			
Height:	56	4.67	1.42
Ground to -			
Front Bumper (Top)	21	1.75	0.53
Headlight - center	26	2.17	0.66
Hood - top front:	30	2.50	0.76
Base of Windshield	37	3.08	0.94
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	39	3.25	0.99
Base of Rear Window:	43	3.58	1.09

2004 HYUNDAI SONATA (V6) 4 DOOR SEDAN

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
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	55	4.58	1.40
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	29	2.42	0.74

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	492	41.00	12.50
Steering Ratio:	:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	P205/65R16		

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 = 138.0 ft t = 3.1 sec a = -28.0 ft/sec² G-force = -0.87

Acceleration:

0 to 30mph	t =	3.3	sec	a =	13.3	ft/sec²	G-force = 0.41
0 to 60mph	t =	9.0	sec	a =	9.8	ft/sec²	G-force = 0.30
45 to 65mph	t =	5.6	sec	a =	5.2	ft/sec²	G-force = 0.16

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 2002 - 2005

2004 HYUNDAI SONATA (V6) 4 DOOR SEDAN

Other Information

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

Center of Gravity (No Load):

Inches behind front axle	=	41.34
Inches in front of rear axle	=	64.66
Inches from side of vehicle	=	36.00
Inches from ground	=	21.98
Inches from front corner	=	87.13
Inches from rear corner	=	113.52
Inches from front bumper	=	79.34
Inches from rear bumper	=	107.66

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2113.69	lb*ft*sec²
Pitch Moment of Inertia	=	2041.77	lb*ft*sec²
Roll Moment of Inertia	=	430.14	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	=	18.4	deg
Angle of Windshield	=	30.4	deg
Angle of Steering Tires at Max Turn	=	24.7	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

#4078

2002 HYUNDAI SONATA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2004 HYUNDAI SONATA**

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

Year Range	Make	Model	Body Styles	Wheelbase
1999 - 2005	HYUNDAI	SONATA	4D	107.4
Remarks: MILD RESTYLE in 2002				
2001 - 2006	KIA	OPTIMA	4D	106.3
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 #	4078	NHTSA Test Reference Guide Version #	V5			
Test Date	2002-02-06	Contract #	DTNH22-97-C-11033			
Contract/Study Title	FMVSS 214 INDICANT - 2002 HYUNDAI SONATA WITH SIDE AIRBAG					
Test Objective(s)	VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE DATA					
Test Type	COMPLIANCE - INDICANT TEST	Configuration	IMPACTOR INTO VEHICLE			
Impact Angle	270	Side Impact Point	N/A	mm	N/A	inches
			0	mm	0.0	inches
		Closing Speed	62.0	Km/Hr	38.52	MPH
Test Performer	MGA RESEARCH					
Test Reference #	BT02020601					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	20 C	68.0 F	Total Number of Curves	55		
Data Recorder Type	OTHER	Data Link	OTHER			
Test Commentary	EME ON BOARD DAS 3200					

Fixed Barrier Information

Barrier Type		Pole Barrier Diameter		mm	inches
Barrier Shape					
Barrier Commentary					

2002 HYUNDAI SONATA LEFT FRONT SEAT OCCUPANT

Test #	4078		
Vehicle #	2	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	NHTSA SIDE IMPACT DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	SIDE IMPACT DUMMY		
Occupant Manufacturer	FIRST TECHNOLOGY S/N 049		
Occupant Modification			
Occupant Description			
Occupant Commentary	LOWER CHEST AND LEFT LEG TO DOORPANEL; RIGHT LEG TO LEFT LEG		

Head

Head to -

Windshielder Header	394	mm	15.5	inches	Head Injury Criteria (HIC)	135	
WindShield	598	mm	23.5	inches	HIC Lower Time Interval (ms)	40.3	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	76.3	
Side Header	199	mm	7.8	inches			
Side Window	324	mm	12.8	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	563	mm	22.2	inches	Arm to Door	112	mm	4.4	inches
Steering Wheel	384	mm	15.1	inches	Hip to Door	142	mm	5.6	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	0	Pelvic Peak Lateral Acceleration (g's)	93.6
Thoracic Trauma Index	63.9	Thorax Peak Acceleration (g's)	0

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): AIR BAG

Second Contact Region (Chest/Abdomen): OTHER

Legs

Knees to Dash	201	mm	7.9	inches	Knees to Seatback	0	mm	0.0	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): OTHER

Second Contact Region (Legs):

2002 HYUNDAI SONATA LEFT FRONT SEAT OCCUPANT

Test #	4078					
Vehicle #	2	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	NHTSA SIDE IMPACT DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	SIDE IMPACT DUMMY
Occupant Manufacturer	FIRST TECHNOLOGY S/N 049
Occupant Modification	
Occupant Description	
Occupant Commentary	LOWER CHEST AND LEFT LEG TO DOORPANEL; RIGHT LEG TO LEFT LEG

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	SEAT BACK
Deployment	DEPLOYED PROPERLY
Restraint Commentary	PRIMARY
Restraint # 2	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY

2002 HYUNDAI SONATA LEFT REAR SEAT OCCUPANT

Test #	4078		
Vehicle #	2	Sex	MALE
Location	LEFT REAR SEAT	Age	0
Position	NON-ADJUSTABLE SEAT	Height	0 mm 0.0 inches
Type	NHTSA SIDE IMPACT DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	SIDE IMPACT DUMMY		
Occupant Manufacturer	FIRST TECHNOLOGY S/N 048		
Occupant Modification			
Occupant Description			
Occupant Commentary	CHEST AND LEFT LEG TO DOOR PANEL; RIGHT LEG TO LEFT LEG		

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)	47.9	
Seatback	603	mm	23.7	inches	HIC Upper Time Interval (ms)	67.8	
Side Header	168	mm	6.6	inches			
Side Window	319	mm	12.6	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): C PILLAR

Second Contact Region (Head):

Chest

Chest to -

Dash	0	mm	0.0	inches	Arm to Door	113	mm	4.4	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	169	mm	6.7	inches
Seatback	520	mm	20.5	inches					

Chest Severity Index	0	Pelvic Peak Lateral Acceleration (g's)	89.3
Thoracic Trauma Index	58.1	Thorax Peak Acceleration (g's)	0

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): OTHER

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash 0 mm 0.0 inches Knees to Seatback 117 mm 4.6 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): OTHER

Second Contact Region (Legs):

2002 HYUNDAI SONATA LEFT REAR SEAT OCCUPANT

Test #	4078					
Vehicle #	2	Sex	MALE			
Location	LEFT REAR SEAT	Age	0			
Position	NON-ADJUSTABLE SEAT	Height	0	mm	0.0	inches
Type	NHTSA SIDE IMPACT DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	SIDE IMPACT DUMMY
Occupant Manufacturer	FIRST TECHNOLOGY S/N 048
Occupant Modification	
Occupant Description	
Occupant Commentary	CHEST AND LEFT LEG TO DOOR PANEL; RIGHT LEG TO LEFT LEG

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	PRIMARY
Restraint # 2	NONE
Mounted	NOT APPLICABLE
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY

Vehicle 1 0 NHTSA DEFORMABLE IMPACTOR

Test #	4078		
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			
Vehicle Commentary	FMVSS 214 DEFORMABLE BARRIER AND IMPACTOR		

Vehicle Length	4115	mm	162.0	inches	CG behind Front Axle	1106	mm	43.5	inches
Vehicle Width	1252	mm	49.3	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2591	mm	102.0	inches	Total Length of Indentation	0	mm	0.0	inches
Vehicle Test Weight	1362	KG	3002	pounds	Maximum Static Crush Depth	0	mm	0.0	inches
					Pre-Impact Speed	62	kph	38.5	mph

Vehicle Damage Index: | 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)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
27.0	NOT APPLICABLE	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	27.0	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 0 NHTSA DEFORMABLE IMPACTOR

Test #	4078		
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			
Vehicle Commentary	FMVSS 214 DEFORMABLE BARRIER AND IMPACTOR		

Vehicle Length	4115	mm	162.0	inches	CG behind Front Axle	1106	mm	43.5	inches
Vehicle Width	1252	mm	49.3	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2591	mm	102.0	inches	Total Length of Indentation	0	mm	0.0	inches
Vehicle Test Weight	1362	KG	3002	pounds	Maximum Static Crush Depth	0	mm	0.0	inches
					Pre-Impact Speed	62	kph	38.5	mph

Vehicle Damage Index		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 2002 HYUNDAI SONATA

Test #	4078		
VIN	KMHWF25S92A559263	NHTSA Test Vehicle Number	2
Year	2002	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	HYUNDAI	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	SONATA	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.4 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	4740	mm	186.6	inches	CG behind Front Axle	1137	mm	44.8	inches
Vehicle Width	1780	mm	70.1	inches	Center of Damage to CG Axis	-246	mm	-9.7	inches
Vehicle Wheelbase	2696	mm	106.1	inches	Total Length of Indentation	3150	mm	124.0	inches
Vehicle Test Weight	1682	KG	3707	pounds	Maximum Static Crush Depth	365	mm	14.4	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index: 03LPAW2

Principal Direction of Force: 297

Damage Profile Distance Measurements

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

DPD 1	4	mm	0.2	inches
DPD 2	82	mm	3.2	inches
DPD 3	330	mm	13.0	inches
DPD 4	309	mm	12.2	inches
DPD 5	82	mm	3.2	inches
DPD 6	-3	mm	-0.1	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	162.8	inches	159.5	inches	3.3	inches
	4135	mm	4052	mm	83	mm
Centerline	186.6	inches	183.7	inches	3.0	inches
	4740	mm	4665	mm	75	mm
Right Bumper Corner	162.8	inches	163.0	inches	-0.2	inches
	4135	mm	4141	mm	-6	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
27.0	DIRECT ENGAGEMENT	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT DEFINED	0.0	DIRECT ENGAGEMENT
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 2 2002 HYUNDAI SONATA

Test #	4078		
VIN	KMHWF25S92A559263	NHTSA Test Vehicle Number	2
Year	2002	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	HYUNDAI	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	SONATA	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.4 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	4740	mm	186.6	inches	CG behind Front Axle	1137	mm	44.8	inches
Vehicle Width	1780	mm	70.1	inches	Center of Damage to CG Axis	-246	mm	-9.7	inches
Vehicle Wheelbase	2696	mm	106.1	inches	Total Length of Indentation	3150	mm	124.0	inches
Vehicle Test Weight	1682	KG	3707	pounds	Maximum Static Crush Depth	365	mm	14.4	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index: 03LPAW2 — Principal Direction of Force: 297

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	4740	186.6	4665	183.7				
				Engine Block	0	0.0	0	0.0				
4135	162.8	4052	159.5	Front Bumper Corner					4135	162.8	4141	163.0
				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				

2002 HYUNDAI SONATA

NHTSA Crash Test - #4078 - Side Impact

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

Test Vehicle Weight = 3707 pounds
KE Equivalent Speed = 25.8 MPH
Test Crush Length = 124.0 inches

Impactor Weight = 3002
Impactor Test Speed = 38.5

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Rear)	0.2	3.2	13.0	12.2	3.2	-0.1	(Front)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.2 inches					397867.0
Using a Rated No Damage Speed of	1.0mph	2968.0	367587.4	12.0	
Using a Rated No Damage Speed of	2.0mph	5696.4	338506.0	47.9	
Using a Rated No Damage Speed of	3.0mph	8185.2	310622.9	107.8	
Using a Rated No Damage Speed of	5.0mph	12443.7	258451.5	299.6	
Average Crush = 6.3 inches					401.0
Using a Rated No Damage Speed of	1.0mph	94.2	370.5	12.0	
Using a Rated No Damage Speed of	2.0mph	180.8	341.1	47.9	
Using a Rated No Damage Speed of	3.0mph	259.8	313.0	107.8	
Using a Rated No Damage Speed of	5.0mph	395.0	260.5	228.7	
Maximum Crush = 13.0 inches					94.2
Using a Rated No Damage Speed of	1.0mph	45.7	87.0	12.0	
Using a Rated No Damage Speed of	2.0mph	87.6	80.1	47.9	
Using a Rated No Damage Speed of	3.0mph	125.9	73.5	107.8	
Using a Rated No Damage Speed of	5.0mph	191.4	61.2	299.6	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	13.0	26.1	0.4	1.4

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.4

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

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1999 - 2005
Make: HYUNDAI
Model: SONATA

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
3383	2000 HYUNDAI SONATA FOUR DOOR SEDAN	2.0	9.7	25.6	124.9	151.6	51.5	178.3	27.0
3569	2001 KIA OPTIMA FOUR DOOR SEDAN	2.0	6.8	22.1	119.8	177.8	40.4	214.9	28.8
4078	2002 HYUNDAI SONATA FOUR DOOR SEDAN	2.0	6.3	25.8	179.7	337.0	47.9	396.1	41.9
4902	2004 KIA OPTIMA FOUR DOOR SEDAN	2.0	9.5	25.7	226.2	282.9	90.5	332.6	27.9
5849	2006 KIA OPTIMA FOUR DOOR SEDAN	2.0	5.8	25.9	164.3	338.8	39.9	397.9	46.3
	Average (AVG)				**163.0**	**257.6**	**54.0**	**304.0**	**34.4**
	Minimum (MIN)				**119.8**	**151.6**	**39.9**	**178.3**	**27.0**
	Maximum (MAX)				**226.2**	**338.8**	**90.5**	**397.9**	**46.3**
	Standard Deviation (STDev-sample)				**43.6**	**88.2**	**21.0**	**102.3**	**9.0**
	Number of Tests (n)			**5**					

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1999 - 2005
Make: HYUNDAI
Model: SONATA

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
3383	2000 HYUNDAI SONATA FOUR DOOR SEDAN	2.0	16.2	25.6	75.2	54.9	51.5	64.6	16.2
3569	2001 KIA OPTIMA FOUR DOOR SEDAN	2.0	13.0	22.1	62.4	48.3	40.4	58.4	15.0
4078	2002 HYUNDAI SONATA FOUR DOOR SEDAN	2.0	14.4	25.8	79.3	65.6	47.9	77.1	18.5
4902	2004 KIA OPTIMA FOUR DOOR SEDAN	2.0	15.2	25.7	140.9	109.7	90.5	129.0	17.4
5849	2006 KIA OPTIMA FOUR DOOR SEDAN	2.0	13.9	25.9	68.7	59.2	39.9	69.5	19.3
	Average (AVG)				**85.3**	**67.5**	**54.0**	**79.7**	**17.3**
	Minimum (MIN)				**62.4**	**48.3**	**39.9**	**58.4**	**15.0**
	Maximum (MAX)				**140.9**	**109.7**	**90.5**	**129.0**	**19.3**
	Standard Deviation (STDev-sample)				**31.7**	**24.4**	**21.0**	**28.4**	**1.7**
	Number of Tests (n)			**5**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 5TDZA23C56S431560

Model:	2006 Toyota Sienna 4 Door MPV
Engine Size:	3.3L / 201cu.in.
Engine Description:	V6 Cylinder with Dual Overhead Cam
Horse Power:	225 @ 5600 rpm
Torque:	240 lb-ft @ 3600 rpm
Injection System:	Multiport Fuel Injection (MFI)
PSI:	44-50 psi
Ignition:	electronic
Manufacturer:	Toyota
Assembly Plant:	Princeton, Indiana
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (5TD) indicate a Toyota SUV made in the U.S.A.

The Fourth character (Z) indicates a 4 Door MPV

The Fifth character (A) indicates the OEM engine: 3.3L / 201cu.in., V6,DOHC

The Sixth and Eighth characters (2C) indicate a Sienna

The Seventh character (3) indicates Dual Air Bags

The Ninth character (the check digit) is entered as 5.
The VIN appears Valid, the calculated value is 5.

The Tenth character (6) indicates the model year 2006

The Eleventh character (S) indicates the vehicle was made in the assembly plant in Princeton, Indiana

The Twelfth through Seventeenth characters (431560) indicate the Serial Number and are unique to this vehicle.

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 5TDZA23C76S441474

Model:	2006 Toyota Sienna 4 Door MPV
Engine Size:	3.3L / 201cu.in.
Engine Description:	V6 Cylinder with Dual Overhead Cam
Horse Power:	225 @ 5600 rpm
Torque:	240 lb-ft @ 3600 rpm
Injection System:	Multiport Fuel Injection (MFI)
PSI:	44-50 psi
Ignition:	electronic
Manufacturer:	Toyota
Assembly Plant:	Princeton, Indiana
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (5TD) indicate a Toyota SUV made in the U.S.A.

The Fourth character (Z) indicates a 4 Door MPV

The Fifth character (A) indicates the OEM engine: 3.3L / 201cu.in., V6,DOHC

The Sixth and Eighth characters (2C) indicate a Sienna

The Seventh character (3) indicates Dual Air Bags

The Ninth character (the check digit) is entered as 7.
The VIN appears Valid, the calculated value is 7.

The Tenth character (6) indicates the model year 2006

The Eleventh character (S) indicates the vehicle was made in the assembly plant in Princeton, Indiana

The Twelfth through Seventeenth characters (441474) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2006 TOYOTA SIENNA 4 DOOR PASSENGER VAN

Curb Weight:		4200	lbs.	1905	kg.
Curb Weight Distribution -	Front:	58	% Rear:	42	%
Gross Vehicle Weight Rating:		5690	lbs.	2581	kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	200	16.67	5.08
Wheelbase:	119	9.92	3.02
Front Bumper to Front Axle:	39	3.25	0.99
Front Bumper to Front of Front Well:	23	1.92	0.58
Front Bumper to Front of Hood:	6	0.50	0.15
Front Bumper to Base of Windshield:	39	3.25	0.99
Front Bumper to Top of Windshield:	73	6.08	1.85
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	26	2.17	0.66
Rear Bumper to Rear of Trunk:	3	0.25	0.08
Rear Bumper to Base of Rear Window:	4	0.33	0.10
Width Dimensions			
Maximum Width:	77	6.42	1.96
Front Track:	66	5.50	1.68
Rear Track:	67	5.58	1.70
Vertical Dimensions			
Height:	69	5.75	1.75
Ground to -			
Front Bumper (Top)	24	2.00	0.61
Headlight - center	34	2.83	0.86
Hood - top front:	34	2.83	0.86
Base of Windshield	44	3.67	1.12
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	40	3.33	1.02
Base of Rear Window:	46	3.83	1.17

2006 TOYOTA SIENNA 4 DOOR PASSENGER VAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	64	5.33	1.63
Front Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	65	5.42	1.65
Rear Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (min)	40	3.33	1.02

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	444	37.00	11.28
Steering Ratio:	:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	P215/65R16		

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ALL WHEEL ABS

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

d = 131.0 ft t = 3.0 sec a = -29.5 ft/sec² G-force = -0.92

Acceleration:

0 to 30mph	t =	2.7	sec	a =	16.3	ft/sec²	G-force = 0.51
0 to 60mph	t =	7.8	sec	a =	11.3	ft/sec²	G-force = 0.35
45 to 65mph	t =	4.2	sec	a =	7.0	ft/sec²	G-force = 0.22

Transmission Type: 5spd AUTOMATIC

Notes:

Federal Bumper Standard Requirements: No Requirement

N.S.D.C = 2006 - 2010

2006 TOYOTA SIENNA 4 DOOR PASSENGER VAN

Other Information

Tip-Over Stability Ratio =	1.23	Reasonably Stable
NHTSA Star Rating (calculated)		***

Center of Gravity (No Load):

Inches behind front axle	=	49.98
Inches in front of rear axle	=	69.02
Inches from side of vehicle	=	38.50
Inches from ground	=	27.01
Inches from front corner	=	96.95
Inches from rear corner	=	117.51
Inches from front bumper	=	88.98
Inches from rear bumper	=	111.02

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2983.00	lb*ft*sec²
Pitch Moment of Inertia	=	3047.00	lb*ft*sec²
Roll Moment of Inertia	=	689.00	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	59.0	deg
Angle Front of Hood to Windshield Base	=	16.9	deg
Angle Front of Hood to Windshield Top	=	26.2	deg
Angle of Windshield	=	34.1	deg
Angle of Steering Tires at Max Turn	=	30.7	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

#4846

2004 TOYOTA SIENNA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2006 TOYOTA SIENNA**

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

Year Range	Make	Model	Body Styles	Wheelbase
2004 - 2010	TOYOTA	SIENNA	VAN	119.3

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 #	**4846**	NHTSA Test Reference Guide Version #	**V5**				
Test Date	**2003-11-25**	Contract #	**DTNH22-01-D-12005**				
Contract/Study Title	**NCAP - 2004 TOYOTA SIENNA**						
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	
			0	mm	**0.0**	inches	
		Closing Speed	**56.6**	Km/Hr	**35.17**	MPH	
Test Performer	**MGA RESEARCH**						
Test Reference #	**BT03112501**						
Test Track Surface	**CONCRETE**	Condition	**DRY**				
Ambient Temperature	**21** C **69.8** F	Total Number of Curves	**150**				
Data Recorder Type	**OTHER**	Data Link	**OTHER**				
Test Commentary	**EME ON BOARD DAS 3200**						

Fixed Barrier Information

Barrier Type	**RIGID**	Pole Barrier Diameter	**0**	mm	**0**	inches
Barrier Shape	**LOAD CELL BARRIER**					
Barrier Commentary						

2004 TOYOTA SIENNA LEFT FRONT SEAT OCCUPANT

Test #	4846		
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 066		
Occupant Modification			
Occupant Description			
Occupant Commentary	HEAD TO HEADREST		

Head

Head to -

Windshielder Header	434	mm	17.1	inches	Head Injury Criteria (HIC)	370	
WindShield	723	mm	28.5	inches	HIC Lower Time Interval (ms)	62.4	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	98.4	
Side Header	265	mm	10.4	inches			
Side Window	359	mm	14.1	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	559	mm	22.0	inches	Arm to Door	144	mm	5.7	inches
Steering Wheel	355	mm	14.0	inches	Hip to Door	159	mm	6.3	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)	39.3

Lap Belt Peak Load	6097	Newtons	1370.7	pound Force
Shoulder Belt Peak Load	6379	Newtons	1434.1	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	140	mm	5.5	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-2824	Newtons	-634.9	pounds Force
Right Femur Peak Load	-3959	Newtons	-890.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2004 TOYOTA SIENNA LEFT FRONT SEAT OCCUPANT

Test #	4846					
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 066
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO HEADREST

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	STEERING WHEEL
Deployment	DEPLOYED PROPERLY
Restraint Commentary	PRIMARY
Restraint # 2	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY

2004 TOYOTA SIENNA RIGHT FRONT SEAT OCCUPANT

Test #	4846		
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 065		
Occupant Modification			
Occupant Description			
Occupant Commentary	HEAD TO HEADREST		

Head

Head to -

Windshielder Header	351	mm	13.8	inches	Head Injury Criteria (HIC)	678	
WindShield	589	mm	23.2	inches	HIC Lower Time Interval (ms)	72.4	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	107.3	
Side Header	223	mm	8.8	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	545	mm	21.5	inches	Arm to Door	134	mm	5.3	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	121	mm	4.8	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)	33.4

Lap Belt Peak Load	5097	Newtons	1145.9	pound Force
Shoulder Belt Peak Load	4996	Newtons	1123.2	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	106	mm	4.2	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-4833	Newtons	-1086.5	pounds Force
Right Femur Peak Load	-2767	Newtons	-622.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2004 TOYOTA SIENNA RIGHT FRONT SEAT OCCUPANT

Test #	4846					
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 065
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO HEADREST

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	DASH PANEL - UNSPECIFIED
Deployment	DEPLOYED PROPERLY
Restraint Commentary	PRIMARY
Restraint # 2	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY

2004 TOYOTA SIENNA RIGHT REAR SEAT OCCUPANT

Test #	4846		
Vehicle #	1	Sex	NOT APPLICABLE
Location	RIGHT REAR SEAT	Age	0
Position	NON-ADJUSTABLE SEAT	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	3 YEAR OLD CHILD		
Calibration Method	PART 572		
Occupant Manufacturer	FIRST TECHNOLOGY S/N 040		
Occupant Modification			
Occupant Description			
Occupant Commentary	HEAD TO CRS; FEET TO FRONT PASSENGER SEATBACK		

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	676	
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	75.9	
Seatback	685	mm	27.0	inches	HIC Upper Time Interval (ms)	111.9	
Side Header	0	mm	0.0	inches			
Side Window	441	mm	17.4	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	286	mm	11.3	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	327	mm	12.9	inches
Seatback	655	mm	25.8	inches					
Chest Severity Index	0				Pelvic Peak Lateral Acceleration (g's)	0			
Thoracic Trauma Index	0				Thorax Peak Acceleration (g's)	41			
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	479	mm	18.9	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)	OTHER								
Second Contact Region (Legs)									

2004 TOYOTA SIENNA RIGHT REAR SEAT OCCUPANT

Test #	4846					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	RIGHT REAR SEAT	Age	0			
Position	NON-ADJUSTABLE SEAT	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	3 YEAR OLD CHILD					

Calibration Method	PART 572
Occupant Manufacturer	FIRST TECHNOLOGY S/N 040
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO CRS; FEET TO FRONT PASSENGER SEATBACK

Restraints

Restraint # 1	CONVERTIBLE CHILD SAFETY SEAT, FRONT FACING
Mounted	LATCH - LOWER ANCHORAGES AND TOP TETHER
Deployment	NOT APPLICABLE
Restraint Commentary	PRIMARY - EVENFLO VANGUARD 5 FORWARD FACING
Restraint # 2	5 POINT BELT
Mounted	CHILD SEAT
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY - EVENFLO VANGUARD 5 FORWARD FACING

2004 TOYOTA SIENNA LEFT REAR SEAT OCCUPANT

Test #	4846						
Vehicle #	1			Sex	NOT APPLICABLE		
Location	LEFT REAR SEAT			Age	0		
Position	NON-ADJUSTABLE SEAT			Height	0	mm	0.0 inches
Type	HYBRID III DUMMY			Weight	0.0	kg	0 pounds
Size	3 YEAR OLD CHILD						

Calibration Method	PART 572
Occupant Manufacturer	FIRST TECHNOLOGY S/N 042
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO CRS; FEET TO DRIVER SEATBACK

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	705		
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	84.3		
Seatback	669	mm	26.3	inches	HIC Upper Time Interval (ms)	120.3		
Side Header	0	mm	0.0	inches				
Side Window	436	mm	17.2	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	273	mm	10.7 inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	321	mm	12.6 inches
Seatback	614	mm	24.2	inches				

Chest Severity Index	0	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	40

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 360 mm 14.2 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)	OTHER
Second Contact Region (Legs)	

2004 TOYOTA SIENNA LEFT REAR SEAT OCCUPANT

Test #	4846					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	LEFT REAR SEAT	Age	0			
Position	NON-ADJUSTABLE SEAT	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	3 YEAR OLD CHILD					

Calibration Method	PART 572
Occupant Manufacturer	FIRST TECHNOLOGY S/N 042
Occupant Modification	
Occupant Description	
Occupant Commentary	HEAD TO CRS; FEET TO DRIVER SEATBACK

Restraints

Restraint # 1	CONVERTIBLE CHILD SAFETY SEAT, FRONT FACING
Mounted	LATCH - LOWER ANCHORAGES AND TOP TETHER
Deployment	NOT APPLICABLE
Restraint Commentary	PRIMARY - BRITAX ROUNDABOUT FORWARD FACING
Restraint # 2	5 POINT BELT
Mounted	CHILD SEAT
Deployment	NOT APPLICABLE
Restraint Commentary	SECONDARY - BRITAX ROUNDABOUT FORWARD FACING

Vehicle 1 2004 TOYOTA SIENNA

Test #	4846		
VIN	5TDZA23C14S057073	NHTSA Test Vehicle Number	1
Year	2004	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	SIENNA	Steering Column Collapse Mechanism	UNKNOWN
Body	VAN		
Engine	V6 TRANSVERSE FRONT		
Displacement	3.3 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	5080	mm	200.0	inches	CG behind Front Axle	1317	mm	51.9	inches
Vehicle Width	1839	mm	72.4	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	3026	mm	119.1	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	2103	KG	4635	pounds	Maximum Static Crush Depth	526	mm	20.7	inches
					Pre-Impact Speed	57	kph	35.2	mph

Vehicle Damage Index: 12FDEW6

Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	351	mm	13.8	inches
DPD 2	443	mm	17.4	inches
DPD 3	472	mm	18.6	inches
DPD 4	513	mm	20.2	inches
DPD 5	503	mm	19.8	inches
DPD 6	417	mm	16.4	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	193.4	inches	179.6	inches	13.8	inches
	4913	mm	4562	mm	351	mm
Centerline	200.0	inches	179.3	inches	20.7	inches
	5080	mm	4554	mm	526	mm
Right Bumper Corner	193.4	inches	177.0	inches	16.4	inches
	4913	mm	4496	mm	417	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
0.0	NO DIRECT ENGAGEMENT	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
DIRECT ENGAGEMENT	0.0	NO DIRECT ENGAGEMENT
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 TOYOTA SIENNA

Test #	4846		
VIN	5TDZA23C14S057073	NHTSA Test Vehicle Number	1
Year	2004	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	SIENNA	Steering Column Collapse Mechanism	UNKNOWN
Body	VAN		
Engine	V6 TRANSVERSE FRONT		
Displacement	3.3 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary			

Vehicle Length	5080	mm	200.0	inches	CG behind Front Axle	1317	mm	51.9	inches
Vehicle Width	1839	mm	72.4	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	3026	mm	119.1	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	2103	KG	4635	pounds	Maximum Static Crush Depth	526	mm	20.7	inches
					Pre-Impact Speed	57	kph	35.2	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							
				5080	200.0	4554	179.3				
				Engine Block							
				565	22.2	567	22.3				
4913	193.4	4562	179.6	Front Bumper Corner				4913	193.4	4496	177.0
				Front of Engine							
				4520	178.0	4273	168.2				
4162	163.9	4116	162.0	Firewall				4149	163.3	4101	161.5
				4260	167.7	4245	167.1				
3646	143.5	3668	144.4	Upper Leading Edge of Door				3651	143.7	3645	143.5
3562	140.2	3553	139.9	Lower Leading Edge of Door				3560	140.2	3555	140.0
3575	140.7	3555	140.0	Bottom of 'A' Post				3571	140.6	3551	139.8
2579	101.5	2585	101.8	Upper Trailing Edge of Door				2575	101.4	2575	101.4
2560	100.8	2549	100.4	Lower Trailing Edge of Door				2554	100.6	2549	100.4
				Steering Column							
				3238	127.5	3170	124.8				
				Center of Seering Column to 'A' Post (Horizontal)							
				433	17.0	265	10.4				
				Center of Steering Column to Headliner (Vertical)							
				452	17.8	472	18.6				

2004 TOYOTA SIENNA

NHTSA Crash Test - #4846 - Front Impact

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

Test Vehicle Weight = 4635 pounds
Vehicle Closing Speed = 35.2 mph
Test Crush Length = 72.4 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	13.8	20.7	16.4	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 13.8 inches					333.4
Using a Rated No Damage Speed of	2.5 mph	303.8	287.6	160.4	
Using a Rated No Damage Speed of	5.0 mph	561.0	245.3	641.6	
Using a Rated No Damage Speed of	7.5 mph	771.8	206.3	1443.5	
Using a Rated No Damage Speed of	10.0 mph	936.1	170.7	2566.2	
Average Crush = 17.9 inches					198.1
Using a Rated No Damage Speed of	2.5 mph	234.2	171.0	160.4	
Using a Rated No Damage Speed of	5.0 mph	432.5	145.8	641.6	
Using a Rated No Damage Speed of	7.5 mph	595.0	122.6	1443.5	
Using a Rated No Damage Speed of	10.0 mph	721.7	101.5	2566.2	
Maximum Crush = 20.7 inches					148.2
Using a Rated No Damage Speed of	2.5 mph	202.5	127.8	160.4	
Using a Rated No Damage Speed of	5.0 mph	374.0	109.0	641.6	
Using a Rated No Damage Speed of	7.5 mph	514.5	91.7	1443.5	
Using a Rated No Damage Speed of	10.0 mph	624.1	75.9	2566.2	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.7	33.0	-2.2	-6.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.9

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 TOYOTA SIENNA

NHTSA Crash Test - #4846 - Front Impact

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

Test Vehicle Weight = 4635 pounds
Vehicle Closing Speed = 35.2 mph
Test Crush Length = 60.0 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	13.8	20.7	16.4	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 13.8 inches					402.3
Using a Rated No Damage Speed of	2.5 mph	366.5	347.1	193.5	
Using a Rated No Damage Speed of	5.0 mph	677.0	296.0	774.2	
Using a Rated No Damage Speed of	7.5 mph	931.3	249.0	1741.9	
Using a Rated No Damage Speed of	10.0 mph	1129.6	206.0	3096.6	
Average Crush = 17.9 inches					239.1
Using a Rated No Damage Speed of	2.5 mph	282.6	206.3	193.5	
Using a Rated No Damage Speed of	5.0 mph	521.9	175.9	774.2	
Using a Rated No Damage Speed of	7.5 mph	718.0	148.0	1741.9	
Using a Rated No Damage Speed of	10.0 mph	870.9	122.5	3096.6	
Maximum Crush = 20.7 inches					178.8
Using a Rated No Damage Speed of	2.5 mph	244.4	154.3	193.5	
Using a Rated No Damage Speed of	5.0 mph	451.3	131.6	774.2	
Using a Rated No Damage Speed of	7.5 mph	620.9	110.7	1741.9	
Using a Rated No Damage Speed of	10.0 mph	753.1	91.6	3096.6	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.7	33.0	-2.2	-6.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.9

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 TOYOTA SIENNA

NHTSA Crash Test - #4846 - Front Impact

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

Test Vehicle Weight = 4635 pounds
Vehicle Closing Speed = 35.2 MPH
Test Crush Length = 72.4 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	13.8	17.4	18.6	20.2	19.8	16.4	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 13.8 inches					333.4
Using a Rated No Damage Speed of	2.5mph	303.8	287.6	160.4	
Using a Rated No Damage Speed of	5.0mph	561.0	245.3	641.6	
Using a Rated No Damage Speed of	7.5mph	771.8	206.3	1443.5	
Using a Rated No Damage Speed of	10.0mph	936.1	170.7	2566.2	
Average Crush = 18.2 inches					191.7
Using a Rated No Damage Speed of	2.5mph	230.3	165.4	160.4	
Using a Rated No Damage Speed of	5.0mph	425.4	141.0	641.6	
Using a Rated No Damage Speed of	7.5mph	585.2	118.6	1443.5	
Using a Rated No Damage Speed of	10.0mph	709.8	98.2	1786.1	
Maximum Crush = 20.2 inches					155.6
Using a Rated No Damage Speed of	2.5mph	207.5	134.2	160.4	
Using a Rated No Damage Speed of	5.0mph	383.3	114.5	641.6	
Using a Rated No Damage Speed of	7.5mph	527.3	96.3	1443.5	
Using a Rated No Damage Speed of	10.0mph	639.5	79.7	2566.2	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.2	32.6	-2.6	-8.0

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.5

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 TOYOTA SIENNA

NHTSA Crash Test - #4846 - Front Impact

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

Test Vehicle Weight = 4635 pounds
Vehicle Closing Speed = 35.2 MPH
Test Crush Length = 60.0 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	13.8	17.4	18.6	20.2	19.8	16.4	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 13.8 inches					402.3
Using a Rated No Damage Speed of	2.5mph	366.5	347.1	193.5	
Using a Rated No Damage Speed of	5.0mph	677.0	296.0	774.2	
Using a Rated No Damage Speed of	7.5mph	931.3	249.0	1741.9	
Using a Rated No Damage Speed of	10.0mph	1129.6	206.0	3096.6	
Average Crush = 18.2 inches					231.3
Using a Rated No Damage Speed of	2.5mph	277.9	199.6	193.5	
Using a Rated No Damage Speed of	5.0mph	513.3	170.2	774.2	
Using a Rated No Damage Speed of	7.5mph	706.2	143.1	1741.9	
Using a Rated No Damage Speed of	10.0mph	856.5	118.4	2155.3	
Maximum Crush = 20.2 inches					187.7
Using a Rated No Damage Speed of	2.5mph	250.4	162.0	193.5	
Using a Rated No Damage Speed of	5.0mph	462.5	138.2	774.2	
Using a Rated No Damage Speed of	7.5mph	636.3	116.2	1741.9	
Using a Rated No Damage Speed of	10.0mph	771.7	96.2	3096.6	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.2	32.6	-2.6	-8.0

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.5

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: 2004 - 2010
Make: TOYOTA
Model: SIENNA

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
4846	2004 TOYOTA SIENNA VAN	5.0	18.2	35.2	424.7	140.6	641.6	191.1	27.1
5203	2004 TOYOTA SIENNA VAN	5.0	15.8	29.5	404.4	125.5	651.5	182.0	22.0
5269	2005 TOYOTA SIENNA MINIVAN	5.0	17.2	35.0	431.1	150.3	618.1	204.6	28.5
	Average (AVG)				**420.1**	**138.8**	**637.1**	**192.6**	**25.9**
	Minimum (MIN)				**404.4**	**125.5**	**618.1**	**182.0**	**22.0**
	Maximum (MAX)				**431.1**	**150.3**	**651.5**	**204.6**	**28.5**
	Standard Deviation (STDev-sample)				**13.9**	**12.5**	**17.2**	**11.4**	**3.4**
	Number of Tests (n)			**3**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 2004 - 2010
Make: TOYOTA
Model: SIENNA

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
4846	2004 TOYOTA SIENNA VAN	5.0	20.7	35.2	373.9	108.9	641.6	148.0	23.9
5203	2004 TOYOTA SIENNA VAN	5.0	17.1	29.5	372.1	106.3	651.5	154.2	20.3
5269	2005 TOYOTA SIENNA MINIVAN	5.0	21.3	35.0	348.3	98.1	618.1	133.5	23.0
	Average (AVG)				**364.8**	**104.4**	**637.1**	**145.2**	**22.4**
	Minimum (MIN)				**348.3**	**98.1**	**618.1**	**133.5**	**20.3**
	Maximum (MAX)				**373.9**	**108.9**	**651.5**	**154.2**	**23.9**
	Standard Deviation (STDev-sample)				**14.3**	**5.6**	**17.2**	**10.6**	**1.9**
	Number of Tests (n)			**3**					

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#6444

2006 TOYOTA SIENNA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2006 TOYOTA SIENNA**

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

Year Range	Make	Model	Body Styles	Wheelbase
2004 - 2010	TOYOTA	SIENNA	VAN	119.3

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 #	6444	NHTSA Test Reference Guide Version #	V5			
Test Date	2008-01-08	Contract #	DTNH22-07-D-0060			
Contract/Study Title	2006 TOYOTA SIENNA LEFT SIDE FMVSS 214 POLE IMPACT AT 32 KPH					
Test Objective(s)						
Test Type	RESEARCH SAFETY VEHICLE TEST	Configuration	VEHICLE INTO BARRIER			
Impact Angle	285	Side Impact Point	161	mm	6.3	inches
			0	mm	0.0	inches
		Closing Speed	31.9	Km/Hr	19.82	MPH
Test Performer	TRC OF OHIO					
Test Reference #	080108					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	21 C	69.8 F	Total Number of Curves	143		
Data Recorder Type	DIGITAL DATA ACQUISITION	Data Link	UMBILICAL CABLE			
Test Commentary						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0 inches
Barrier Shape	POLE				
Barrier Commentary	8 LOAD CELL BARRIER				

2006 TOYOTA SIENNA LEFT FRONT SEAT OCCUPANT

Test #	6444		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	WORLDSID SIDE IMPACT DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	SIDE IMPACT DUMMY		
Occupant Manufacturer	WORLDSID; S/N 016		
Occupant Modification			
Occupant Description			
Occupant Commentary	HIC=36MS HIC; 15 MS HIC=380		

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	418	
WindShield	755	mm	29.7	inches	HIC Lower Time Interval (ms)	46.8	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	68.48	
Side Header	416	mm	16.4	inches			
Side Window	0	mm	0.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	603	mm	23.7	inches	Arm to Door	144	mm	5.7	inches
Steering Wheel	345	mm	13.6	inches	Hip to Door	107	mm	4.2	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	0	Pelvic Peak Lateral Acceleration (g's)	59.2
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	0

Lap Belt Peak Load: Newtons 0.0 pound Force

Shoulder Belt Peak Load: 0 Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash 52 mm 2.0 inches Knees to Seatback 0 mm 0.0 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): DASHPANEL

Second Contact Region (Legs):

2006 TOYOTA SIENNA LEFT FRONT SEAT OCCUPANT

Test #	6444					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	WORLDSID SIDE IMPACT DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	SIDE IMPACT DUMMY
Occupant Manufacturer	WORLDSID; S/N 016
Occupant Modification	
Occupant Description	
Occupant Commentary	HIC=36MS HIC; 15 MS HIC=380

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	CURTAIN AIRBAG
Mounted	HEADER - SIDE
Deployment	DEPLOYED PROPERLY
Restraint Commentary	SIDE AIRBAG
Restraint # 3	CURTAIN AIRBAG
Mounted	HEADER - SIDE
Deployment	DEPLOYED PROPERLY
Restraint Commentary	SIDE CURTAIN

Vehicle 1 2006 TOYOTA SIENNA

Test #	6444		
VIN	5TDZA23C36S448521	NHTSA Test Vehicle Number	1
Year	2006	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	SIENNA	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	UTILITY VEHICLE		
Engine	V6 TRANSVERSE FRONT		
Displacement	3.3 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary	DPD1,2,5,6=LEVEL 4; DPD3=LEVEL 1, DPD4=LEVEL 2		

Vehicle Length	5085	mm	200.2	inches	CG behind Front Axle	1376	mm	54.2	inches
Vehicle Width	1975	mm	77.8	inches	Center of Damage to CG Axis	28	mm	1.1	inches
Vehicle Wheelbase	3030	mm	119.3	inches	Total Length of Indentation	2850	mm	112.2	inches
Vehicle Test Weight	2010	KG	4430	pounds	Maximum Static Crush Depth	433	mm	17.0	inches
					Pre-Impact Speed	32	kph	19.8	mph

Vehicle Damage Index: 09LPEW2

Principal Direction of Force: 285

Damage Profile Distance Measurements

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

DPD 1	-20	mm	-0.8	inches
DPD 2	96	mm	3.8	inches
DPD 3	223	mm	8.8	inches
DPD 4	359	mm	14.1	inches
DPD 5	-48	mm	-1.9	inches
DPD 6	-108	mm	-4.3	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): 0.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

A-pillar Engagement (Side Impact Only): 0.0

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: 0.0

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

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

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

Vehicle 1 2006 TOYOTA SIENNA

Test #	6444		
VIN	5TDZA23C36S448521	NHTSA Test Vehicle Number	1
Year	2006	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	SIENNA	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	UTILITY VEHICLE		
Engine	V6 TRANSVERSE FRONT		
Displacement	3.3 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary	DPD1,2,5,6=LEVEL 4; DPD3=LEVEL 1, DPD4=LEVEL 2		

Vehicle Length	5085	mm	200.2	inches	CG behind Front Axle	1376	mm	54.2	inches
Vehicle Width	1975	mm	77.8	inches	Center of Damage to CG Axis	28	mm	1.1	inches
Vehicle Wheelbase	3030	mm	119.3	inches	Total Length of Indentation	2850	mm	112.2	inches
Vehicle Test Weight	2010	KG	4430	pounds	Maximum Static Crush Depth	433	mm	17.0	inches
					Pre-Impact Speed	32	kph	19.8	mph

Vehicle Damage Index	09LPEW2	Principal Direction of Force	285

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				

2006 TOYOTA SIENNA

NHTSA Crash Test - #6444 - Side Impact

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

Test Vehicle Weight = 4430 pounds
Vehicle Closing Speed = 19.8 MPH
Test Crush Length = 112.2 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Rear)	-0.8	3.8	8.8	14.1	-1.9	-4.3	(Front)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 1.0 inches					12436.6
Using a Rated No Damage Speed of	1.0mph	595.8	11213.4	15.8	
Using a Rated No Damage Speed of	2.0mph	1128.2	10053.5	63.3	
Using a Rated No Damage Speed of	3.0mph	1597.4	8956.9	142.4	
Using a Rated No Damage Speed of	5.0mph	2345.8	6953.7	395.7	
Average Crush = 5.4 inches					426.5
Using a Rated No Damage Speed of	1.0mph	110.3	384.5	15.8	
Using a Rated No Damage Speed of	2.0mph	208.9	344.8	63.3	
Using a Rated No Damage Speed of	3.0mph	295.8	307.2	142.4	
Using a Rated No Damage Speed of	5.0mph	434.4	238.5	273.7	
Maximum Crush = 14.1 inches					62.6
Using a Rated No Damage Speed of	1.0mph	42.3	56.4	15.8	
Using a Rated No Damage Speed of	2.0mph	80.0	50.6	63.3	
Using a Rated No Damage Speed of	3.0mph	113.3	45.1	142.4	
Using a Rated No Damage Speed of	5.0mph	166.4	35.0	395.7	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	14.1	27.2	7.4	27.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 11.1

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

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 2004 - 2010
Make: TOYOTA
Model: SIENNA

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
4733	2004 TOYOTA SIENNA MINIVAN	2.0	8.0	24.0	181.0	248.9	65.8	296.2	28.8
5405	2005 TOYOTA SIENNA UTILITY VEHICLE	2.0	6.6	20.0	143.1	194.6	52.6	240.3	24.2
5874	2006 TOYOTA SIENNA MINIVAN	2.0	6.6	23.9	380.8	631.2	114.9	751.6	34.6
6444	2006 TOYOTA SIENNA UTILITY VEHICLE	2.0	5.4	19.8	207.4	339.9	63.3	420.5	28.9
	Average (AVG)				**228.1**	**353.6**	**74.2**	**427.1**	**29.1**
	Minimum (MIN)				**143.1**	**194.6**	**52.6**	**240.3**	**24.2**
	Maximum (MAX)				**380.8**	**631.2**	**114.9**	**751.6**	**34.6**
	Standard Deviation (STDev-sample)				**105.2**	**194.5**	**27.8**	**229.0**	**4.3**
	Number of Tests (n)			**4**					

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 2004 - 2010
Make: TOYOTA
Model: SIENNA

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
4733	2004 TOYOTA SIENNA MINIVAN	2.0	13.0	24.0	111.1	93.8	65.8	111.6	17.7
5405	2005 TOYOTA SIENNA UTILITY VEHICLE	2.0	19.8	20.0	47.9	21.8	52.6	26.9	8.1
5874	2006 TOYOTA SIENNA MINIVAN	2.0	11.2	23.9	224.5	219.3	114.9	261.2	20.4
6444	2006 TOYOTA SIENNA UTILITY VEHICLE	2.0	17.0	19.8	66.2	34.6	63.3	42.8	9.2
	Average (AVG)				**112.4**	**92.4**	**74.2**	**110.6**	**13.8**
	Minimum (MIN)				**47.9**	**21.8**	**52.6**	**26.9**	**8.1**
	Maximum (MAX)				**224.5**	**219.3**	**114.9**	**261.2**	**20.4**
	Standard Deviation (STDev-sample)				**79.3**	**90.2**	**27.8**	**106.9**	**6.1**
	Number of Tests (n)			**4**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 1ZV8T20C2K5215954

Model:	1989 Ford Probe 2 door Hatchback
Engine Size:	2.2 L/ 133 cu.in.
Engine Description:	In-line 4 cylinder with Overhead Cam
Horse Power:	110 @ 4700 rpm
Torque:	130 lb-ft at 3000 rpm
Injection System:	Multi-Port Fuel Injection (MFI)
PSI:	64-85 psi
Ignition:	electronic
Manufacturer:	Mazda.
Assembly Plant:	AAI - Flat Rock, MI
Drive Wheels:	This is a Front Wheel Drive vehicle

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

The Fourth character (8) indicates N/A

The Fifth through Seventh characters (T20) indicate a Probe and a 2 door Hatchback

The Eighth character (C) indicates the OEM engine: 2.2 L/ 133 cu.in., L4, OHC

The Ninth character (the check digit) is entered as 2.
The VIN appears Invalid, the calculated value is 10. (The display Character should be X)

The Tenth character (K) indicates the model year 1989

The Eleventh character (5) indicates the vehicle was made in the assembly plant in AAI - Flat Rock, MI

The Twelfth through Seventeenth characters (215954) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

1989 FORD PROBE 2 DOOR COUPE

Curb Weight:		2725	lbs.	1236	kg.
Curb Weight Distribution -	Front:	63	% Rear:	37	%
Gross Vehicle Weight Rating:			lbs.		kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	177	14.75	4.50
Wheelbase:	99	8.25	2.51
Front Bumper to Front Axle:	35	2.92	0.89
Front Bumper to Front of Front Well:	21	1.75	0.53
Front Bumper to Front of Hood:			
Front Bumper to Base of Windshield:	50	4.17	1.27
Front Bumper to Top of Windshield:	79	6.58	2.01
Rear Bumper to Rear Axle:	43	3.58	1.09
Rear Bumper to Rear of Rear Well:	24	2.00	0.61
Rear Bumper to Rear of Trunk:	3	0.25	0.08
Rear Bumper to Base of Rear Window:	12	1.00	0.30
Width Dimensions			
Maximum Width:	67	5.58	1.70
Front Track:	61	5.08	1.55
Rear Track:	61	5.08	1.55
Vertical Dimensions			
Height:	52	4.33	1.32
Ground to -			
Front Bumper (Top)	19	1.58	0.48
Headlight - center	23	1.92	0.58
Hood - top front:	23	1.92	0.58
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:	39	3.25	0.99

1989 FORD PROBE 2 DOOR COUPE

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	55	4.58	1.40
Front Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	54	4.50	1.37
Rear Seat to Headliner	35	2.92	0.89
Front Leg Room - seatback to floor (min)	30	2.50	0.76

Seatbelts: 3pt - front and rear

Airbags: NO AIRBAGS

Steering Data

Turning Circle (Diameter)	456	38.00	11.58
Steering Ratio:	17.10:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	185-70 R14		

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 = 124.0 ft t = 2.8 sec a = -31.2 ft/sec² G-force = -0.97

Acceleration:

0 to 30mph	t =	4.3	sec	a =	10.2	ft/sec²	G-force = 0.32
0 to 60mph	t =	8.0	sec	a =	11.0	ft/sec²	G-force = 0.34
45 to 65mph	t =	6.2	sec	a =	4.7	ft/sec²	G-force = 0.15

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1989 - 1991

1989 FORD PROBE 2 DOOR COUPE

Other Information

Tip-Over Stability Ratio =	1.44	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	36.63
Inches in front of rear axle	=	62.37
Inches from side of vehicle	=	33.50
Inches from ground	=	21.24
Inches from front corner	=	79.08
Inches from rear corner	=	110.57
Inches from front bumper	=	71.63
Inches from rear bumper	=	105.37

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1600.75	lb*ft*sec²
Pitch Moment of Inertia	=	1548.75	lb*ft*sec²
Roll Moment of Inertia	=	340.50	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=		deg
Angle Front of Hood to Windshield Base	=		deg
Angle Front of Hood to Windshield Top	=		deg
Angle of Windshield	=	24.1	deg
Angle of Steering Tires at Max Turn	=	24.9	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).

4N6XPRT Systems
Expert System Software for Litigation

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Toll Free: 1- 800-266-9778

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

E-Mail: 4n6@4n6xprt.com

The NHTSA Crash Test database contains NO REAR Impact tests for the Ford Probe.

To create a SIMILAR class of vehicle, we first looked at the Probe, which was reported as 3059 pounds.

We then looked at the NHTSA database for CARS that have REAR IMPACT TESTS and had a weight range of 2959-3159 pounds (+/- 100 pounds).

The Test Summary Reports based on the Average and Maximum crush depths follow.

Available Test Results
Rear Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 2959-3159

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	KEES (mph)	Vehicle Width Stiffness A	Vehicle Width Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
2974	1998 HONDA CIVIC FOUR DOOR SEDAN	5.0	38.8	35.7	142.2	22.5	448.9	30.4	13.1
2439	1996 DODGE NEON FOUR DOOR SEDAN	5.0	33.7	35.9	164.4	30.2	447.8	40.7	15.3
1526	1991 SUBARU LEGACY FOUR DOOR SEDAN	5.0	11.9	22.2	268.0	77.9	460.7	129.7	16.7
1430	1990 VOLKSWAGEN CORRADO THREE DOOR HA...	5.0	12.0	22.2	262.8	75.2	459.0	125.3	16.4
2668	1998 FORD ESCORT TWO DOOR COUPE	5.0	7.1	23.5	461.8	241.6	441.4	390.1	31.2
	Average (AVG)				**259.8**	**89.5**	**451.6**	**143.2**	**18.5**
	Minimum (MIN)				**142.2**	**22.5**	**441.4**	**30.4**	**13.1**
	Maximum (MAX)				**461.8**	**241.6**	**460.7**	**390.1**	**31.2**
	Standard Deviation (STDev-sample)				**126.3**	**88.7**	**8.1**	**145.5**	**7.2**
	Number of Tests (n)			**5**					

Available Test Results
Rear Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 2959-3159

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	KEES (mph)	Vehicle Width Stiffness Values A	B	G	Kv	Crush Factor
2439	1996 DODGE NEON FOUR DOOR SEDAN	5.0	42.0	35.9	131.8	19.4	447.8	26.2	12.3
2974	1998 HONDA CIVIC FOUR DOOR SEDAN	5.0	38.8	35.7	142.2	22.5	448.9	30.4	13.1
1526	1991 SUBARU LEGACY FOUR DOOR SEDAN	5.0	12.4	22.2	256.2	71.3	460.7	118.6	16.0
1430	1990 VOLKSWAGEN CORRADO THREE DOOR HA...	5.0	13.0	22.2	243.3	64.5	459.0	107.4	15.2
2668	1998 FORD ESCORT TWO DOOR COUPE	5.0	14.0	23.5	233.4	61.7	441.4	99.6	15.8
	Average (AVG)				**201.4**	**47.9**	**451.6**	**76.4**	**14.5**
	Minimum (MIN)				**131.8**	**19.4**	**441.4**	**26.2**	**12.3**
	Maximum (MAX)				**256.2**	**71.3**	**460.7**	**118.6**	**16.0**
	Standard Deviation (STDev-sample)				**59.4**	**24.9**	**8.1**	**44.5**	**1.7**
	Number of Tests (n)			**5**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 1P3ES42C4VD246421

Model:	1997 Plymouth Neon Highline 2-Door Specialty Hardtop
Engine Size:	2.0 L/ 122 cu.in.
Engine Description:	In-Line 4 cylinder with Single Overhead Cam
Horse Power:	132 @ 6000 rpm
Torque:	129 lb-ft @ 5000 rpm
Injection System:	Sequential Fuel Injection (SFI)
PSI:	48 psi
Ignition:	Electronic
Manufacturer:	Chrysler
Assembly Plant:	Belvidere, IL
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (1P3) indicate a Plymouth Passenger Car made in the U.S.A.

The Fourth character (E) indicates Restraint System Active, Driver & Frnt Passenger Air Bags

The Fifth and Sixth characters (S4) indicate a Neon Highline

The Seventh character (2) indicates a 2-Door Specialty Hardtop

The Eighth character (C) indicates the OEM engine: 2.0 L/ 122 cu.in., L4 16V, SOHC

The Ninth character (the check digit) is entered as 4.
The VIN appears Valid, the calculated value is 4.

The Tenth character (V) indicates the model year 1997

The Eleventh character (D) indicates the vehicle was made in the assembly plant in Belvidere, IL

The Twelfth through Seventeenth characters (246421) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:

4N6XPRT Systems

8387 University Avenue

La Mesa CA 91941

4/19/2011

1997 PLYMOUTH NEON 2 DOOR COUPE

Curb Weight:		2380	lbs.	1080	kg.
Curb Weight Distribution -	Front:	58	% Rear:	42	%
Gross Vehicle Weight Rating:		3481	lbs.	1579	kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	172	14.33	4.37
Wheelbase:	104	8.67	2.64
Front Bumper to Front Axle:	32	2.67	0.81
Front Bumper to Front of Front Well:	19	1.58	0.48
Front Bumper to Front of Hood:	4	0.33	0.10
Front Bumper to Base of Windshield:	42	3.50	1.07
Front Bumper to Top of Windshield:	70	5.83	1.78
Rear Bumper to Rear Axle:	36	3.00	0.91
Rear Bumper to Rear of Rear Well:	19	1.58	0.48
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:	67	5.58	1.70
Front Track:	57	4.75	1.45
Rear Track:	57	4.75	1.45
Vertical Dimensions			
Height:	55	4.58	1.40
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	24	2.00	0.61
Hood - top front:	29	2.42	0.74
Base of Windshield	34	2.83	0.86
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	39	3.25	0.99
Base of Rear Window:	40	3.33	1.02

1997 PLYMOUTH NEON 2 DOOR COUPE

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	53	4.42	1.35
Front Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	52	4.33	1.32
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	34	2.83	0.86

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

Steering Data			
Turning Circle (Diameter)	420	35.00	10.67
Steering Ratio:	18.00:1		
Wheel Radius:	11	0.92	0.28
Tire Size (OEM):	165-80R13		

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 = 142.0 ft t = 3.2 sec a = -27.2 ft/sec² G-force = -0.85

Acceleration:

0 to 30mph	t =	2.8	sec	a =	15.7	ft/sec²	G-force = 0.49
0 to 60mph	t =	8.4	sec	a =	10.5	ft/sec²	G-force = 0.33
45 to 65mph	t =		sec	a =		ft/sec²	G-force =

Transmission Type: 5spd MANUAL

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

N.S.D.C = 1995 - 1999

1997 PLYMOUTH NEON 2 DOOR COUPE

Other Information

Tip-Over Stability Ratio =	1.27	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	43.68
Inches in front of rear axle	=	60.32
Inches from side of vehicle	=	33.50
Inches from ground	=	22.47
Inches from front corner	=	82.76
Inches from rear corner	=	101.98
Inches from front bumper	=	75.68
Inches from rear bumper	=	96.32

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1245.40	lb*ft*sec²
Pitch Moment of Inertia	=	1207.20	lb*ft*sec²
Roll Moment of Inertia	=	278.40	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	66.0	deg
Angle Front of Hood to Windshield Base	=	7.5	deg
Angle Front of Hood to Windshield Top	=	20.0	deg
Angle of Windshield	=	34.2	deg
Angle of Steering Tires at Max Turn	=	28.4	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

#2964

1998 DODGE NEON

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **1997 PLYMOUTH NEON**

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

Year Range	Make	Model	Body Styles	Wheelbase
1995 - 1999	DODGE	NEON	2D, 4D	105
Remarks: ALSO SOLD BY PLYMOUTH				
1995 - 1999	PLYMOUTH	NEON		104
Remarks: ALSO SOLD BY DODGE				
1995 - 1999	DODGE	NEON	2D, 4D	105
Remarks: ALSO SOLD BY PLYMOUTH				
1995 - 1999	PLYMOUTH	NEON		104
Remarks: ALSO SOLD BY DODGE				

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 #	2964	NHTSA Test Reference Guide Version #	V4			
Test Date	1998-10-27	Contract #	DTNH22-97-D-02007			
Contract/Study Title	1998 NHTSA OFFSET PROGRAM R AND D					
Test Objective(s)	OBTAIN ATD AND VEHICLE DATA					
Test Type	TEST PROCEDURE DEVELOPMENT	Configuration	VEHICLE INTO BARRIER			
Impact Angle	0	Side Impact Point	0	mm	0.0	inches
			N/A	mm	N/A	inches
		Closing Speed	60.7	Km/Hr	37.72	MPH
Test Performer	KARCO ENGINEERING					
Test Reference #	MW0311					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	35 C	95.0 F	Total Number of Curves	97		
Data Recorder Type	OTHER	Data Link	OTHER			
Test Commentary	60.3 KMH 40% FRONTAL OFFSET WITH HYBRID III 5TH FEMALE					

Fixed Barrier Information

Barrier Type	DEFORMABLE	Pole Barrier Diameter	9999	mm	9999 inches
Barrier Shape	EEVC OFFSET BARRIER				
Barrier Commentary	EEVC DEFORMABLE OFFSET BARRIER (1000mm wide)				

1998 DODGE NEON LEFT FRONT SEAT OCCUPANT

Test #	2964						
Vehicle #	1			Sex	FEMALE		
Location	LEFT FRONT SEAT			Age	99		
Position	FORWARD OF CENTER POSITION			Height	999	mm 39.3	inches
Type	HYBRID III DUMMY			Weight	999.0	kg 2202	pounds
Size	5 PERCENTILE						

Calibration Method	HYBRID III
Occupant Manufacturer	FTSS, S/N:273
Occupant Modification	UNMODIFIED
Occupant Description	NO COMMENTS
Occupant Commentary	SEAT POSITION IS FULL FORWARD

Head

Head to -

Windshielder Header	264	mm	10.4	inches	Head Injury Criteria (HIC)	387			
WindShield	610	mm	24.0	inches	HIC Lower Time Interval (ms)	57			
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	88.8			
Side Header	240	mm	9.4	inches					
Side Window	300	mm	11.8	inches					

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head)	AIR BAG
Second Contact Region (Head)	

Chest

Chest to -

Dash	440	mm	17.3	inches	Arm to Door	45	mm	1.8	inches
Steering Wheel	180	mm	7.1	inches	Hip to Door	150	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)	44.3

Lap Belt Peak Load 1863 Newtons 418.8 pound Force

Shoulder Belt Peak Load 1604 Newtons 360.6 pound Force

First Contact Region (Chest/Abdomen)	AIR BAG
Second Contact Region (Chest/Abdomen)	NONE

Legs

Knees to Dash 60 mm 2.4 inches Knees to Seatback 9999 mm 0.0 inches

Left Femur Peak Load -4170 Newtons -937.5 pounds Force

Right Femur Peak Load -1563 Newtons -351.4 pounds Force

First Contact Region (Legs)	KNEE RESTRAINT
Second Contact Region (Legs)	

1998 DODGE NEON LEFT FRONT SEAT OCCUPANT

Test #	2964					
Vehicle #	1	Sex	FEMALE			
Location	LEFT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	FTSS, S/N:273
Occupant Modification	UNMODIFIED
Occupant Description	NO COMMENTS
Occupant Commentary	SEAT POSITION IS FULL FORWARD

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

1998 DODGE NEON RIGHT FRONT SEAT OCCUPANT

Test #	2964		
Vehicle #	1	Sex	FEMALE
Location	RIGHT FRONT SEAT	Age	99
Position	FORWARD OF CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	FTSS, S/N:274		
Occupant Modification	UNMODIFIED		
Occupant Description	N0 COMMENTS		
Occupant Commentary	SEAT POSITION IS FULL FORWARD		

Head

Head to -

Windshielder Header	250	mm	9.8	inches	Head Injury Criteria (HIC)	277	
WindShield	585	mm	23.0	inches	HIC Lower Time Interval (ms)	61.6	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	97.5	
Side Header	245	mm	9.6	inches			
Side Window	310	mm	12.2	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	AIR BAG						
Second Contact Region (Head)							

Chest

Chest to -

Dash	390	mm	15.4	inches	Arm to Door	91	mm	3.6	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	140	mm	5.5	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)	48.8			
Lap Belt Peak Load	4386	Newtons	986.0	pound Force					
Shoulder Belt Peak Load	5057	Newtons	1136.9	pound Force					
First Contact Region (Chest/Abdomen)	AIR BAG								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	90	mm	3.5	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-2886	Newtons	-648.8	pounds Force					
Right Femur Peak Load	-867	Newtons	-194.9	pounds Force					
First Contact Region (Legs)	DASHPANEL								
Second Contact Region (Legs)									

1998 DODGE NEON RIGHT FRONT SEAT OCCUPANT

Test #	2964					
Vehicle #	1	Sex	FEMALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	FTSS, S/N:274
Occupant Modification	UNMODIFIED
Occupant Description	N0 COMMENTS
Occupant Commentary	SEAT POSITION IS FULL FORWARD

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 1998 DODGE NEON

Test #	2964		
VIN	1B3ES47C1WD550365	NHTSA Test Vehicle Number	1
Year	1998	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	NEON	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	DPD 5 AND 6 ARE POSITIVE		

Vehicle Length	4360	mm	171.7	inches	CG behind Front Axle	981 mm	38.6 inches
Vehicle Width	1495	mm	58.9	inches	Center of Damage to CG Axis	0 mm	0.0 inches
Vehicle Wheelbase	2645	mm	104.1	inches	Total Length of Indentation	1495 mm	58.9 inches
Vehicle Test Weight	1307	KG	2881	pounds	Maximum Static Crush Depth	641 mm	25.2 inches
					Pre-Impact Speed	61 kph	37.7 mph

Vehicle Damage Index: 12FDEW8

Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	641	mm	25.2	inches
DPD 2	632	mm	24.9	inches
DPD 3	435	mm	17.1	inches
DPD 4	321	mm	12.6	inches
DPD 5	83	mm	3.3	inches
DPD 6	196	mm	7.7	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	160.4	inches	135.1	inches	25.3	inches
	4075	mm	3432	mm	643	mm
Centerline	171.7	inches	157.3	inches	14.3	inches
	4360	mm	3996	mm	364	mm
Right Bumper Corner	160.4	inches	168.1	inches	-7.7	inches
	4074	mm	4270	mm	-196	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
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 1998 DODGE NEON

Test #	2964		
VIN	1B3ES47C1WD550365	NHTSA Test Vehicle Number	1
Year	1998	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	NEON	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	DPD 5 AND 6 ARE POSITIVE		

Vehicle Length	4360	mm	171.7	inches	CG behind Front Axle	981	mm	38.6	inches
Vehicle Width	1495	mm	58.9	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2645	mm	104.1	inches	Total Length of Indentation	1495	mm	58.9	inches
Vehicle Test Weight	1307	KG	2881	pounds	Maximum Static Crush Depth	641	mm	25.2	inches
					Pre-Impact Speed	61	kph	37.7	mph

Vehicle Damage Index	12FDEW8	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							
				4360	171.7	3996	157.3				
				Engine Block							
				220	8.7	220	8.7				
4075	160.4	3432	135.1	Front Bumper Corner				4074	160.4	4270	168.1
				Front of Engine							
				3728	146.8	3620	142.5				
3282	129.2	3028	119.2	Firewall				3292	129.6	3236	127.4
				3394	133.6	3125	123.0				
2968	116.9	2945	115.9	Upper Leading Edge of Door				2974	117.1	2975	117.1
3023	119.0	2947	116.0	Lower Leading Edge of Door				3014	118.7	3019	118.9
2992	117.8	2727	107.4	Bottom of 'A' Post				2989	117.7	2989	117.7
1965	77.4	1976	77.8	Upper Trailing Edge of Door				1966	77.4	1979	77.9
1964	77.3	1935	76.2	Lower Trailing Edge of Door				1962	77.2	1964	77.3
				Steering Column							
				2575	101.4	2362	93.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				460	18.1	475	18.7				
				Center of Steering Column to Headliner (Vertical)							
				435	17.1	617	24.3				

1998 DODGE NEON

NHTSA Crash Test - #2964 - Front Impact

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

Test Vehicle Weight = 2881 pounds
Vehicle Closing Speed = 37.7 mph
Test Crush Length = 58.9 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	25.3	14.3	-7.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.0 inches					0.0
Using a Rated No Damage Speed of	2.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	5.0 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	7.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	10.0 mph	0.0	0.0	0.0	
Average Crush = 13.5 inches					306.3
Using a Rated No Damage Speed of	2.5 mph	255.9	267.0	122.6	
Using a Rated No Damage Speed of	5.0 mph	475.5	230.5	490.5	
Using a Rated No Damage Speed of	7.5 mph	658.7	196.6	1103.6	
Using a Rated No Damage Speed of	10.0 mph	805.6	165.4	1961.9	
Maximum Crush = 25.3 inches					87.2
Using a Rated No Damage Speed of	2.5 mph	136.5	76.0	122.6	
Using a Rated No Damage Speed of	5.0 mph	253.7	65.6	490.5	
Using a Rated No Damage Speed of	7.5 mph	351.5	56.0	1103.6	
Using a Rated No Damage Speed of	10.0 mph	429.9	47.1	1961.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	25.3	36.4	-1.3	-3.5

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 22.5

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

1998 DODGE NEON

NHTSA Crash Test - #2964 - Front Impact

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

Test Vehicle Weight = 2881 pounds
Vehicle Closing Speed = 37.7 mph
Test Crush Length = 58.9 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	25.3	14.3	-7.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.0 inches					0.0
Using a Rated No Damage Speed of	2.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	5.0 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	7.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	10.0 mph	0.0	0.0	0.0	
Average Crush = 13.5 inches					306.3
Using a Rated No Damage Speed of	2.5 mph	255.9	267.0	122.6	
Using a Rated No Damage Speed of	5.0 mph	475.5	230.5	490.5	
Using a Rated No Damage Speed of	7.5 mph	658.7	196.6	1103.6	
Using a Rated No Damage Speed of	10.0 mph	805.6	165.4	1961.9	
Maximum Crush = 25.3 inches					87.2
Using a Rated No Damage Speed of	2.5 mph	136.5	76.0	122.6	
Using a Rated No Damage Speed of	5.0 mph	253.7	65.6	490.5	
Using a Rated No Damage Speed of	7.5 mph	351.5	56.0	1103.6	
Using a Rated No Damage Speed of	10.0 mph	429.9	47.1	1961.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	25.3	36.4	-1.3	-3.5

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 22.5

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

1998 DODGE NEON

NHTSA Crash Test - #2964 - Front Impact

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

Test Vehicle Weight = 2881 pounds
Vehicle Closing Speed = 37.7 MPH
Test Crush Length = 58.9 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	25.2	24.9	17.1	12.6	3.3	7.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 3.3 inches					5125.7
Using a Rated No Damage Speed of	2.5mph	1046.8	4468.7	122.6	
Using a Rated No Damage Speed of	5.0mph	1945.1	3856.8	490.5	
Using a Rated No Damage Speed of	7.5mph	2694.7	3289.9	1103.6	
Using a Rated No Damage Speed of	10.0mph	3295.6	2768.0	1961.9	
Average Crush = 14.9 inches					251.4
Using a Rated No Damage Speed of	2.5mph	231.9	219.2	122.6	
Using a Rated No Damage Speed of	5.0mph	430.8	189.2	490.5	
Using a Rated No Damage Speed of	7.5mph	596.8	161.4	1103.6	
Using a Rated No Damage Speed of	10.0mph	729.9	135.8	1408.0	
Maximum Crush = 25.2 inches					87.9
Using a Rated No Damage Speed of	2.5mph	137.1	76.6	122.6	
Using a Rated No Damage Speed of	5.0mph	254.7	66.1	490.5	
Using a Rated No Damage Speed of	7.5mph	352.9	56.4	1103.6	
Using a Rated No Damage Speed of	10.0mph	431.6	47.5	1961.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	25.2	36.4	-1.3	-3.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 22.6

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

1998 DODGE NEON

NHTSA Crash Test - #2964 - Front Impact

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

Test Vehicle Weight = 2881 pounds
Vehicle Closing Speed = 37.7 MPH
Test Crush Length = 58.9 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	25.2	24.9	17.1	12.6	3.3	7.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 3.3 inches					5125.7
Using a Rated No Damage Speed of	2.5mph	1046.8	4468.7	122.6	
Using a Rated No Damage Speed of	5.0mph	1945.1	3856.8	490.5	
Using a Rated No Damage Speed of	7.5mph	2694.7	3289.9	1103.6	
Using a Rated No Damage Speed of	10.0mph	3295.6	2768.0	1961.9	
Average Crush = 14.9 inches					251.4
Using a Rated No Damage Speed of	2.5mph	231.9	219.2	122.6	
Using a Rated No Damage Speed of	5.0mph	430.8	189.2	490.5	
Using a Rated No Damage Speed of	7.5mph	596.8	161.4	1103.6	
Using a Rated No Damage Speed of	10.0mph	729.9	135.8	1408.0	
Maximum Crush = 25.2 inches					87.9
Using a Rated No Damage Speed of	2.5mph	137.1	76.6	122.6	
Using a Rated No Damage Speed of	5.0mph	254.7	66.1	490.5	
Using a Rated No Damage Speed of	7.5mph	352.9	56.4	1103.6	
Using a Rated No Damage Speed of	10.0mph	431.6	47.5	1961.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	25.2	36.4	-1.3	-3.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 22.6

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: 1995 - 1999
Make: PLYMOUTH
Model: NEON

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
2069	1995 DODGE NEON FOUR DOOR SEDAN	5.0	14.2	29.5	283.5	97.9	410.5	141.9	24.5
2127	1995 PLYMOUTH NEON FOUR DOOR SEDAN	5.0	20.1	35.0	250.4	74.7	419.6	101.7	24.4
2320	1996 DODGE NEON FOUR DOOR SEDAN	5.0	18.0	35.1	301.6	100.8	451.3	137.1	27.4
2672	1996 DODGE NEON FOUR DOOR SEDAN	5.0	13.7	37.8	387.0	185.7	403.3	246.7	41.8
2709	1998 DODGE NEON FOUR DOOR SEDAN	5.0	20.1	35.0	262.2	78.3	439.0	106.6	24.4
2838	1998 DODGE NEON FOUR DOOR SEDAN	5.0	14.6	29.3	301.7	100.5	453.1	146.0	23.5
2861	1998 DODGE NEON TWO DOOR COUPE	5.0	17.2	29.6	244.2	69.8	426.8	101.1	20.4
2884	1998 DODGE NEON TWO DOOR COUPE	5.0	7.8	24.8	428.5	217.3	422.6	340.9	31.5
2896	1998 DODGE NEON FOUR DOOR SEDAN	5.0	17.2	30.3	322.4	94.7	548.5	135.9	21.3
2897	1998 DODGE NEON FOUR DOOR SEDAN	5.0	16.3	37.4	351.5	139.7	442.3	186.1	34.3
2964	1998 DODGE NEON FOUR DOOR SEDAN	5.0	14.9	37.7	431.4	189.7	490.5	252.2	38.2
3466	1998 DODGE NEON FOUR DOOR SEDAN	5.0	13.2	37.8	461.0	228.6	465.0	303.6	43.2
3608	1996 DODGE NEON FOUR DOOR SEDAN	5.0	30.2	71.5	396.1	174.2	450.2	201.4	67.6
3667	1998 DODGE NEON FOUR DOOR SEDAN	5.0	14.9	37.5	375.7	164.3	429.5	218.8	37.8
	Average (AVG)				**342.7**	**136.9**	**446.6**	**187.1**	**32.9**
	Minimum (MIN)				**244.2**	**69.8**	**403.3**	**101.1**	**20.4**
	Maximum (MAX)				**461.0**	**228.6**	**548.5**	**340.9**	**67.6**
	Standard Deviation (STDev-sample)				**71.9**	**55.4**	**37.2**	**76.6**	**12.6**
	Number of Tests (n)			**14**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1995 - 1999
Make: PLYMOUTH
Model: NEON

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
2069	1995 DODGE NEON FOUR DOOR SEDAN	5.0	15.0	29.5	268.4	87.7	410.5	127.1	23.2
2127	1995 PLYMOUTH NEON FOUR DOOR SEDAN	5.0	24.5	35.0	205.5	50.3	419.6	68.5	20.0
2320	1996 DODGE NEON FOUR DOOR SEDAN	5.0	20.2	35.1	269.7	80.6	451.3	109.5	24.5
2672	1996 DODGE NEON FOUR DOOR SEDAN	5.0	23.0	37.8	229.6	65.3	403.3	86.8	24.8
2709	1998 DODGE NEON FOUR DOOR SEDAN	5.0	23.0	35.0	228.6	59.5	439.0	81.0	21.3
2838	1998 DODGE NEON FOUR DOOR SEDAN	5.0	16.4	29.3	269.2	80.0	453.1	116.2	21.0
2861	1998 DODGE NEON TWO DOOR COUPE	5.0	20.2	29.6	208.2	50.8	426.8	73.5	17.4
2884	1998 DODGE NEON TWO DOOR COUPE	5.0	15.8	24.8	211.9	53.1	422.6	83.4	15.6
2896	1998 DODGE NEON FOUR DOOR SEDAN	5.0	19.3	30.3	287.3	75.2	548.5	108.0	19.0
2897	1998 DODGE NEON FOUR DOOR SEDAN	5.0	25.9	37.4	221.7	55.5	442.3	74.0	21.6
2964	1998 DODGE NEON FOUR DOOR SEDAN	5.0	25.3	37.7	253.6	65.5	490.5	87.1	22.5
3362	1996 PLYMOUTH NEON FOUR DOOR SEDAN	5.0	29.3	69.7	398.6	175.7	452.1	204.0	66.2
3466	1998 DODGE NEON FOUR DOOR SEDAN	5.0	22.3	37.8	273.1	80.2	465.0	106.6	25.6
3608	1996 DODGE NEON FOUR DOOR SEDAN	5.0	32.5	71.5	368.8	151.1	450.2	174.6	63.0
3667	1998 DODGE NEON FOUR DOOR SEDAN	5.0	26.0	37.5	214.6	53.6	429.5	71.3	21.6
	Average (AVG)				**260.6**	**78.9**	**447.0**	**104.8**	**27.2**
	Minimum (MIN)				**205.5**	**50.3**	**403.3**	**68.5**	**15.6**
	Maximum (MAX)				**398.6**	**175.7**	**548.5**	**204.0**	**66.2**
	Standard Deviation (STDev-sample)				**57.1**	**36.7**	**35.9**	**39.1**	**15.5**
	Number of Tests (n)			**15**					

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2009 BUICK LACROSSE 4 DOOR SEDAN

Curb Weight:	3530 lbs.		1601	kg.
Curb Weight Distribution - Front:	56 %	Rear:	44	%
Gross Vehicle Weight Rating:	4617 lbs.		2094	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	198	16.50	5.03
Wheelbase:	110	9.17	2.79
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:	5	0.42	0.13
Front Bumper to Base of Windshield:	51	4.25	1.30
Front Bumper to Top of Windshield:	84	7.00	2.13
Rear Bumper to Rear Axle:	45	3.75	1.14
Rear Bumper to Rear of Rear Well:	27	2.25	0.69
Rear Bumper to Rear of Trunk:	7	0.58	0.18
Rear Bumper to Base of Rear Window:	25	2.08	0.64
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:	57	4.75	1.45
Ground to -			
Front Bumper (Top)	19	1.58	0.48
Headlight - center	27	2.25	0.69
Hood - top front:	29	2.42	0.74
Base of Windshield	38	3.17	0.97
Rear Bumper - top:	26	2.17	0.66
Trunk - top rear:	42	3.50	1.07
Base of Rear Window:	43	3.58	1.09

2009 BUICK LACROSSE 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
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	57	4.75	1.45
Rear Seat to Headliner	37	3.08	0.94
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)	432	36.00	10.97
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 = 146.0 ft t = 3.3 sec a = -26.5 ft/sec² G-force = -0.82

Acceleration:

0 to 30mph	t =		sec	a =		ft/sec²	G-force =	
0 to 60mph	t =	9.0	sec	a =	9.8	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 = 2008 - 2009

2009 BUICK LACROSSE 4 DOOR SEDAN

Other Information

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

Center of Gravity (No Load):

Inches behind front axle	=	48.40
Inches in front of rear axle	=	61.60
Inches from side of vehicle	=	36.50
Inches from ground	=	22.37
Inches from front corner	=	98.42
Inches from rear corner	=	112.68
Inches from front bumper	=	91.40
Inches from rear bumper	=	106.60

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2429.90	lb*ft*sec²
Pitch Moment of Inertia	=	2345.70	lb*ft*sec²
Roll Moment of Inertia	=	485.40	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	63.4	deg
Angle Front of Hood to Windshield Base	=	11.1	deg
Angle Front of Hood to Windshield Top	=	18.2	deg
Angle of Windshield	=	27.3	deg
Angle of Steering Tires at Max Turn	=	29.2	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).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#5274

2005 BUICK LACROSSE

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2009 BUICK LACROSSE**

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 - 2010	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 #	5274	NHTSA Test Reference Guide Version #	V5				
Test Date	2004-12-17	Contract #	DTNH22-01-D-32005				
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	
			0	mm	0.0	inches	
		Closing Speed	56.5	Km/Hr	35.10	MPH	
Test Performer	CALSPAN						
Test Reference #	RUN2172						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	21 C	69.8 F	Total Number of Curves	198			
Data Recorder Type	DIGITAL DATA ACQUISITION	Data Link	UMBILICAL CABLE				
Test Commentary	FY 05 NCAP - 2005 BUICK LACROSSE - M50102						

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					

2005 BUICK LACROSSE LEFT FRONT SEAT OCCUPANT

Test #	5274		
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: VECTOR S/N:061		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH2: HEAD RESTRAINT		

Head

Head to -

Windshielder Header	362	mm	14.3	inches	Head Injury Criteria (HIC)	374	
WindShield	654	mm	25.7	inches	HIC Lower Time Interval (ms)	67.5	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	103.5	
Side Header	184	mm	7.2	inches			
Side Window	331	mm	13.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	515	mm	20.3	inches	Arm to Door	102	mm	4.0	inches
Steering Wheel	282	mm	11.1	inches	Hip to Door	131	mm	5.2	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	375	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	42.6

Lap Belt Peak Load	4030	Newtons	906.0	pound Force
Shoulder Belt Peak Load	4440	Newtons	998.2	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	154	mm	6.1	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-4886	Newtons	-1098.4	pounds Force
Right Femur Peak Load	-4945	Newtons	-1111.7	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2005 BUICK LACROSSE LEFT FRONT SEAT OCCUPANT

Test #	5274					
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: VECTOR S/N:061
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2: HEAD RESTRAINT

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	BUCKLE PRETENSIONER AND SHOULDER BELT FORCE LIMITER
Restraint # 2	FRONTAL AIRBAG
Mounted	STEERING WHEEL
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NONE

2005 BUICK LACROSSE RIGHT FRONT SEAT OCCUPANT

Test #	5274		
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	MFG: VECTOR S/N:064		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH2: SUNVISOR		

Head

Head to -

Windshielder Header	337	mm	13.3	inches	Head Injury Criteria (HIC)	259	
WindShield	610	mm	24.0	inches	HIC Lower Time Interval (ms)	60.3	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	96.3	
Side Header	181	mm	7.1	inches			
Side Window	333	mm	13.1	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	478	mm	18.8	inches	Arm to Door	111	mm	4.4	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	139	mm	5.5	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	394	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	42.1

Lap Belt Peak Load	3455	Newtons	776.7	pound Force
Shoulder Belt Peak Load	4078	Newtons	916.8	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	121	mm	4.8	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-4044	Newtons	-909.1	pounds Force
Right Femur Peak Load	-1803	Newtons	-405.3	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

2005 BUICK LACROSSE RIGHT FRONT SEAT OCCUPANT

Test #	5274					
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	MFG: VECTOR S/N:064
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2: SUNVISOR

Restraints

Restraint # 1	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	DEPLOYED PROPERLY
Restraint Commentary	BUCKLE PRETENSIONER AND SHOULDER BELT FORCE LIMITER
Restraint # 2	FRONTAL AIRBAG
Mounted	DASH PANEL - MID
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NONE

2005 BUICK LACROSSE RIGHT REAR SEAT OCCUPANT

Test #	5274		
Vehicle #	1	Sex	NOT APPLICABLE
Location	RIGHT REAR SEAT	Age	0
Position	NON-ADJUSTABLE SEAT	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	MFG: DENTON S/N:040		
Occupant Modification	UNMODIFIED		
Occupant Description	SUBPART P THREE YEAR OLD CHILD		
Occupant Commentary	CNTRH1: FACE TO CHEST, CNTRH2: CRS BACK		

Head

Head to -

Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	480	
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	82	
Seatback	634	mm	25.0	inches	HIC Upper Time Interval (ms)	118	
Side Header	0	mm	0.0	inches			
Side Window	398	mm	15.7	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	212	mm	8.3	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	276	mm	10.9	inches
Seatback	354	mm	13.9	inches					
Chest Severity Index	341				Pelvic Peak Lateral Acceleration (g's)	0			
Thoracic Trauma Index	0				Thorax Peak Acceleration (g's)	37.8			
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	398	mm	15.7	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)	SEAT BACK								
Second Contact Region (Legs)									

2005 BUICK LACROSSE RIGHT REAR SEAT OCCUPANT

Test #	5274					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	RIGHT REAR SEAT	Age	0			
Position	NON-ADJUSTABLE SEAT	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	MFG: DENTON S/N:040
Occupant Modification	UNMODIFIED
Occupant Description	SUBPART P THREE YEAR OLD CHILD
Occupant Commentary	CNTRH1: FACE TO CHEST, CNTRH2: CRS BACK

Restraints

Restraint # 1	CONVERTIBLE CHILD SAFETY SEAT, FRONT FACING
Mounted	LATCH - LOWER ANCHORAGES AND TOP TETHER
Deployment	NOT APPLICABLE
Restraint Commentary	EVENFLO TITAN 5 LATCH

2005 BUICK LACROSSE LEFT REAR SEAT OCCUPANT

Test #	5274		
Vehicle #	1	Sex	NOT APPLICABLE
Location	LEFT REAR SEAT	Age	0
Position	NON-ADJUSTABLE SEAT	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	10 YEAR OLD CHILD		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG: DENTON S/N:009		
Occupant Modification	UNMODIFIED		
Occupant Description	TEN YEAR OLD CHILD		
Occupant Commentary	CNTRH1: CHIN TO CHEST, CNTRH2: HEADLINER AND CRS HEAD RESTRAINT		

Head

Head to -							
Windshielder Header	0	mm	0.0	inches	Head Injury Criteria (HIC)	562	
WindShield	0	mm	0.0	inches	HIC Lower Time Interval (ms)	85.8	
Seatback	677	mm	26.7	inches	HIC Upper Time Interval (ms)	121.8	
Side Header	0	mm	0.0	inches			
Side Window	312	mm	12.3	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	200	mm	7.9	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	261	mm	10.3	inches
Seatback	553	mm	21.8	inches					
Chest Severity Index	488				Pelvic Peak Lateral Acceleration (g's)	0			
Thoracic Trauma Index	0				Thorax Peak Acceleration (g's)	51			
Lap Belt Peak Load	5511	Newtons	1238.9	pound Force					
Shoulder Belt Peak Load	6188	Newtons	1391.1	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	302	mm	11.9	inches
Left Femur Peak Load	-137	Newtons	-30.8	pounds Force					
Right Femur Peak Load	-120	Newtons	-27.0	pounds Force					
First Contact Region (Legs)	SEAT BACK								
Second Contact Region (Legs)									

2005 BUICK LACROSSE LEFT REAR SEAT OCCUPANT

Test #	5274					
Vehicle #	1	Sex	NOT APPLICABLE			
Location	LEFT REAR SEAT	Age	0			
Position	NON-ADJUSTABLE SEAT	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	10 YEAR OLD CHILD					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: DENTON S/N:009
Occupant Modification	UNMODIFIED
Occupant Description	TEN YEAR OLD CHILD
Occupant Commentary	CNTRH1: CHIN TO CHEST, CNTRH2: HEADLINER AND CRS HEAD RESTRAINT

Restraints

Restraint # 1	BOOSTER SEAT
Mounted	NOT APPLICABLE
Deployment	NOT APPLICABLE
Restraint Commentary	GRACO TURBOBOOSTER
Restraint # 2	3 POINT BELT
Mounted	BELT - CONVENTIONAL MOUNT
Deployment	NOT APPLICABLE
Restraint Commentary	NONE

Vehicle 1 2005 BUICK LACROSSE

Test #	5274		
VIN	2G4WC532151190569	NHTSA Test Vehicle Number	1
Year	2005	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	BUICK	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	LACROSSE	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	NONE		
Vehicle Commentary	2005 BUICK LACROSSE - M50102		

Vehicle Length	5035	mm	198.2	inches	CG behind Front Axle	1145	mm	45.1	inches
Vehicle Width	1841	mm	72.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2815	mm	110.8	inches	Total Length of Indentation	1467	mm	57.8	inches
Vehicle Test Weight	1832	KG	4038	pounds	Maximum Static Crush Depth	633	mm	24.9	inches
					Pre-Impact Speed	56	kph	35.1	mph

Vehicle Damage Index: 12FDEW3

Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	539	mm	21.2	inches
DPD 2	587	mm	23.1	inches
DPD 3	633	mm	24.9	inches
DPD 4	610	mm	24.0	inches
DPD 5	589	mm	23.2	inches
DPD 6	556	mm	21.9	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	172.4	inches	178.9	inches	-6.6	inches
	4378	mm	4545	mm	-167	mm
Centerline	198.2	inches	173.7	inches	24.5	inches
	5035	mm	4412	mm	623	mm
Right Bumper Corner	172.2	inches	179.4	inches	-7.3	inches
	4373	mm	4558	mm	-185	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 2005 BUICK LACROSSE

Test #	5274		
VIN	2G4WC532151190569	NHTSA Test Vehicle Number	1
Year	2005	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	BUICK	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	LACROSSE	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	NONE		
Vehicle Commentary	2005 BUICK LACROSSE - M50102		

Vehicle Length	5035	mm	198.2	inches	CG behind Front Axle	1145	mm	45.1	inches
Vehicle Width	1841	mm	72.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2815	mm	110.8	inches	Total Length of Indentation	1467	mm	57.8	inches
Vehicle Test Weight	1832	KG	4038	pounds	Maximum Static Crush Depth	633	mm	24.9	inches
					Pre-Impact Speed	56	kph	35.1	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							
				5035	198.2	4412	173.7				
				Engine Block							
				508	20.0	376	14.8				
4378	172.4	4545	178.9	Front Bumper Corner				4373	172.2	4558	179.4
				Front of Engine							
				4083	160.7	4247	167.2				
3698	145.6	4102	161.5	Firewall				3670	144.5	4075	160.4
				3747	147.5	4109	161.8				
3358	132.2	3654	143.9	Upper Leading Edge of Door				3360	132.3	3654	143.9
3404	134.0	3579	140.9	Lower Leading Edge of Door				3402	133.9	3576	140.8
3508	138.1	3676	144.7	Bottom of 'A' Post				3483	137.1	3685	145.1
2293	90.3	2586	101.8	Upper Trailing Edge of Door				2294	90.3	2587	101.9
2307	90.8	2572	101.3	Lower Trailing Edge of Door				2307	90.8	2571	101.2
				Steering Column							
				2911	114.6	3236	127.4				
				Center of Seering Column to 'A' Post (Horizontal)							
				283	11.1	294	11.6				
				Center of Steering Column to Headliner (Vertical)							
				363	14.3	460	18.1				

2005 BUICK LACROSSE

NHTSA Crash Test - #5274 - Front Impact

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

Test Vehicle Weight = 4038 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 72.5 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	-6.6	24.5	-7.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.0 inches					0.0
Using a Rated No Damage Speed of	2.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	5.0 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	7.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	10.0 mph	0.0	0.0	0.0	
Average Crush = 12.3 inches					363.7
Using a Rated No Damage Speed of	2.5 mph	295.9	313.8	139.6	
Using a Rated No Damage Speed of	5.0 mph	546.5	267.5	558.3	
Using a Rated No Damage Speed of	7.5 mph	751.7	224.9	1256.1	
Using a Rated No Damage Speed of	10.0 mph	911.4	186.0	2233.1	
Maximum Crush = 24.5 inches					91.7
Using a Rated No Damage Speed of	2.5 mph	148.6	79.1	139.6	
Using a Rated No Damage Speed of	5.0 mph	274.4	67.4	558.3	
Using a Rated No Damage Speed of	7.5 mph	377.4	56.7	1256.1	
Using a Rated No Damage Speed of	10.0 mph	457.6	46.9	2233.1	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.5	35.9	0.8	2.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.1

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

2005 BUICK LACROSSE

NHTSA Crash Test - #5274 - Front Impact

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

Test Vehicle Weight = 4038 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 57.8 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	-6.6	24.5	-7.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.0 inches					0.0
Using a Rated No Damage Speed of	2.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	5.0 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	7.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	10.0 mph	0.0	0.0	0.0	
Average Crush = 12.3 inches					456.5
Using a Rated No Damage Speed of	2.5 mph	371.4	N/A	175.2	
Using a Rated No Damage Speed of	5.0 mph	685.8	335.7	700.6	
Using a Rated No Damage Speed of	7.5 mph	943.3	282.2	1576.4	
Using a Rated No Damage Speed of	10.0 mph	1143.8	233.4	2802.4	
Maximum Crush = 24.5 inches					115.0
Using a Rated No Damage Speed of	2.5 mph	186.5	99.2	175.2	
Using a Rated No Damage Speed of	5.0 mph	344.3	84.6	700.6	
Using a Rated No Damage Speed of	7.5 mph	473.6	71.1	1576.4	
Using a Rated No Damage Speed of	10.0 mph	574.2	58.8	2802.4	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.5	35.9	0.8	2.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.1

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

2005 BUICK LACROSSE

NHTSA Crash Test - #5274 - Front Impact

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

Test Vehicle Weight = 4038 pounds
Vehicle Closing Speed = 35.1 MPH
Test Crush Length = 72.5 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	21.2	23.1	24.9	24.0	23.2	21.9	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 21.2 inches					122.4
Using a Rated No Damage Speed of	2.5mph	171.7	105.6	139.6	
Using a Rated No Damage Speed of	5.0mph	317.1	90.0	558.3	
Using a Rated No Damage Speed of	7.5mph	436.1	75.7	1256.1	
Using a Rated No Damage Speed of	10.0mph	528.8	62.6	2233.1	
Average Crush = 23.4 inches					100.5
Using a Rated No Damage Speed of	2.5mph	155.6	86.7	139.6	
Using a Rated No Damage Speed of	5.0mph	287.3	73.9	558.3	
Using a Rated No Damage Speed of	7.5mph	395.1	62.1	1256.1	
Using a Rated No Damage Speed of	10.0mph	479.1	51.4	1552.8	
Maximum Crush = 24.9 inches					88.8
Using a Rated No Damage Speed of	2.5mph	146.2	76.6	139.6	
Using a Rated No Damage Speed of	5.0mph	270.0	65.3	558.3	
Using a Rated No Damage Speed of	7.5mph	371.3	54.9	1256.1	
Using a Rated No Damage Speed of	10.0mph	450.2	45.4	2233.1	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.9	36.2	1.1	2.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 19.8

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

2005 BUICK LACROSSE

NHTSA Crash Test - #5274 - Front Impact

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

Test Vehicle Weight = 4038 pounds
Vehicle Closing Speed = 35.1 MPH
Test Crush Length = 57.8 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	21.2	23.1	24.9	24.0	23.2	21.9	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 21.2 inches					153.7
Using a Rated No Damage Speed of	2.5mph	215.5	132.5	175.2	
Using a Rated No Damage Speed of	5.0mph	397.9	113.0	700.6	
Using a Rated No Damage Speed of	7.5mph	547.3	95.0	1576.4	
Using a Rated No Damage Speed of	10.0mph	663.6	78.6	2802.4	
Average Crush = 23.4 inches					126.1
Using a Rated No Damage Speed of	2.5mph	195.2	108.8	175.2	
Using a Rated No Damage Speed of	5.0mph	360.5	92.7	700.6	
Using a Rated No Damage Speed of	7.5mph	495.8	78.0	1576.4	
Using a Rated No Damage Speed of	10.0mph	601.2	64.5	1948.7	
Maximum Crush = 24.9 inches					111.4
Using a Rated No Damage Speed of	2.5mph	183.5	96.1	175.2	
Using a Rated No Damage Speed of	5.0mph	338.8	81.9	700.6	
Using a Rated No Damage Speed of	7.5mph	466.0	68.9	1576.4	
Using a Rated No Damage Speed of	10.0mph	565.0	57.0	2802.4	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.9	36.2	1.1	2.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 19.8

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: 2005 - 2009
Make: BUICK
Model: LACROSSE

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
5274	2005 BUICK LACROSSE FOUR DOOR SEDAN	5.0	23.4	35.1	287.8	74.2	558.3	100.9	21.1
5468	2006 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	23.5	35.1	283.3	72.5	553.6	98.6	20.9
5578	2006 CHEVROLET MONTE CARLO TWO DOOR C...	5.0	26.3	35.0	250.4	57.1	549.0	77.7	18.6
5547	2006 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	23.8	35.2	286.3	72.4	565.9	98.5	20.7
6052	2007 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	12.4	24.7	382.5	121.6	601.5	191.1	19.7
	Average (AVG)				**298.1**	**79.6**	**565.7**	**113.4**	**20.2**
	Minimum (MIN)				**250.4**	**57.1**	**549.0**	**77.7**	**18.6**
	Maximum (MAX)				**382.5**	**121.6**	**601.5**	**191.1**	**21.1**
	Standard Deviation (STDev-sample)				**49.7**	**24.5**	**21.0**	**44.5**	**1.0**
	Number of Tests (n)			**5**					

Available Test Results

Front Impact Test Summary

Report Filter Settings

Year Range: 2005 - 2009
Make: BUICK
Model: LACROSSE

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
5274	2005 BUICK LACROSSE FOUR DOOR SEDAN	5.0	24.9	35.1	269.7	65.2	558.3	88.6	19.8
5468	2006 PONTIAC GRAND PRIX FOUR DOOR SEDAN	5.0	26.7	35.1	249.3	56.1	553.6	76.3	18.4
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
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)				**267.2**	**63.9**	**565.7**	**91.0**	**18.1**
	Minimum (MIN)				**235.7**	**50.6**	**549.0**	**68.9**	**17.4**
	Maximum (MAX)				**340.6**	**96.4**	**601.5**	**151.5**	**19.8**
	Standard Deviation (STDev-sample)				**43.0**	**19.1**	**21.0**	**34.7**	**1.0**
	Number of Tests (n)			**5**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: KNJLT05H4V6198845

Model:	1997 Ford (Made by Kia) Aspire 2 door Hatchback
Engine Size:	1.3L/ 81 cu.in.
Engine Description:	Inline 4 cylinder Single Overhead Valve (SOHC)
Horse Power:	63 @ 5000 rpm
Torque:	73lb-ft at 3000 rpm
Injection System:	Sequential Fuel Injection (SFI)
PSI:	30-38 psi
Ignition:	Electronic
Manufacturer:	Kia
Assembly Plant:	Mazda-Kia, Korea
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (KNJ) indicate a Ford (Made by Kia) Passenger car made in Korea

The Fourth character (L) indicates Manual Seatbelts + Driver/Passgr Air Bag

The Fifth through Seventh characters (T05) indicate an Aspire and a 2 door Hatchback

The Eighth character (H) indicates the OEM engine: 1.3L/ 81 cu.in., I4 SOHC

The Ninth character (the check digit) is entered as 4.
The VIN appears Valid, the calculated value is 4.

The Tenth character (V) indicates the model year 1997

The Eleventh character (6) indicates the vehicle was made in the assembly plant in Mazda-Kia, Korea

The Twelfth through Seventeenth characters (198845) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

1997 FORD ASPIRE 2 DOOR HATCHBACK

Curb Weight:	2004 lbs.		909 kg.	
Curb Weight Distribution -	Front: 62 %	Rear:	38 %	
Gross Vehicle Weight Rating:	2952 lbs.		1339 kg.	
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	153	12.75	3.89
Wheelbase:	91	7.58	2.31
Front Bumper to Front Axle:	30	2.50	0.76
Front Bumper to Front of Front Well:	9	0.75	0.23
Front Bumper to Front of Hood:	5	0.42	0.13
Front Bumper to Base of Windshield:	44	3.67	1.12
Front Bumper to Top of Windshield:	69	5.75	1.75
Rear Bumper to Rear Axle:	32	2.67	0.81
Rear Bumper to Rear of Rear Well:	14	1.17	0.36
Rear Bumper to Rear of Trunk:	3	0.25	0.08
Rear Bumper to Base of Rear Window:	6	0.50	0.15
Width Dimensions			
Maximum Width:	66	5.50	1.68
Front Track:	56	4.67	1.42
Rear Track:	55	4.58	1.40
Vertical Dimensions			
Height:	56	4.67	1.42
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	25	2.08	0.64
Hood - top front:	29	2.42	0.74
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:			
Base of Rear Window:	42	3.50	1.07

1997 FORD ASPIRE 2 DOOR HATCHBACK

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	50	4.17	1.27
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	49	4.08	1.24
Rear Seat to Headliner	36	3.00	0.91
Front Leg Room - seatback to floor (min)	34	2.83	0.86

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	540	45.00	13.72
Steering Ratio: 22.00:1			
Wheel Radius:	11	0.92	0.28
Tire Size (OEM): 165-70R13			

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 = 163.0 ft t = 3.7 sec a = -23.7 ft/sec² G-force = -0.74

Acceleration:

0 to 30mph	t =	4.1	sec	a =	10.7	ft/sec²	G-force = 0.33
0 to 60mph	t =	14.3	sec	a =	6.2	ft/sec²	G-force = 0.19
45 to 65mph	t =		sec	a =		ft/sec²	G-force =

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 1997

1997 FORD ASPIRE 2 DOOR HATCHBACK

Other Information

Tip-Over Stability Ratio =	1.30	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	34.58
Inches in front of rear axle	=	56.42
Inches from side of vehicle	=	33.00
Inches from ground	=	21.45
Inches from front corner	=	72.52
Inches from rear corner	=	94.38
Inches from front bumper	=	64.58
Inches from rear bumper	=	88.42

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	858.12	lb*ft*sec²
Pitch Moment of Inertia	=	834.96	lb*ft*sec²
Roll Moment of Inertia	=	210.72	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	60.9	deg
Angle Front of Hood to Windshield Base	=	10.2	deg
Angle Front of Hood to Windshield Top	=	21.3	deg
Angle of Windshield	=	35.8	deg
Angle of Steering Tires at Max Turn	=	19.3	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).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#2500

1997 FORD ASPIRE

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **1997 FORD ASPIRE**

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

Year Range	Make	Model	Body Styles	Wheelbase
1994 - 1997	FORD	ASPIRE	3D, 5D	90.7, 93.9

Remarks: KOREAN-MADE

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 #	2500	NHTSA Test Reference Guide Version #	V4			
Test Date	1996-11-15	Contract #	DTNH22-93-C-02047			
Contract/Study Title	FMVSS 214 COMPLIANCE (RIGHT SIDE) 1997 FORD ASPIRE (CV0207)					
Test Objective(s)	VEHICLE CRASHWORTHINESS AND OCCUPANT PROTECTION					
Test Type	FMVSS 214 SIDE IMPACT PROTECTION	Configuration	IMPACTOR INTO VEHICLE			
Impact Angle	90	Side Impact Point	101	mm	4.0	inches
			0	mm	0.0	inches
		Closing Speed	53.1	Km/Hr	32.99	MPH
Test Performer	MGA RESEARCH					
Test Reference #	BT96111501					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	20 C	68.0 F	Total Number of Curves	54		
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 FORD ASPIRE RIGHT FRONT SEAT OCCUPANT

Test #	2500		
Vehicle #	2	Sex	MALE
Location	RIGHT FRONT SEAT	Age	99
Position	CENTER POSITION	Height	999 mm 39.3 inches
Type	APR SIDE IMPACT DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	HSRI		
Occupant Manufacturer	FIRST TECHNOLOGY: S/N 272		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRL1 LEFT LEG CONTACTS RIGHT LEG; RIGHT LEG CONTACTS DOOR PANEL		

Head

Head to -

Windshielder Header	327	mm	12.9	inches	Head Injury Criteria (HIC)	9999	
WindShield	986	mm	38.8	inches	HIC Lower Time Interval (ms)	1000	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	1000	
Side Header	184	mm	7.2	inches			
Side Window	254	mm	10.0	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	SIDE WINDOW						
Second Contact Region (Head)							

Chest

Chest to -

Dash	577	mm	22.7	inches	Arm to Door	76	mm	3.0	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	131	mm	5.2	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)	NONE								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	136	mm	5.4	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 FORD ASPIRE RIGHT FRONT SEAT OCCUPANT

Test #	2500					
Vehicle #	2	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	APR SIDE IMPACT DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HSRI
Occupant Manufacturer	FIRST TECHNOLOGY: S/N 272
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRL1 LEFT LEG CONTACTS RIGHT LEG; RIGHT LEG CONTACTS DOOR PANEL

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	PADDING
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

1997 FORD ASPIRE RIGHT REAR SEAT OCCUPANT

Test #	2500		
Vehicle #	2	Sex	MALE
Location	RIGHT REAR SEAT	Age	99
Position	NONADJUSTABLE SEAT	Height	999 mm 39.3 inches
Type	APR SIDE IMPACT DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	HSRI		
Occupant Manufacturer	FIRST TECHNOLOGIES: S/N 271		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRL1 LEFT KNEE TO RIGHT KNEE; RIGHT KNEE CONTACTS B PILLAR		

Head

Head to -

Windshielder Header	9999	mm	0.0	inches	Head Injury Criteria (HIC)	9999	
WindShield	9999	mm	0.0	inches	HIC Lower Time Interval (ms)	1000	
Seatback	503	mm	19.8	inches	HIC Upper Time Interval (ms)	1000	
Side Header	242	mm	9.5	inches			
Side Window	277	mm	10.9	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	79	mm	3.1	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	98	mm	3.9	inches
Seatback	456	mm	18.0	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)	NONE								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	9999	mm	0.0	inches	Knees to Seatback	194	mm	7.6	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 FORD ASPIRE RIGHT REAR SEAT OCCUPANT

Test #	2500					
Vehicle #	2	Sex	MALE			
Location	RIGHT REAR SEAT	Age	99			
Position	NONADJUSTABLE SEAT	Height	999	mm	39.3	inches
Type	APR SIDE IMPACT DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HSRI
Occupant Manufacturer	FIRST TECHNOLOGIES: S/N 271
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRL1 LEFT KNEE TO RIGHT KNEE; RIGHT KNEE CONTACTS B PILLAR

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	PADDING
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

Vehicle 1 0 NHTSA DEFORMABLE IMPACTOR

Test #	2500		
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	2014	mm	79.3	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	53	kph	33.0	mph

Vehicle Damage Index: 9999999

Principal Direction of Force: 27

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)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
27.0	DIRECT ENGAGEMENT	999.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	27.0	DIRECT ENGAGEMENT
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 0 NHTSA DEFORMABLE IMPACTOR

Test #	2500		
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	2014	mm	79.3	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	53	kph	33.0	mph

Vehicle Damage Index	9999999	Principal Direction of Force	27

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 FORD ASPIRE

Test #	2500		
VIN	KNJLT05HXV6201361	NHTSA Test Vehicle Number	2
Year	1997	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	ASPIRE	Steering Column Collapse Mechanism	UNKNOWN
Body	THREE DOOR HATCHBACK		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.4 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	3702	mm	145.7	inches	CG behind Front Axle	952	mm	37.5	inches
Vehicle Width	1674	mm	65.9	inches	Center of Damage to CG Axis	406	mm	16.0	inches
Vehicle Wheelbase	2310	mm	90.9	inches	Total Length of Indentation	3300	mm	129.9	inches
Vehicle Test Weight	1111	KG	2449	pounds	Maximum Static Crush Depth	30	mm	1.2	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index: 03RPEW7

Principal Direction of Force: 63

Damage Profile Distance Measurements

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

DPD 1	0	mm	0.0	inches
DPD 2	183	mm	7.2	inches
DPD 3	300	mm	11.8	inches
DPD 4	267	mm	10.5	inches
DPD 5	98	mm	3.9	inches
DPD 6	0	mm	0.0	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	136.9	inches	137.8	inches	-0.9	inches
	3476	mm	3499	mm	-23	mm
Centerline	145.7	inches	145.0	inches	0.8	inches
	3702	mm	3682	mm	20	mm
Right Bumper Corner	136.9	inches	136.8	inches	0.1	inches
	3476	mm	3474	mm	2	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
27.0	DIRECT ENGAGEMENT	90.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	0.0	DIRECT ENGAGEMENT
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 2 1997 FORD ASPIRE

Test #	2500		
VIN	KNJLT05HXV6201361	NHTSA Test Vehicle Number	2
Year	1997	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	FORD	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	ASPIRE	Steering Column Collapse Mechanism	UNKNOWN
Body	THREE DOOR HATCHBACK		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.4 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	3702	mm	145.7	inches	CG behind Front Axle	952	mm	37.5	inches
Vehicle Width	1674	mm	65.9	inches	Center of Damage to CG Axis	406	mm	16.0	inches
Vehicle Wheelbase	2310	mm	90.9	inches	Total Length of Indentation	3300	mm	129.9	inches
Vehicle Test Weight	1111	KG	2449	pounds	Maximum Static Crush Depth	30	mm	1.2	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index: 03RPEW7 — Principal Direction of Force: 63

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							
				3702	145.7	3682	145.0				
				Engine Block							
				0	0.0	0	0.0				
3476	136.9	3499	137.8	Front Bumper Corner				3476	136.9	3474	136.8
				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 FORD ASPIRE

NHTSA Crash Test - #2500 - Side Impact

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

Test Vehicle Weight = 2449 pounds
KE Equivalent Speed = 24.5 MPH
Test Crush Length = 129.9 inches

Impactor Weight = 2989
Impactor Test Speed = 33.0

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Rear)	0.0	7.2	11.8	10.5	3.9	0.0	(Front)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 3.9 inches					594.5
Using a Rated No Damage Speed of	1.0mph	90.9	546.8	7.6	
Using a Rated No Damage Speed of	2.0mph	174.1	501.2	30.2	
Using a Rated No Damage Speed of	3.0mph	249.5	457.6	68.0	
Using a Rated No Damage Speed of	5.0mph	377.0	376.3	188.9	
Average Crush = 6.7 inches					201.4
Using a Rated No Damage Speed of	1.0mph	52.9	185.3	7.6	
Using a Rated No Damage Speed of	2.0mph	101.3	169.8	30.2	
Using a Rated No Damage Speed of	3.0mph	145.2	155.0	68.0	
Using a Rated No Damage Speed of	5.0mph	219.5	127.5	141.8	
Maximum Crush = 11.8 inches					64.9
Using a Rated No Damage Speed of	1.0mph	30.0	59.7	7.6	
Using a Rated No Damage Speed of	2.0mph	57.5	54.8	30.2	
Using a Rated No Damage Speed of	3.0mph	82.4	50.0	68.0	
Using a Rated No Damage Speed of	5.0mph	124.6	41.1	188.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	11.8	24.9	0.4	1.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

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

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

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

E-Mail: 4n6@4n6xprt.com

The NHTSA Crash Test database contains only ONE SIDE Impact tests for the Ford Aspire.

To create a class vehicle, we looked at the NHTSA database for THREE DOOR HATCHBACKS that have SIDE IMPACT TESTS, and a test weight range of 2249-2649 pounds (+/- 200 pounds of the one available test)

The Test Summary Reports based on the Average and Maximum crush depths follow.

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Bodystyle: THREE DOOR HATCHBACK

Vehicle Weight Range: 2249-2649

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
2169	1990 HONDA CIVIC THREE DOOR HATCHBACK	2.0	15.8	25.2	80.0	58.6	54.6	69.1	16.0
2500	1997 FORD ASPIRE THREE DOOR HATCHBACK	2.0	6.7	24.5	101.7	171.0	30.2	202.8	35.8
2536	1997 HYUNDAI ACCENT THREE DOOR HATCHBACK	2.0	7.8	24.1	100.5	142.8	35.3	169.8	29.9
2660	1995 GEO METRO THREE DOOR HATCHBACK	2.0	31.8	21.7	32.1	10.0	51.8	12.1	5.9
3444	1996 GEO METRO THREE DOOR HATCHBACK	2.0	5.5	21.8	139.6	251.2	38.8	304.5	34.5
	Average (AVG)				**90.8**	**126.7**	**42.1**	**151.7**	**24.4**
	Minimum (MIN)				**32.1**	**10.0**	**30.2**	**12.1**	**5.9**
	Maximum (MAX)				**139.6**	**251.2**	**54.6**	**304.5**	**35.8**
	Standard Deviation (STDev-sample)				**39.2**	**94.8**	**10.6**	**114.7**	**13.0**
	Number of Tests (n)			**5**					

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Bodystyle: THREE DOOR HATCHBACK

Vehicle Weight Range: 2249-2649

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
2169	1990 HONDA CIVIC THREE DOOR HATCHBACK	2.0	15.8	25.2	80.0	58.6	54.6	69.1	16.0
2500	1997 FORD ASPIRE THREE DOOR HATCHBACK	2.0	11.8	24.5	57.5	54.6	30.2	64.8	20.3
2536	1997 HYUNDAI ACCENT THREE DOOR HATCHBACK	2.0	12.0	24.1	65.1	60.0	35.3	71.3	19.4
2660	1995 GEO METRO THREE DOOR HATCHBACK	2.0	42.7	21.7	23.9	5.5	51.8	6.7	4.4
3444	1996 GEO METRO THREE DOOR HATCHBACK	2.0	10.5	21.8	73.1	68.9	38.8	83.5	18.1
	Average (AVG)				**59.9**	**49.5**	**42.1**	**59.1**	**15.6**
	Minimum (MIN)				**23.9**	**5.5**	**30.2**	**6.7**	**4.4**
	Maximum (MAX)				**80.0**	**68.9**	**54.6**	**83.5**	**20.3**
	Standard Deviation (STDev-sample)				**21.8**	**25.2**	**10.6**	**30.1**	**6.5**
	Number of Tests (n)			**5**					

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

5/7/2011

2011 BUICK REGAL 4 DOOR SEDAN

Curb Weight:	3635 lbs.		1649	kg.
Curb Weight Distribution - Front:	58 %	Rear:	42	%
Gross Vehicle Weight Rating:	4674 lbs.		2120	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	190	15.83	4.83
Wheelbase:	108	9.00	2.74
Front Bumper to Front Axle:	40	3.33	1.02
Front Bumper to Front of Front Well:	25	2.08	0.64
Front Bumper to Front of Hood:	7	0.58	0.18
Front Bumper to Base of Windshield:	49	4.08	1.24
Front Bumper to Top of Windshield:	81	6.75	2.06
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	28	2.33	0.71
Rear Bumper to Rear of Trunk:	5	0.42	0.13
Rear Bumper to Base of Rear Window:	22	1.83	0.56
Width Dimensions			
Maximum Width:	73	6.08	1.85
Front Track:	62	5.17	1.57
Rear Track:	62	5.17	1.57
Vertical Dimensions			
Height:	58	4.83	1.47
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	27	2.25	0.69
Hood - top front:	32	2.67	0.81
Base of Windshield	39	3.25	0.99
Rear Bumper - top:	27	2.25	0.69
Trunk - top rear:	44	3.67	1.12
Base of Rear Window:	45	3.75	1.14

2011 BUICK REGAL 4 DOOR SEDAN

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
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)	37	3.08	0.94

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	444	37.00	11.28
Steering Ratio:	15.20:1		
Wheel Radius:	13	1.08	0.33
Tire Size (OEM):	235/50R18		

Acceleration & Braking Information

Brake Type: ALL DISC

ABS System: ALL WHEEL ABS

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

d = 128.0 ft t = 2.9 sec a = -30.2 ft/sec² G-force = -0.94

Acceleration:

0 to 30mph	t =	2.9	sec	a =	15.2	ft/sec²	G-force = 0.47
0 to 60mph	t =	8.7	sec	a =	10.1	ft/sec²	G-force = 0.31
45 to 65mph	t =	4.8	sec	a =	6.1	ft/sec²	G-force = 0.19

Transmission Type: AUTOMATIC

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 2.5 mph

N.S.D.C = 2011 - 2011

2011 BUICK REGAL 4 DOOR SEDAN

Other Information

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

Center of Gravity (No Load):

Inches behind front axle	=	45.36
Inches in front of rear axle	=	62.64
Inches from side of vehicle	=	36.50
Inches from ground	=	22.77
Inches from front corner	=	92.84
Inches from rear corner	=	110.82
Inches from front bumper	=	85.36
Inches from rear bumper	=	104.64

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2538.05	lb*ft*sec²
Pitch Moment of Inertia	=	2449.65	lb*ft*sec²
Roll Moment of Inertia	=	504.30	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	59.7	deg
Angle Front of Hood to Windshield Base	=	9.5	deg
Angle Front of Hood to Windshield Top	=	18.0	deg
Angle of Windshield	=	28.0	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).

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The Buick Regal (Opel Insignia) is not in the NHTSA Crash Test database due to it being so new..

To create a SIMILAR class of vehicle, we first looked at the Curb Weight of the Buick Regal, then added 700 pounds for test equipment to reach a test weight of 4335 pounds.

We then looked at the NHTSA database for CARS that have FRONT IMPACT TESTS and had a test weight of 4300-4370 pounds (+/- ~35 pounds of the derived test weight).

The Test Summary Reports based on the Average and Maximum crush depths follow.

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 4300-4370

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
4680	2003 HYUNDAI XG350 FOUR DOOR SEDAN	5.0	13.5	29.7	444.7	163.3	605.6	236.1	26.2
4691	2003 BUICK PARK AVENUE FOUR DOOR SEDAN	5.0	21.2	29.8	272.9	63.6	585.6	91.9	16.7
5167	2004 NISSAN MAXIMA FOUR DOOR SEDAN	5.0	17.7	29.8	338.7	95.0	603.5	137.1	20.1
6052	2007 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	12.4	24.7	382.5	121.6	601.5	191.1	19.7
6477	2009 HYUNDAI GENESIS FOUR DOOR SEDAN	5.0	21.4	35.1	332.8	93.7	590.9	127.4	23.1
6519	2009 AUDI A4 FOUR DOOR SEDAN	5.0	24.2	34.9	301.8	74.7	609.7	101.8	20.2
2497	1997 CADILLAC ELDORADO TWO DOOR COUPE	5.0	14.9	29.5	380.1	125.0	578.1	181.1	23.4
	Average (AVG)				**350.5**	**105.3**	**596.4**	**152.4**	**21.3**
	Minimum (MIN)				**272.9**	**63.6**	**578.1**	**91.9**	**16.7**
	Maximum (MAX)				**444.7**	**163.3**	**609.7**	**236.1**	**26.2**
	Standard Deviation (STDev-sample)				**57.2**	**34.0**	**11.7**	**52.3**	**3.1**
	Number of Tests (n)			**7**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 4300-4370

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
4680	2003 HYUNDAI XG350 FOUR DOOR SEDAN	5.0	15.7	29.7	380.0	119.2	605.6	172.3	22.4
4691	2003 BUICK PARK AVENUE FOUR DOOR SEDAN	5.0	22.3	29.8	260.2	57.8	585.6	83.5	15.9
5167	2004 NISSAN MAXIMA FOUR DOOR SEDAN	5.0	18.4	29.8	325.3	87.7	603.5	126.5	19.3
6052	2007 CHEVROLET IMPALA FOUR DOOR SEDAN	5.0	13.9	24.7	340.6	96.4	601.5	151.5	17.6
6477	2009 HYUNDAI GENESIS FOUR DOOR SEDAN	5.0	23.9	35.1	298.3	75.3	590.9	102.4	20.7
6519	2009 AUDI A4 FOUR DOOR SEDAN	5.0	25.9	34.9	281.7	65.1	609.7	88.6	18.8
2497	1997 CADILLAC ELDORADO TWO DOOR COUPE	5.0	18.9	29.5	300.0	77.8	578.1	112.8	18.4
	Average (AVG)				**312.3**	**82.8**	**596.4**	**119.7**	**19.0**
	Minimum (MIN)				**260.2**	**57.8**	**578.1**	**83.5**	**15.9**
	Maximum (MAX)				**380.0**	**119.2**	**609.7**	**172.3**	**22.4**
	Standard Deviation (STDev-sample)				**39.9**	**20.6**	**11.7**	**32.8**	**2.1**
	Number of Tests (n)			**7**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN:	1G1JC5243X7126887
Model:	1999 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

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) indicates a 4 Door Sedan

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

The Eighth character (4) indicates 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 (X) indicates the model year 1999

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

The Twelfth through Seventeenth characters (126887) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

1999 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

1999 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

1999 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

#2546

1996 CHEVROLET CAVALIER

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **1997 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 #	2546	NHTSA Test Reference Guide Version #	V4				
Test Date	1996-09-30	Contract #	DTR557-995-C00011				
Contract/Study Title	1996 CHEVROLET CAVALIER INTO FRONTAL LOAD CELL BARRIER						
Test Objective(s)	DETERMINE PROTECTIVE CAPABILITY OF DOWNLOADED INFLATORS IN FRONT LCB						
Test Type	BASELINE TEST	Configuration	VEHICLE INTO BARRIER				
Impact Angle	0	Side Impact Point	0	mm	0.0	inches	
			0	mm	0.0	inches	
		Closing Speed	56.2	Km/Hr	34.92	MPH	
Test Performer	TRC OF OHIO						
Test Reference #	960930						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	22 C	71.6 F	Total Number of Curves	95			
Data Recorder Type	OTHER	Data Link	UMBILICAL CABLE				
Test Commentary	RECTYP IS DIGITAL ONBOARD						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	99999	mm	99999	inches
Barrier Shape	LOAD CELL BARRIER					
Barrier Commentary	NO COMMENTS					

1996 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

Test #	2546						
Vehicle #	1			Sex	MALE		
Location	LEFT FRONT SEAT			Age	99		
Position	CENTER POSITION			Height	999	mm	39.3 inches
Type	HYBRID III DUMMY			Weight	999.0	kg	2202 pounds
Size	50 PERCENTILE						

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: HUMANOID, S/N: 142
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2 IS HEAD RESTRAINT AND SUNVISOR

Head

Head to -

Windshielder Header	300	mm	11.8	inches	Head Injury Criteria (HIC)	746			
WindShield	537	mm	21.1	inches	HIC Lower Time Interval (ms)	62.08			
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	98.08			
Side Header	191	mm	7.5	inches					
Side Window	308	mm	12.1	inches					
Neck to Seatback	9999	mm	0.0	inches					

First Contact Region (Head)	AIR BAG
Second Contact Region (Head)	

Chest

Chest to -

Dash	508	mm	20.0	inches	Arm to Door	127	mm	5.0	inches
Steering Wheel	291	mm	11.5	inches	Hip to Door	120	mm	4.7	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index	599	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	58.7

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)	NONE

Legs

Knees to Dash	163	mm	6.4	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-5463	Newtons	-1228.1	pounds Force					
Right Femur Peak Load	-7141	Newtons	-1605.4	pounds Force					

First Contact Region (Legs)	DASHPANEL
Second Contact Region (Legs)	

1996 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

Test #	2546					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: HUMANOID, S/N: 142
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2 IS HEAD RESTRAINT AND SUNVISOR

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	DOWNLOAD AIRBAG INFLATORS
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	DOWNLOAD AIRBAG INFLATORS

1996 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

Test #	2546						
Vehicle #	1			Sex	MALE		
Location	RIGHT FRONT SEAT			Age	99		
Position	CENTER POSITION			Height	999	mm	39.3 inches
Type	HYBRID III DUMMY			Weight	999.0	kg	2202 pounds
Size	50 PERCENTILE						

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: ARL, S/N: 192
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2 IS HEAD RESTRAINT AND SUNVISOR

Head

Head to -

Windshielder Header	293	mm	11.5	inches	Head Injury Criteria (HIC)	669	
WindShield	539	mm	21.2	inches	HIC Lower Time Interval (ms)	69.84	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	105.84	
Side Header	171	mm	6.7	inches			
Side Window	302	mm	11.9	inches			

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head)	AIR BAG
Second Contact Region (Head)	

Chest

Chest to -

Dash	463	mm	18.2	inches	Arm to Door	138	mm	5.4	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	141	mm	5.6	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index	721	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	77.1

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)	NONE

Legs

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

Left Femur Peak Load	-6509	Newtons	-1463.3	pounds Force
Right Femur Peak Load	-8142	Newtons	-1830.4	pounds Force

First Contact Region (Legs)	DASHPANEL
Second Contact Region (Legs)	

1996 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

Test #	2546					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: ARL, S/N: 192
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH2 IS HEAD RESTRAINT AND SUNVISOR

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	DOWNLOADED AIRBAG INFLATOR
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	DOWNLOADED AIRBAG INFLATOR

Vehicle 1 1996 CHEVROLET CAVALIER

Test #	2546		
VIN	1G1JC5246T7288815	NHTSA Test Vehicle Number	1
Year	1996	Vehicle Modification Indicator	MODIFIED VEHICLE
Make	CHEVROLET	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CAVALIER	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	DOWNLOADED AIRBAG INFLATORS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4579	mm	180.3	inches	CG behind Front Axle	1063	mm	41.9	inches
Vehicle Width	1715	mm	67.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2642	mm	104.0	inches	Total Length of Indentation	1525	mm	60.0	inches
Vehicle Test Weight	1457	KG	3211	pounds	Maximum Static Crush Depth	525	mm	20.7	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	410	mm	16.1	inches
DPD 2	491	mm	19.3	inches
DPD 3	520	mm	20.5	inches
DPD 4	525	mm	20.7	inches
DPD 5	483	mm	19.0	inches
DPD 6	323	mm	12.7	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	170.1	inches	153.9	inches	16.1	inches
	4320	mm	3910	mm	410	mm
Centerline	180.3	inches	159.1	inches	21.2	inches
	4579	mm	4040	mm	539	mm
Right Bumper Corner	170.6	inches	157.9	inches	12.7	inches
	4333	mm	4010	mm	323	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 1996 CHEVROLET CAVALIER

Test #	2546		
VIN	1G1JC5246T7288815	NHTSA Test Vehicle Number	1
Year	1996	Vehicle Modification Indicator	MODIFIED VEHICLE
Make	CHEVROLET	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CAVALIER	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	DOWNLOADED AIRBAG INFLATORS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4579	mm	180.3	inches	CG behind Front Axle	1063	mm	41.9	inches
Vehicle Width	1715	mm	67.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2642	mm	104.0	inches	Total Length of Indentation	1525	mm	60.0	inches
Vehicle Test Weight	1457	KG	3211	pounds	Maximum Static Crush Depth	525	mm	20.7	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 Pre-Test		Left Side Post-Test		Centerline				Right Side Pre-Test		Right Side Post-Test	
mm	inches	mm	inches	Pre-Test mm	Pre-Test inches	Post-Test mm	Post-Test inches	mm	inches	mm	inches
				Length of Vehicle at Centerline							
				4579	180.3	4040	159.1				
				Engine Block							
				440	17.3	440	17.3				
4320	170.1	3910	153.9	Front Bumper Corner				4333	170.6	4010	157.9
				Front of Engine							
				3844	151.3	3629	142.9				
3442	135.5	3456	136.1	Firewall				3434	135.2	3276	129.0
				3439	135.4	3306	130.2				
3084	121.4	3092	121.7	Upper Leading Edge of Door				3094	121.8	3091	121.7
3090	121.7	3083	121.4	Lower Leading Edge of Door				3078	121.2	3065	120.7
3041	119.7	3064	120.6	Bottom of 'A' Post				3045	119.9	3054	120.2
2045	80.5	2058	81.0	Upper Trailing Edge of Door				2052	80.8	2059	81.1
2050	80.7	2049	80.7	Lower Trailing Edge of Door				2045	80.5	2033	80.0
				Steering Column							
				2651	104.4	2719	107.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				287	11.3	288	11.3				
				Center of Steering Column to Headliner (Vertical)							
				440	17.3	375	14.8				

1996 CHEVROLET CAVALIER

NHTSA Crash Test - #2546 - Front Impact

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

Test Vehicle Weight = 3211 pounds
Vehicle Closing Speed = 34.9 mph
Test Crush Length = 67.5 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	16.1	21.2	12.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.7 inches					288.3
Using a Rated No Damage Speed of	2.5 mph	243.3	248.5	119.2	
Using a Rated No Damage Speed of	5.0 mph	449.2	211.6	476.6	
Using a Rated No Damage Speed of	7.5 mph	617.5	177.8	1072.4	
Using a Rated No Damage Speed of	10.0 mph	748.2	146.8	1906.5	
Average Crush = 17.8 inches					146.8
Using a Rated No Damage Speed of	2.5 mph	173.6	126.5	119.2	
Using a Rated No Damage Speed of	5.0 mph	320.5	107.7	476.6	
Using a Rated No Damage Speed of	7.5 mph	440.5	90.5	1072.4	
Using a Rated No Damage Speed of	10.0 mph	533.8	74.7	1906.5	
Maximum Crush = 21.2 inches					103.5
Using a Rated No Damage Speed of	2.5 mph	145.8	89.2	119.2	
Using a Rated No Damage Speed of	5.0 mph	269.1	76.0	476.6	
Using a Rated No Damage Speed of	7.5 mph	369.9	63.8	1072.4	
Using a Rated No Damage Speed of	10.0 mph	448.2	52.7	1906.5	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	21.2	33.4	-1.6	-4.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.0

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

1996 CHEVROLET CAVALIER

NHTSA Crash Test - #2546 - Front Impact

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

Test Vehicle Weight = 3211 pounds
Vehicle Closing Speed = 34.9 mph
Test Crush Length = 60.0 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	16.1	21.2	12.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.7 inches					324.2
Using a Rated No Damage Speed of	2.5 mph	273.7	279.4	134.0	
Using a Rated No Damage Speed of	5.0 mph	505.1	238.0	536.0	
Using a Rated No Damage Speed of	7.5 mph	694.4	199.9	1206.0	
Using a Rated No Damage Speed of	10.0 mph	841.4	165.1	2144.0	
Average Crush = 17.8 inches					165.0
Using a Rated No Damage Speed of	2.5 mph	195.3	142.3	134.0	
Using a Rated No Damage Speed of	5.0 mph	360.4	121.2	536.0	
Using a Rated No Damage Speed of	7.5 mph	495.4	101.8	1206.0	
Using a Rated No Damage Speed of	10.0 mph	600.3	84.1	2144.0	
Maximum Crush = 21.2 inches					116.3
Using a Rated No Damage Speed of	2.5 mph	163.9	100.3	134.0	
Using a Rated No Damage Speed of	5.0 mph	302.6	85.4	536.0	
Using a Rated No Damage Speed of	7.5 mph	416.0	71.7	1206.0	
Using a Rated No Damage Speed of	10.0 mph	504.1	59.3	2144.0	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	21.2	33.4	-1.6	-4.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.0

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

1996 CHEVROLET CAVALIER

NHTSA Crash Test - #2546 - Front Impact

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

Test Vehicle Weight = 3211 pounds
Vehicle Closing Speed = 34.9 MPH
Test Crush Length = 67.5 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	16.1	19.3	20.5	20.7	19.0	12.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.7 inches					288.3
Using a Rated No Damage Speed of	2.5mph	243.3	248.5	119.2	
Using a Rated No Damage Speed of	5.0mph	449.2	211.6	476.6	
Using a Rated No Damage Speed of	7.5mph	617.5	177.8	1072.4	
Using a Rated No Damage Speed of	10.0mph	748.2	146.8	1906.5	
Average Crush = 18.8 inches					131.6
Using a Rated No Damage Speed of	2.5mph	164.4	113.4	119.2	
Using a Rated No Damage Speed of	5.0mph	303.4	96.6	476.6	
Using a Rated No Damage Speed of	7.5mph	417.1	81.1	1072.4	
Using a Rated No Damage Speed of	10.0mph	505.4	67.0	1322.5	
Maximum Crush = 20.7 inches					108.5
Using a Rated No Damage Speed of	2.5mph	149.3	93.5	119.2	
Using a Rated No Damage Speed of	5.0mph	275.6	79.7	476.6	
Using a Rated No Damage Speed of	7.5mph	378.8	66.9	1072.4	
Using a Rated No Damage Speed of	10.0mph	459.0	55.3	1906.5	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.7	33.0	-2.0	-5.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.6

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

1996 CHEVROLET CAVALIER

NHTSA Crash Test - #2546 - Front Impact

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

Test Vehicle Weight = 3211 pounds
Vehicle Closing Speed = 34.9 MPH
Test Crush Length = 60.0 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	16.1	19.3	20.5	20.7	19.0	12.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 12.7 inches					324.2
Using a Rated No Damage Speed of	2.5mph	273.7	279.4	134.0	
Using a Rated No Damage Speed of	5.0mph	505.1	238.0	536.0	
Using a Rated No Damage Speed of	7.5mph	694.4	199.9	1206.0	
Using a Rated No Damage Speed of	10.0mph	841.4	165.1	2144.0	
Average Crush = 18.8 inches					147.9
Using a Rated No Damage Speed of	2.5mph	184.9	127.5	134.0	
Using a Rated No Damage Speed of	5.0mph	341.2	108.6	536.0	
Using a Rated No Damage Speed of	7.5mph	469.1	91.2	1206.0	
Using a Rated No Damage Speed of	10.0mph	568.4	75.3	1487.3	
Maximum Crush = 20.7 inches					122.0
Using a Rated No Damage Speed of	2.5mph	167.9	105.2	134.0	
Using a Rated No Damage Speed of	5.0mph	309.9	89.6	536.0	
Using a Rated No Damage Speed of	7.5mph	426.0	75.2	1206.0	
Using a Rated No Damage Speed of	10.0mph	516.2	62.2	2144.0	

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

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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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	20.7	33.0	-2.0	-5.9

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 23.6

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: 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
2214	1995 PONTIAC SUNFIRE FOUR DOOR SEDAN	5.0	10.8	29.6	429.3	194.8	472.9	282.1	32.3
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
2546	1996 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	18.8	34.9	303.7	96.8	476.6	131.8	26.0
2688	1998 CHEVROLET CAVALIER TWO DOOR COUPE	5.0	18.8	35.2	270.3	86.9	420.2	118.1	26.4
2689	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	14.2	35.1	361.0	152.9	426.0	208.0	34.7
2754	1997 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	15.5	34.9	380.0	146.5	492.9	199.6	31.4
2850	1997 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	16.5	30.1	347.2	105.4	571.9	151.6	21.9
3096	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	13.5	29.0	290.3	103.7	406.6	151.2	25.1
3112	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	9.0	24.9	399.2	176.4	451.7	276.1	27.5
3178	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	9.7	25.1	371.0	152.9	450.1	238.6	25.8
3179	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	13.4	29.2	292.4	105.5	405.2	153.7	25.4
3180	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	15.0	29.2	262.7	84.9	406.3	123.5	22.8
4445	2003 CHEVROLET CAVALIER TWO DOOR COUPE	5.0	12.7	34.8	424.3	198.3	453.9	270.6	38.0
5206	2004 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	15.3	29.6	318.0	102.7	492.2	148.6	23.0
	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
2214	1995 PONTIAC SUNFIRE FOUR DOOR SEDAN	5.0	11.5	29.6	404.4	172.9	472.9	250.4	30.4
2253	1995 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	22.3	35.1	281.2	76.0	520.3	103.3	22.1
2528	1997 CHEVROLET CAVALIER TWO DOOR COUPE	5.0	21.2	35.0	259.8	73.4	459.6	99.9	23.1
2546	1996 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	21.2	34.9	268.8	75.8	476.6	103.3	23.0
2688	1998 CHEVROLET CAVALIER TWO DOOR COUPE	5.0	22.6	35.2	224.0	59.7	420.2	81.1	21.9
2689	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	19.3	35.1	266.0	83.0	426.0	112.9	25.6
2754	1997 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	19.7	34.9	299.7	91.1	492.9	124.1	24.8
2850	1997 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	18.1	30.1	317.4	88.1	571.9	126.7	20.0
2873	1997 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	11.3	25.4	301.3	108.9	417.0	168.7	22.9
3096	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	15.9	29.0	245.3	74.0	406.6	108.0	21.2
3112	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	21.5	24.9	167.7	31.1	451.7	48.7	11.6
3177	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	10.4	25.0	346.9	133.1	452.2	207.9	24.0
3178	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	23.3	25.1	155.2	26.8	450.1	41.8	10.8
3179	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	17.3	29.2	226.6	63.4	405.2	92.3	19.7
3180	1999 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	17.8	29.2	221.0	60.1	406.3	87.4	19.2
4445	2003 CHEVROLET CAVALIER TWO DOOR COUPE	5.0	15.4	34.8	351.9	136.4	453.9	186.1	31.5
5206	2004 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	17.8	29.6	273.2	75.8	492.2	109.7	19.8
	Average (AVG)				**271.2**	**84.1**	**457.4**	**120.7**	**21.9**
	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**					

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#2933

1998 CHEVROLET CAVALIER

Provided By

4N6XPRT StifCalcs®

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Sister/Clone database reader

You entered: **1997 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 #	2933	NHTSA Test Reference Guide Version #	V4			
Test Date	1998-09-01	Contract #	DTRS57-95-C-00011			
Contract/Study Title	DEFORMABLE IMPACTOR INTO REAR OF 1998 CHEVROLET CAVILIER					
Test Objective(s)	TO DETERMINE VEHICLE AND OCCUPANT RESPONSE IN AN 80KPH REAR IMPACT					
Test Type	TEST PROCEDURE DEVELOPMENT	Configuration	IMPACTOR INTO VEHICLE			
Impact Angle	180	Side Impact Point	0	mm	0.0	inches
			494	mm	19.4	inches
		Closing Speed	79.9	Km/Hr	49.65	MPH
Test Performer	TRC OF OHIO					
Test Reference #	980901					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	26 C	78.8 F	Total Number of Curves	57		
Data Recorder Type	OTHER	Data Link	UMBILICAL CABLE			
Test Commentary	RECTYP IS DIGITAL ONBOARD					

Fixed Barrier Information

Barrier Type		Pole Barrier Diameter		mm	inches
Barrier Shape					
Barrier Commentary					

1998 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

Test #	2933		
Vehicle #	2	Sex	MALE
Location	LEFT FRONT SEAT	Age	99
Position	CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG: UTAMA ENGINEERING, S/N: 001		
Occupant Modification	9 ARRAY HEAD, 8 STRING THORAX		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH1 IS HEADREST		

Head

Head to -

Windshielder Header	216	mm	8.5	inches	Head Injury Criteria (HIC)	353	
WindShield	532	mm	20.9	inches	HIC Lower Time Interval (ms)	112.8	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	135.2	
Side Header	191	mm	7.5	inches			
Side Window	321	mm	12.6	inches			

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head) OTHER

Second Contact Region (Head)

Chest

Chest to -

Dash	507	mm	20.0	inches	Arm to Door	117	mm	4.6	inches
Steering Wheel	310	mm	12.2	inches	Hip to Door	129	mm	5.1	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index	44	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	14.8

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) NONE

Second Contact Region (Chest/Abdomen) NONE

Legs

Knees to Dash	163	mm	6.4	inches	Knees to Seatback	9999	mm	0.0	inches

Left Femur Peak Load	-587	Newtons	-132.0	pounds Force
Right Femur Peak Load	-531	Newtons	-119.4	pounds Force

First Contact Region (Legs) DASHPANEL

Second Contact Region (Legs)

1998 CHEVROLET CAVALIER LEFT FRONT SEAT OCCUPANT

Test #	2933					
Vehicle #	2	Sex	MALE			
Location	LEFT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: UTAMA ENGINEERING, S/N: 001
Occupant Modification	9 ARRAY HEAD, 8 STRING THORAX
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH1 IS HEADREST

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

1998 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

Test #	2933		
Vehicle #	2	Sex	MALE
Location	RIGHT FRONT SEAT	Age	99
Position	CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG: APPLIED SAFETY TECHNOLOGY CORPORATION, S/N: 110		
Occupant Modification	9 ARRAY HEAD, 8 STRING THORAX		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH1 IS HEADREST; CNTRL2 IS AIRBAG		

Head

Head to -

Windshielder Header	271	mm	10.7	inches	Head Injury Criteria (HIC)	1724	
WindShield	493	mm	19.4	inches	HIC Lower Time Interval (ms)	116.4	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	122.48	
Side Header	185	mm	7.3	inches			
Side Window	297	mm	11.7	inches			

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head): OTHER

Second Contact Region (Head):

Chest

Chest to -

Dash	493	mm	19.4	inches	Arm to Door	131	mm	5.2	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	150	mm	5.9	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index	112	Pelvic Peak Lateral Acceleration (g's)	0
Thoracic Trauma Index	0	Thorax Peak Acceleration (g's)	28.7

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): NONE

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	175	mm	6.9	inches	Knees to Seatback	9999	mm	0.0	inches

Left Femur Peak Load	-613	Newtons	-137.8	pounds Force
Right Femur Peak Load	-567	Newtons	-127.5	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1998 CHEVROLET CAVALIER RIGHT FRONT SEAT OCCUPANT

Test #	2933					
Vehicle #	2	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: APPLIED SAFETY TECHNOLOGY CORPORATION, S/N: 110
Occupant Modification	9 ARRAY HEAD, 8 STRING THORAX
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH1 IS HEADREST; CNTRL2 IS AIRBAG

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

Vehicle 1 1999 OTHER OTHER

Test #	2933		
VIN		NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	RESEARCH VEHICLE
Make	OTHER	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	OTHER	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	NOT APPLICABLE		
Engine	NOT APPLICABLE		
Displacement	0 Liter	Transmission	NOT APPLICABLE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	9999 mm	0.0 inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	9999 mm	0.0 inches
Vehicle Wheelbase	99999	mm	0.0	inches	Total Length of Indentation	99999 mm	0.0 inches
Vehicle Test Weight	1368	KG	3015	pounds	Maximum Static Crush Depth	0 mm	0.0 inches
					Pre-Impact Speed	80 kph	49.6 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): 999.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

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: 0.0

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

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

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

Vehicle 1 1999 OTHER OTHER

Test #	2933		
VIN		NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	RESEARCH VEHICLE
Make	OTHER	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	OTHER	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	NOT APPLICABLE		
Engine	NOT APPLICABLE		
Displacement	0 Liter	Transmission	NOT APPLICABLE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	9999	mm	0.0	inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	99999	mm	0.0	inches	Total Length of Indentation	99999	mm	0.0	inches
Vehicle Test Weight	1368	KG	3015	pounds	Maximum Static Crush Depth	0	mm	0.0	inches
					Pre-Impact Speed	80	kph	49.6	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 1998 CHEVROLET CAVALIER

Test #	2933		
VIN	1G1JC5245W7135153	NHTSA Test Vehicle Number	2
Year	1998	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	CHEVROLET	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CAVALIER	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	5006	mm	197.1	inches	CG behind Front Axle	956	mm	37.6	inches
Vehicle Width	1720	mm	67.7	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2644	mm	104.1	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	1441	KG	3176	pounds	Maximum Static Crush Depth	963	mm	37.9	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index: 40BZAW6

Principal Direction of Force: 180

Damage Profile Distance Measurements

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

DPD 1	250	mm	9.8	inches
DPD 2	538	mm	21.2	inches
DPD 3	637	mm	25.1	inches
DPD 4	840	mm	33.1	inches
DPD 5	963	mm	37.9	inches
DPD 6	932	mm	36.7	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	190.2	inches	180.3	inches	9.8	inches
	4830	mm	4580	mm	250	mm
Centerline	197.1	inches	166.9	inches	30.2	inches
	5006	mm	4239	mm	767	mm
Right Bumper Corner	189.7	inches	153.0	inches	36.7	inches
	4818	mm	3886	mm	932	mm

Bumper Engagement (Inline Impact Only): 999.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

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: 0.0

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

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

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

Vehicle 2 1998 CHEVROLET CAVALIER

Test #	2933		
VIN	1G1JC5245W7135153	NHTSA Test Vehicle Number	2
Year	1998	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	CHEVROLET	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CAVALIER	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	5006	mm	197.1	inches	CG behind Front Axle	956	mm	37.6	inches
Vehicle Width	1720	mm	67.7	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2644	mm	104.1	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	1441	KG	3176	pounds	Maximum Static Crush Depth	963	mm	37.9	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index	40BZAW6	Principal Direction of Force	180

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							
				5006	197.1	4239	166.9				
				Engine Block							
				400	15.7	400	15.7				
4830	190.2	4580	180.3	Front Bumper Corner				4818	189.7	3886	153.0
				Front of Engine							
				1203	47.4	1214	47.8				
1546	60.9	1541	60.7	Firewall				1554	61.2	1559	61.4
				1554	61.2	1561	61.5				
1969	77.5	1987	78.2	Upper Leading Edge of Door				1985	78.1	1991	78.4
1957	77.0	1945	76.6	Lower Leading Edge of Door				1950	76.8	1949	76.7
1957	77.0	1968	77.5	Bottom of 'A' Post				1950	76.8	2000	78.7
2924	115.1	2942	115.8	Upper Trailing Edge of Door				2989	117.7	2937	115.6
2942	115.8	2927	115.2	Lower Trailing Edge of Door				2940	115.7	2932	115.4
				Steering Column							
				2375	93.5	2380	93.7				
				Center of Seering Column to 'A' Post (Horizontal)							
				280	11.0	263	10.4				
				Center of Steering Column to Headliner (Vertical)							
				420	16.5	425	16.7				

1998 CHEVROLET CAVALIER

NHTSA Crash Test - #2933 - Rear Impact

Pre/Post Depths - Vehicle Width - KE Equivalent Speed - Trapezoidal Average

Test Vehicle Weight =	3176 pounds	Impactor Weight =	3015
KE Equivalent Speed =	34.6 mph	Impactor Test Speed =	49.6
Test Crush Length =	67.7 inches		

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	9.8	30.2	36.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 9.8 inches					470.0
Using a Rated No Damage Speed of	2.5 mph	308.4	404.6	117.5	
Using a Rated No Damage Speed of	5.0 mph	568.8	344.1	470.0	
Using a Rated No Damage Speed of	7.5 mph	781.2	288.5	1057.5	
Using a Rated No Damage Speed of	10.0 mph	945.7	237.8	1880.1	
Average Crush = 26.7 inches					63.3
Using a Rated No Damage Speed of	2.5 mph	113.2	54.5	117.5	
Using a Rated No Damage Speed of	5.0 mph	208.8	46.4	470.0	
Using a Rated No Damage Speed of	7.5 mph	286.7	38.9	1057.5	
Using a Rated No Damage Speed of	10.0 mph	347.1	32.0	1880.1	
Maximum Crush = 36.7 inches					33.5
Using a Rated No Damage Speed of	2.5 mph	82.3	28.9	117.5	
Using a Rated No Damage Speed of	5.0 mph	151.9	24.5	470.0	
Using a Rated No Damage Speed of	7.5 mph	208.6	20.6	1057.5	
Using a Rated No Damage Speed of	10.0 mph	252.5	17.0	1880.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	36.7	43.9	9.2	21.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 13.1

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

1998 CHEVROLET CAVALIER

NHTSA Crash Test - #2933 - Rear Impact

Pre/Post Depths - Indention Length - KE Equivalent Speed - Trapezoidal Average

Test Vehicle Weight =	3176 pounds	Impactor Weight =	3015
KE Equivalent Speed =	34.6 mph	Impactor Test Speed =	49.6
Test Crush Length =	60.0 inches		

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	9.8	30.2	36.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 9.8 inches					530.4
Using a Rated No Damage Speed of	2.5 mph	348.0	456.6	132.6	
Using a Rated No Damage Speed of	5.0 mph	641.9	388.4	530.5	
Using a Rated No Damage Speed of	7.5 mph	881.7	325.6	1193.5	
Using a Rated No Damage Speed of	10.0 mph	1067.3	268.4	2121.9	
Average Crush = 26.7 inches					71.5
Using a Rated No Damage Speed of	2.5 mph	127.7	61.5	132.6	
Using a Rated No Damage Speed of	5.0 mph	235.6	52.3	530.5	
Using a Rated No Damage Speed of	7.5 mph	323.6	43.9	1193.5	
Using a Rated No Damage Speed of	10.0 mph	391.7	36.2	2121.9	
Maximum Crush = 36.7 inches					37.8
Using a Rated No Damage Speed of	2.5 mph	92.9	32.6	132.6	
Using a Rated No Damage Speed of	5.0 mph	171.4	27.7	530.5	
Using a Rated No Damage Speed of	7.5 mph	235.4	23.2	1193.5	
Using a Rated No Damage Speed of	10.0 mph	285.0	19.1	2121.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	36.7	43.9	9.2	21.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 13.1

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

1998 CHEVROLET CAVALIER

NHTSA Crash Test - #2933 - Rear Impact

Damage Profile Distances - Vehicle Width - KE Equivalent Speed - Trapezoidal Average

Test Vehicle Weight = 3176 pounds
KE Equivalent Speed = 34.6 MPH
Test Crush Length = 67.7 inches

Impactor Weight = 3015
Impactor Test Speed = 49.6

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	9.8	21.2	25.1	33.1	37.9	36.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 9.8 inches					470.0
Using a Rated No Damage Speed of	2.5mph	308.4	404.6	117.5	
Using a Rated No Damage Speed of	5.0mph	568.8	344.1	470.0	
Using a Rated No Damage Speed of	7.5mph	781.2	288.5	1057.5	
Using a Rated No Damage Speed of	10.0mph	945.7	237.8	1880.1	
Average Crush = 28.1 inches					57.2
Using a Rated No Damage Speed of	2.5mph	107.5	49.2	117.5	
Using a Rated No Damage Speed of	5.0mph	198.4	41.9	470.0	
Using a Rated No Damage Speed of	7.5mph	272.4	35.1	1057.5	
Using a Rated No Damage Speed of	10.0mph	329.8	28.9	1299.4	
Maximum Crush = 37.9 inches					31.4
Using a Rated No Damage Speed of	2.5mph	79.7	27.1	117.5	
Using a Rated No Damage Speed of	5.0mph	147.1	23.0	470.0	
Using a Rated No Damage Speed of	7.5mph	202.0	19.3	1057.5	
Using a Rated No Damage Speed of	10.0mph	244.5	15.9	1880.1	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	37.9	44.6	10.0	22.3

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 12.7

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

1998 CHEVROLET CAVALIER

NHTSA Crash Test - #2933 - Rear Impact

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

Test Vehicle Weight = 3176 pounds
KE Equivalent Speed = 34.6 MPH
Test Crush Length = 60.0 inches

Impactor Weight = 3015
Impactor Test Speed = 49.6

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	9.8	21.2	25.1	33.1	37.9	36.7	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 9.8 inches					530.4
Using a Rated No Damage Speed of	2.5mph	348.0	456.6	132.6	
Using a Rated No Damage Speed of	5.0mph	641.9	388.4	530.5	
Using a Rated No Damage Speed of	7.5mph	881.7	325.6	1193.5	
Using a Rated No Damage Speed of	10.0mph	1067.3	268.4	2121.9	
Average Crush = 28.1 inches					64.5
Using a Rated No Damage Speed of	2.5mph	121.4	55.5	132.6	
Using a Rated No Damage Speed of	5.0mph	223.9	47.2	530.5	
Using a Rated No Damage Speed of	7.5mph	307.5	39.6	1193.5	
Using a Rated No Damage Speed of	10.0mph	372.2	32.6	1466.5	
Maximum Crush = 37.9 inches					35.5
Using a Rated No Damage Speed of	2.5mph	90.0	30.5	132.6	
Using a Rated No Damage Speed of	5.0mph	166.0	26.0	530.5	
Using a Rated No Damage Speed of	7.5mph	228.0	21.8	1193.5	
Using a Rated No Damage Speed of	10.0mph	276.0	17.9	2121.9	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	37.9	44.6	10.0	22.3

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 12.7

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
Rear 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)	KEES (mph)	Vehicle Width Stiffness Values A	B	G	Kv	Crush Factor
2521	1995 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	18.4	48.8	447.4	213.0	469.8	264.4	51.8
2933	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	28.1	34.6	198.3	41.8	470.0	57.2	17.1
2973	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	41.4	35.0	139.3	20.2	480.5	27.5	11.8
	Average (AVG)				**261.7**	**91.7**	**473.4**	**116.4**	**26.9**
	Minimum (MIN)				**139.3**	**20.2**	**469.8**	**27.5**	**11.8**
	Maximum (MAX)				**447.4**	**213.0**	**480.5**	**264.4**	**51.8**
	Standard Deviation (STDev-sample)				**163.5**	**105.6**	**6.1**	**129.1**	**21.7**
	Number of Tests (n)			**3**					

Available Test Results
Rear 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)	KEES (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
2521	1995 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	32.1	48.8	256.4	70.0	469.8	86.9	29.7
2732	1996 CHEVROLET CAVALIER TWO DOOR SEDAN	5.0	22.8	52.8	396.7	166.5	472.7	203.1	49.0
2733	1996 CHEVROLET CAVALIER TWO DOOR SEDAN	5.0	21.4	52.0	412.1	180.8	469.7	221.3	50.5
2933	1998 CHEVROLET CAVALIER FOUR DOOR SEDAN	5.0	33.1	34.6	168.5	30.2	470.0	41.3	14.5
	Average (AVG)				**308.4**	**111.9**	**470.6**	**138.2**	**35.9**
	Minimum (MIN)				**168.5**	**30.2**	**469.7**	**41.3**	**14.5**
	Maximum (MAX)				**412.1**	**180.8**	**472.7**	**221.3**	**50.5**
	Standard Deviation (STDev-sample)				**116.7**	**73.4**	**1.4**	**87.8**	**17.1**
	Number of Tests (n)			**4**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 1G3NL52F92C250429

Model:	2002 Oldsmobile Alero Level II 4 Door Sedan
Engine Size:	2.2L / 134cu.in.
Engine Description:	Inline 4 With Dual Overhead Camshaft
Horse Power:	145 @ 5600 rpm
Torque:	150 lb-ft at 4000 rpm
Injection System:	Sequential Fuel Injection (SFI)
PSI:	55-65 psi
Ignition:	Electronic
Manufacturer:	Saturn
Assembly Plant:	Lansing (B), MI
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (1G3) indicate a Oldsmobile Car made in the U.S.A.

The Fourth and Fifth characters (NL) indicate an Alero Level II

The Sixth character (5) indicates a 4 Door Sedan

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

The Eighth character (F) indicates the OEM engine: 2.2L / 134cu.in., L4 DOHC

The Ninth character (the check digit) is entered as 9.
The VIN appears Valid, the calculated value is 9.

The Tenth character (2) indicates the model year 2002

The Eleventh character (C) indicates the vehicle was made in the assembly plant in Lansing (B), MI

The Twelfth through Seventeenth characters (250429) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2002 OLDSMOBILE ALERO 4 DOOR SEDAN

Curb Weight:	3022 lbs.		1371 kg.	
Curb Weight Distribution -	Front: 64 %		Rear: 36 %	
Gross Vehicle Weight Rating:	4035 lbs.		1830 kg.	
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	187	15.58	4.75
Wheelbase:	107	8.92	2.72
Front Bumper to Front Axle:	40	3.33	1.02
Front Bumper to Front of Front Well:	25	2.08	0.64
Front Bumper to Front of Hood:	6	0.50	0.15
Front Bumper to Base of Windshield:	52	4.33	1.32
Front Bumper to Top of Windshield:	83	6.92	2.11
Rear Bumper to Rear Axle:	40	3.33	1.02
Rear Bumper to Rear of Rear Well:	25	2.08	0.64
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	27	2.25	0.69
Width Dimensions			
Maximum Width:	70	5.83	1.78
Front Track:	58	4.83	1.47
Rear Track:	59	4.92	1.50
Vertical Dimensions			
Height:	55	4.58	1.40
Ground to -			
Front Bumper (Top)	22	1.83	0.56
Headlight - center	25	2.08	0.64
Hood - top front:	27	2.25	0.69
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	41	3.42	1.04
Base of Rear Window:	44	3.67	1.12

2002 OLDSMOBILE ALERO 4 DOOR SEDAN

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)	41	3.42	1.04
Rear Seat Shoulder Width	51	4.25	1.30
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	28	2.33	0.71

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	468	39.00	11.89
Steering Ratio: 14.70:1			
Wheel Radius:	12	1.00	0.30
Tire Size (OEM): P225/50R16			

Acceleration & Braking Information

Brake Type: ALL DISC

ABS System: ALL WHEEL ABS

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

d = 135.0 ft t = 3.1 sec a = -28.6 ft/sec² G-force = -0.89

Acceleration:

0 to 30mph	t =	2.6	sec	a =	16.9	ft/sec²	G-force = 0.53
0 to 60mph	t =	7.8	sec	a =	11.3	ft/sec²	G-force = 0.35
45 to 65mph	t =	4.3	sec	a =	6.8	ft/sec²	G-force = 0.21

Transmission Type: 4spd AUTOMATIC

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 2.5 mph

N.S.D.C = 1999 - 2004

2002 OLDSMOBILE ALERO 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	=	38.52
Inches in front of rear axle	=	68.48
Inches from side of vehicle	=	35.00
Inches from ground	=	21.59
Inches from front corner	=	85.97
Inches from rear corner	=	113.99
Inches from front bumper	=	78.52
Inches from rear bumper	=	108.48

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1906.66	lb*ft*sec²
Pitch Moment of Inertia	=	1842.78	lb*ft*sec²
Roll Moment of Inertia	=	393.96	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	39.8	deg
Angle Front of Hood to Windshield Base	=	11.1	deg
Angle Front of Hood to Windshield Top	=	18.7	deg
Angle of Windshield	=	28.7	deg
Angle of Steering Tires at Max Turn	=	26.2	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).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#3247

1999 PONTIAC GRAND AM

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
10R-030201SC02301

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

Sister/Clone database reader

You entered: **2002 OLDSMOBILE ALERO**

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

Year Range	Make	Model	Body Styles	Wheelbase
1999 - 2004	OLDSMOBILE	ALERO	2D, 4D	107
Remarks:				
1999 - 2005	PONTIAC	GRANDAM	2D, 4D	107, 116
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 #	3247	NHTSA Test Reference Guide Version #	V4			
Test Date	1998-10-13	Contract #	DTNH22-95-D-11000			
Contract/Study Title	SAFETY COMPLIANCE TESTING FOR FMVSS 301 FUEL SYSTEM INTEGRITY					
Test Objective(s)	TO OBTAIN VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE					
Test Type	FMVSS 301 FUEL SYSTEM INTEGRITY	Configuration	IMPACTOR INTO VEHICLE			
Impact Angle	180	Side Impact Point	99999	mm	0.0	inches
			99999	mm	0.0	inches
		Closing Speed	48.1	Km/Hr	29.89	MPH
Test Performer	CALSPAN					
Test Reference #	RUN1785					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	19 C	66.2 F	Total Number of Curves	26		
Data Recorder Type	FM TAPE RECORDER	Data Link	UMBILICAL CABLE			
Test Commentary	NO COMMENTS					

Fixed Barrier Information

Barrier Type		Pole Barrier Diameter		mm	inches
Barrier Shape					
Barrier Commentary					

1999 PONTIAC GRAND AM LEFT FRONT SEAT OCCUPANT

Test #	3247		
Vehicle #	2	Sex	MALE
Location	LEFT FRONT SEAT	Age	99
Position	CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG:ARL,S/N 150		
Occupant Modification	NO MODIFICATIONS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH1: FRONT SEAT HEADREST		

Head

Head to -

Windshielder Header	277	mm	10.9	inches	Head Injury Criteria (HIC)	247	
WindShield	546	mm	21.5	inches	HIC Lower Time Interval (ms)	104.7	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	140.7	
Side Header	157	mm	6.2	inches			
Side Window	325	mm	12.8	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	OTHER						
Second Contact Region (Head)							

Chest

Chest to -

Dash	498	mm	19.6	inches	Arm to Door	130	mm	5.1	inches
Steering Wheel	279	mm	11.0	inches	Hip to Door	150	mm	5.9	inches
Seatback	9999	mm	0.0	inches					
Chest Severity Index	49				Pelvic Peak Lateral Acceleration (g's)	0			
Thoracic Trauma Index	0				Thorax Peak Acceleration (g's)	16.1			
Lap Belt Peak Load	272	Newtons	61.1	pound Force					
Shoulder Belt Peak Load	9999	Newtons	2247.9	pound Force					
First Contact Region (Chest/Abdomen)	SEAT BACK								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	145	mm	5.7	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)	NONE								
Second Contact Region (Legs)									

1999 PONTIAC GRAND AM LEFT FRONT SEAT OCCUPANT

Test #	3247					
Vehicle #	2	Sex	MALE			
Location	LEFT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG:ARL,S/N 150
Occupant Modification	NO MODIFICATIONS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH1: FRONT SEAT HEADREST

Restraints

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

1999 PONTIAC GRAND AM RIGHT FRONT SEAT OCCUPANT

Test #	3247		
Vehicle #	2	Sex	NOT APPLICABLE
Location	RIGHT FRONT SEAT	Age	99
Position	CENTER POSITION	Height	999 mm 39.3 inches
Type	PART 572 DUMMY	Weight	999.0 kg 2202 pounds
Size	50 PERCENTILE		
Calibration Method	PART 572		
Occupant Manufacturer	ALDERSON		
Occupant Modification	UNMODIFIED		
Occupant Description	NON-INSTRUMENTED DUMMY		
Occupant Commentary	CNTRH1: FRONT SEAT HEADREST; CNTRH2: ROOF LINER		

Head

Head to -

Windshielder Header	9999	mm	0.0	inches	Head Injury Criteria (HIC)	9999	
WindShield	9999	mm	0.0	inches	HIC Lower Time Interval (ms)	1000	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	1000	
Side Header	9999	mm	0.0	inches			
Side Window	9999	mm	0.0	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	OTHER						
Second Contact Region (Head)							

Chest

Chest to -

Dash	9999	mm	0.0	inches	Arm to Door	9999	mm	0.0	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	9999	mm	0.0	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)	SEAT BACK								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	9999	mm	0.0	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)	NONE								
Second Contact Region (Legs)									

1999 PONTIAC GRAND AM RIGHT FRONT SEAT OCCUPANT

Test #	3247					
Vehicle #	2	Sex	NOT APPLICABLE			
Location	RIGHT FRONT SEAT	Age	99			
Position	CENTER POSITION	Height	999	mm	39.3	inches
Type	PART 572 DUMMY	Weight	999.0	kg	2202	pounds
Size	50 PERCENTILE					

Calibration Method	PART 572
Occupant Manufacturer	ALDERSON
Occupant Modification	UNMODIFIED
Occupant Description	NON-INSTRUMENTED DUMMY
Occupant Commentary	CNTRH1: FRONT SEAT HEADREST; CNTRH2: ROOF LINER

Restraints

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

Vehicle 1 1999 NHTSA FLAT IMPACTOR

Test #	3247		
VIN		NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	RESEARCH VEHICLE
Make	NHTSA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	FLAT IMPACTOR	Steering Column Collapse Mechanism	UNKNOWN
Body	NOT APPLICABLE		
Engine	OTHER		
Displacement	0 Liter	Transmission	NOT APPLICABLE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	MOVING BARRIER IMPACTOR		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	1344	mm	52.9	inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	99999	mm	0.0	inches	Total Length of Indentation	99999	mm	0.0	inches
Vehicle Test Weight	1797	KG	3961	pounds	Maximum Static Crush Depth	9999	mm	0.0	inches
					Pre-Impact Speed	48	kph	29.9	mph

Vehicle Damage Index: 9999999

Principal Direction of Force: 0

Damage Profile Distance Measurements

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

DPD 1	9999	mm	0.0	inches
DPD 2	9999	mm	0.0	inches
DPD 3	9999	mm	0.0	inches
DPD 4	9999	mm	0.0	inches
DPD 5	9999	mm	0.0	inches
DPD 6	9999	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
	99999	mm	99999	mm	0	mm
Centerline	0.0	inches	0.0	inches	0.0	inches
	99999	mm	99999	mm	0	mm
Right Bumper Corner	0.0	inches	0.0	inches	0.0	inches
	99999	mm	99999	mm	0	mm

Bumper Engagement (Inline Impact Only): 999.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

A-pillar Engagement (Side Impact Only): 999.0

Moving Test Cart Angle: DIRECT ENGAGEMENT

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

Moving Test Cart/Vehicle Crabbed Angle: 0.0

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

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

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

Vehicle 1 1999 NHTSA FLAT IMPACTOR

Test #	3247		
VIN		NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	RESEARCH VEHICLE
Make	NHTSA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	FLAT IMPACTOR	Steering Column Collapse Mechanism	UNKNOWN
Body	NOT APPLICABLE		
Engine	OTHER		
Displacement	0 Liter	Transmission	NOT APPLICABLE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	MOVING BARRIER IMPACTOR		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	1344	mm	52.9	inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	99999	mm	0.0	inches	Total Length of Indentation	99999	mm	0.0	inches
Vehicle Test Weight	1797	KG	3961	pounds	Maximum Static Crush Depth	9999	mm	0.0	inches
					Pre-Impact Speed	48	kph	29.9	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							
				99999	0.0	99999	0.0				
				Engine Block							
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Front Bumper Corner				99999	0.0	99999	0.0
				Front of Engine							
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Firewall				99999	0.0	99999	0.0
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Upper Leading Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Lower Leading Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Bottom of 'A' Post				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Upper Trailing Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Lower Trailing Edge of Door				99999	0.0	99999	0.0
				Steering Column							
				99999	0.0	99999	0.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				99999	0.0	99999	0.0				
				Center of Steering Column to Headliner (Vertical)							
				99999	0.0	99999	0.0				

Vehicle 2 1999 PONTIAC GRAND AM

Test #	3247		
VIN	1G2NE52T3XC515499	NHTSA Test Vehicle Number	2
Year	1999	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	PONTIAC	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	GRAND AM	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.4 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	1999 PONTIAC GRAND AM 4-DOOR SEDAN		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	960	mm	37.8	inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2718	mm	107.0	inches	Total Length of Indentation	99999	mm	0.0	inches
Vehicle Test Weight	1604	KG	3535	pounds	Maximum Static Crush Depth	361	mm	14.2	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index 9999999 Principal Direction of Force 180

Damage Profile Distance Measurements

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

DPD 1	9999	mm	0.0	inches
DPD 2	9999	mm	0.0	inches
DPD 3	9999	mm	0.0	inches
DPD 4	9999	mm	0.0	inches
DPD 5	9999	mm	0.0	inches
DPD 6	9999	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
	99999	mm	99999	mm	0	mm
Centerline	0.0	inches	0.0	inches	0.0	inches
	99999	mm	99999	mm	0	mm
Right Bumper Corner	0.0	inches	0.0	inches	0.0	inches
	99999	mm	99999	mm	0	mm

Bumper Engagement (Inline Impact Only): 999.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

A-pillar Engagement (Side Impact Only): 999.0

Moving Test Cart Angle: DIRECT ENGAGEMENT

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

Moving Test Cart/Vehicle Crabbed Angle: 0.0

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

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

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

Vehicle 2 1999 PONTIAC GRAND AM

Test #	3247		
VIN	1G2NE52T3XC515499	NHTSA Test Vehicle Number	2
Year	1999	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	PONTIAC	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	GRAND AM	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.4 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	UNMODIFIED		
Vehicle Commentary	1999 PONTIAC GRAND AM 4-DOOR SEDAN		

Vehicle Length	99999	mm	0.0	inches	CG behind Front Axle	960	mm	37.8	inches
Vehicle Width	0	mm	0.0	inches	Center of Damage to CG Axis	9999	mm	0.0	inches
Vehicle Wheelbase	2718	mm	107.0	inches	Total Length of Indentation	99999	mm	0.0	inches
Vehicle Test Weight	1604	KG	3535	pounds	Maximum Static Crush Depth	361	mm	14.2	inches
					Pre-Impact Speed	0	kph	0.0	mph

Vehicle Damage Index 9999999 Principal Direction of Force 180

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							
				99999	0.0	99999	0.0				
				Engine Block							
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Front Bumper Corner				99999	0.0	99999	0.0
				Front of Engine							
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Firewall				99999	0.0	99999	0.0
				99999	0.0	99999	0.0				
99999	0.0	99999	0.0	Upper Leading Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Lower Leading Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Bottom of 'A' Post				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Upper Trailing Edge of Door				99999	0.0	99999	0.0
99999	0.0	99999	0.0	Lower Trailing Edge of Door				99999	0.0	99999	0.0
				Steering Column							
				99999	0.0	99999	0.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				99999	0.0	99999	0.0				
				Center of Steering Column to Headliner (Vertical)							
				99999	0.0	99999	0.0				

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
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Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

The NHTSA Crash Test database contains only ONE REAR Impact tests for the Oldsmobile Alero, and that test is missing both the vehicle width and the Indentation Length..

A MODIFIED Stiffness Report based on the Max Crush and a published vehicle width has been provided.

To create a SIMILAR class of vehicle, we used the reported test weight of 3535 pounds.

We then looked at the NHTSA database for CARS that have REAR IMPACT TESTS and had a weight range of 3435-3635 pounds (+/- 100 pounds).

The Test Summary Reports based on the Average and Maximum crush depths follow.

4N6XPRT StifCalcs - Selected Vehicle: 2002 OLDSMOBILE ALERO

File Print Reports Settings Help Reg To: 4N6XPRT SYSTEMS

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

3.0.2.26

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

Maximum Vehicle Depth

Closing Speed KE Speed

Modify

Vehicle # 2 - 1999 PONTIAC GRAND AM

A - B - G Average | Crush Factor (CF)

NHSTA Crash Test # 3247 Rear Impact

Given:

Test Vehicle Weight =	3535 pounds	Closing Speed =	29.9 mph	Impactor Test Weight =	3961 pounds
Test Vehicle Width =	0.0 inches	KE Speed =	21.7 mph	Impactor Test Speed =	29.9 mph

Reported Maximum Crush Depth (inches)

(Driver Side)	Maximum	(Pass. Side)
	14.2	

Maximum Crush = 14.2 inches

		Crash 3 Stiffness Coefficents			Smac Stiffness
		A	B	G	Kv
					0.0
Using a Rated No Damage Speed of	2.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	5.0 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	7.5 mph	0.0	0.0	0.0	
Using a Rated No Damage Speed of	10.0 mph	0.0	0.0	0.0	

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

MODIFIED - 1999 PONTIAC GRAND AM

NHSTA Crash Test # 3247 Rear Impact - MODIFIED

Max Crush Depth - Vehicle Width - Closing Speed

Test Vehicle Weight = 3535 pounds
Vehicle Closing Speed = 29.9 mph
Test Crush Length = 70.0 inches

Maximum Crush Depth (inches)

Maximum Crush
14.2

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = N/A inches					
Using a Rated No Damage Speed of	2.5 mph				
Using a Rated No Damage Speed of	5.0 mph				
Using a Rated No Damage Speed of	7.5 mph				
Using a Rated No Damage Speed of	10.0 mph				
Average Crush = N/A inches					
Using a Rated No Damage Speed of	2.5 mph				
Using a Rated No Damage Speed of	5.0 mph				
Using a Rated No Damage Speed of	7.5 mph				
Using a Rated No Damage Speed of	10.0 mph				
Maximum Crush = 14.2 inches					179.5
Using a Rated No Damage Speed of	2.5 mph	195.3	150.7	126.5	
Using a Rated No Damage Speed of	5.0 mph	354.9	124.5	506.0	
Using a Rated No Damage Speed of	7.5 mph	479.0	100.7	1138.6	
Using a Rated No Damage Speed of	10.0 mph	567.3	79.5	2024.2	

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

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

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	14.2	27.3	-2.6	-9.5

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 25.2

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
Rear Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 3435-3635

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	KEES (mph)	Vehicle Width Stiffness Values A	B	G	Kv	Crush Factor
2151	1991 PLYMOUTH ACCLAIM FOUR DOOR SEDAN	5.0	16.4	22.2	223.1	46.9	530.5	78.2	12.1
2315	1993 FORD MUSTANG TWO DOOR COUPE	5.0	20.8	33.9	276.2	76.9	496.0	105.8	22.2
2408	1996 FORD MUSTANG TWO DOOR COUPE	5.0	17.6	33.6	324.8	105.1	501.8	145.2	25.5
4857	2003 VOLVO S40 FOUR DOOR SEDAN	5.0	15.3	21.5	221.0	47.5	514.2	80.7	12.0
5084	2004 MAZDA MAZDA6 FOUR DOOR SEDAN	5.0	15.3	21.2	212.5	45.1	501.1	77.2	11.8
	Average (AVG)				**251.5**	**64.3**	**508.7**	**97.4**	**16.7**
	Minimum (MIN)				**212.5**	**45.1**	**496.0**	**77.2**	**11.8**
	Maximum (MAX)				**324.8**	**105.1**	**530.5**	**145.2**	**25.5**
	Standard Deviation (STDev-sample)				**48.1**	**26.3**	**13.9**	**29.2**	**6.6**
	Number of Tests (n)			**5**					

Available Test Results
Rear Impact Test Summary

Report Filter Settings

Year Range: 1990 - 2011

Vehicle Weight Range: 3435-3635

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	KEES (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
1930	1993 BMW 318 FOUR DOOR SEDAN	5.0	9.8	21.5	351.2	118.0	522.7	200.5	18.8
2151	1991 PLYMOUTH ACCLAIM FOUR DOOR SEDAN	5.0	18.1	22.2	201.5	38.3	530.5	63.8	10.9
2315	1993 FORD MUSTANG TWO DOOR COUPE	5.0	28.5	33.9	201.8	41.0	496.0	56.4	16.2
2408	1996 FORD MUSTANG TWO DOOR COUPE	5.0	25.3	33.6	226.4	51.1	501.8	70.5	17.8
2451	1995 VOLVO OTHER FOUR DOOR SEDAN	5.0	24.4	39.1	289.1	80.9	516.9	106.3	25.1
4857	2003 VOLVO S40 FOUR DOOR SEDAN	5.0	16.7	21.5	203.3	40.2	514.2	68.3	11.1
5084	2004 MAZDA MAZDA6 FOUR DOOR SEDAN	5.0	15.3	21.2	212.5	45.1	501.1	77.2	11.8
	Average (AVG)				**240.8**	**59.2**	**511.9**	**91.9**	**16.0**
	Minimum (MIN)				**201.5**	**38.3**	**496.0**	**56.4**	**10.9**
	Maximum (MAX)				**351.2**	**118.0**	**530.5**	**200.5**	**25.1**
	Standard Deviation (STDev-sample)				**57.7**	**29.8**	**12.7**	**50.5**	**5.2**
	Number of Tests (n)			**7**					

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 1FAFP55U83A106747

Model:	2003 Ford Taurus 4 door Sedan
Engine Size:	3.0 L/ 181 cu.in.
Engine Description:	V-6 cylinder with Overhead Valve
Horse Power:	140 @ 4800 rpm
Torque:	160 lb-ft at 3000 rpm
Injection System:	Sequential Port Fuel Injection (SEFI)
PSI:	35-40 psi
Ignition:	electronic
Manufacturer:	Ford
Assembly Plant:	Atlanta, GA
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (1FA) indicate a Ford Passenger Car made in the U.S.A.

The Fourth character (F) indicates Manual Seatbelts + Driver/Passenger Front Air Bags

The Fifth through Seventh characters (P55) indicate a Taurus and a 4 door Sedan

The Eighth character (U) indicates the OEM engine: 3.0 L/ 181 cu.in., V6, OHV

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

The Tenth character (3) indicates the model year 2003

The Eleventh character (A) indicates the vehicle was made in the assembly plant in Atlanta, GA

The Twelfth through Seventeenth characters (106747) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

2003 FORD TAURUS 4 DOOR SEDAN

Curb Weight:	3331 lbs.		1511	kg.
Curb Weight Distribution - Front:	62 %	Rear:	38	%
Gross Vehicle Weight Rating:	4680 lbs.		2123	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	198	16.50	5.03
Wheelbase:	109	9.08	2.77
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:	6	0.50	0.15
Front Bumper to Base of Windshield:	49	4.08	1.24
Front Bumper to Top of Windshield:	82	6.83	2.08
Rear Bumper to Rear Axle:	47	3.92	1.19
Rear Bumper to Rear of Rear Well:	32	2.67	0.81
Rear Bumper to Rear of Trunk:	7	0.58	0.18
Rear Bumper to Base of Rear Window:	28	2.33	0.71
Width Dimensions			
Maximum Width:	73	6.08	1.85
Front Track:	62	5.17	1.57
Rear Track:	62	5.17	1.57
Vertical Dimensions			
Height:	56	4.67	1.42
Ground to -			
Front Bumper (Top)	22	1.83	0.56
Headlight - center	27	2.25	0.69
Hood - top front:	28	2.33	0.71
Base of Windshield	38	3.17	0.97
Rear Bumper - top:	26	2.17	0.66
Trunk - top rear:	41	3.42	1.04
Base of Rear Window:	43	3.58	1.09

2003 FORD TAURUS 4 DOOR SEDAN

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
Front Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (max)	42	3.50	1.07
Rear Seat Shoulder Width	57	4.75	1.45
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	39	3.25	0.99

Seatbelts: 3pt - front and rear

Airbags: FRONT SEAT AIRBAGS + OPTIONAL SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	480	40.00	12.19
Steering Ratio:	17.00:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	P215/60R16		

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 = 141.0 ft t = 3.2 sec a = -27.4 ft/sec² G-force = -0.85

Acceleration:

0 to 30mph	t =	2.8	sec	a =	15.7	ft/sec²	G-force = 0.49
0 to 60mph	t =	8.0	sec	a =	11.0	ft/sec²	G-force = 0.34
45 to 65mph	t =	4.2	sec	a =	7.0	ft/sec²	G-force = 0.22

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 - 2006

2003 FORD TAURUS 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.41	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	41.42
Inches in front of rear axle	=	67.58
Inches from side of vehicle	=	36.50
Inches from ground	=	21.98
Inches from front corner	=	91.06
Inches from rear corner	=	120.25
Inches from front bumper	=	83.42
Inches from rear bumper	=	114.58

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2224.93	lb*ft*sec²
Pitch Moment of Inertia	=	2148.69	lb*ft*sec²
Roll Moment of Inertia	=	449.58	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	45.0	deg
Angle Front of Hood to Windshield Base	=	13.1	deg
Angle Front of Hood to Windshield Top	=	18.9	deg
Angle of Windshield	=	25.9	deg
Angle of Steering Tires at Max Turn	=	26.0	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).

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN:	JT5ST87K0M0093173
Model:	1991 Toyota Celica 2 Door Convertible
Engine Size:	2.0 L/122 cu.in.
Engine Description:	In-Line 4 cylinder with Dual Overhead Cam
Horse Power:	115 @ 5200 rpm
Torque:	124 lb-ft @ 4400 rpm
Injection System:	Electronic Fuel Injection (EFI)
PSI:	38-44 psi
Ignition:	electronic
Manufacturer:	Toyota
Assembly Plant:	Toyota, Japan
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (JT5) indicate a Toyota Celica Convertible made in Japan

The Fourth character (S) indicates the OEM engine: 2.0 L/122 cu.in., L4, DOHC

The Fifth and Sixth characters (T8) indicate a Celica

The Seventh character (7) indicates a GT series Celica Convertible

The Eighth character (K) indicates a 2 Door Incomplete Celica

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

The Tenth character (M) indicates the model year 1991

The Eleventh character (0) indicates the vehicle was made in the assembly plant in Toyota, Japan

The Twelfth through Seventeenth characters (093173) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

1991 TOYOTA CELICA 2 DOOR CONVERTIBLE

Curb Weight:	2700 lbs.		1225 kg.	
Curb Weight Distribution -	Front: 62 %	Rear:	38 %	
Gross Vehicle Weight Rating:	lbs.		kg.	
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	176	14.67	4.47
Wheelbase:	99	8.25	2.51
Front Bumper to Front Axle:	39	3.25	0.99
Front Bumper to Front of Front Well:	23	1.92	0.58
Front Bumper to Front of Hood:	4	0.33	0.10
Front Bumper to Base of Windshield:	51	4.25	1.30
Front Bumper to Top of Windshield:	76	6.33	1.93
Rear Bumper to Rear Axle:	38	3.17	0.97
Rear Bumper to Rear of Rear Well:	22	1.83	0.56
Rear Bumper to Rear of Trunk:	3	0.25	0.08
Rear Bumper to Base of Rear Window:	34	2.83	0.86
Width Dimensions			
Maximum Width:	67	5.58	1.70
Front Track:	57	4.75	1.45
Rear Track:	57	4.75	1.45
Vertical Dimensions			
Height:	50	4.17	1.27
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	29	2.42	0.74
Hood - top front:	28	2.33	0.71
Base of Windshield	34	2.83	0.86
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	36	3.00	0.91
Base of Rear Window:	37	3.08	0.94

1991 TOYOTA CELICA 2 DOOR CONVERTIBLE

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	53	4.42	1.35
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	82	6.83	2.08
Rear Seat to Headliner	35	2.92	0.89
Front Leg Room - seatback to floor (min)	37	3.08	0.94

Seatbelts: 3pt front, 2pt rear

Airbags: NO AIRBAGS

Steering Data

Turning Circle (Diameter)	468	39.00	11.89
Steering Ratio: 16.68:1			
Wheel Radius:	12	1.00	0.30
Tire Size (OEM): 215-60 R13			

Acceleration & Braking Information

Brake Type: ALL DISC

ABS System: ABS UNKNOWN

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

d = 160.0 ft t = 3.6 sec a = -24.2 ft/sec² G-force = -0.75

Acceleration:

0 to 30mph	t =	3.7	sec	a =	11.9	ft/sec²	G-force = 0.37
0 to 60mph	t =	9.8	sec	a =	9.0	ft/sec²	G-force = 0.28
45 to 65mph	t =	5.9	sec	a =	5.0	ft/sec²	G-force = 0.16

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1986 - 1991

1991 TOYOTA CELICA 2 DOOR CONVERTIBLE

Other Information

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

Center of Gravity (No Load):

Inches behind front axle	=	37.62
Inches in front of rear axle	=	61.38
Inches from side of vehicle	=	33.50
Inches from ground	=	20.42
Inches from front corner	=	83.62
Inches from rear corner	=	104.87
Inches from front bumper	=	76.62
Inches from rear bumper	=	99.38

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1575.00	lb*ft*sec²
Pitch Moment of Inertia	=	1524.00	lb*ft*sec²
Roll Moment of Inertia	=	336.00	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	63.4	deg
Angle Front of Hood to Windshield Base	=	7.3	deg
Angle Front of Hood to Windshield Top	=	15.5	deg
Angle of Windshield	=	29.2	deg
Angle of Steering Tires at Max Turn	=	24.2	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).

Expert VIN DeCoder®

Version Number 3.0.2.4

DeCoded VIN: 2G1FP22KXT2135188

Model:	1996 Chevrolet Camaro, RS 2 Door Coupe
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:	Ste. Therese, Quebec
Drive Wheels:	This is a Rear Wheel Drive vehicle

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

The Fourth and Fifth characters (FP) indicate a Camaro, RS

The Sixth character (2) indicates a 2 Door Coupe

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

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

The Ninth character (the check digit) is entered as X.
The VIN appears Valid, the calculated value is 10. (The display Character should be X)

The Tenth character (T) indicates the model year 1996

The Eleventh character (2) indicates the vehicle was made in the assembly plant in Ste. Therese, Quebec

The Twelfth through Seventeenth characters (135188) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.1.0.6

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

4/19/2011

1996 CHEVROLET CAMARO 2 DOOR COUPE

Curb Weight:	3251	lbs.	1475	kg.
Curb Weight Distribution - Front:	55	% Rear:	45	%
Gross Vehicle Weight Rating:	4033	lbs.	1829	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	REAR			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	193	16.08	4.90
Wheelbase:	101	8.42	2.57
Front Bumper to Front Axle:	47	3.92	1.19
Front Bumper to Front of Front Well:	26	2.17	0.66
Front Bumper to Front of Hood:	10	0.83	0.25
Front Bumper to Base of Windshield:	63	5.25	1.60
Front Bumper to Top of Windshield:	90	7.50	2.29
Rear Bumper to Rear Axle:	45	3.75	1.14
Rear Bumper to Rear of Rear Well:	29	2.42	0.74
Rear Bumper to Rear of Trunk:	5	0.42	0.13
Rear Bumper to Base of Rear Window:	18	1.50	0.46
Width Dimensions			
Maximum Width:	74	6.17	1.88
Front Track:	61	5.08	1.55
Rear Track:	61	5.08	1.55
Vertical Dimensions			
Height:	51	4.25	1.30
Ground to -			
Front Bumper (Top)	22	1.83	0.56
Headlight - center	25	2.08	0.64
Hood - top front:	28	2.33	0.71
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	26	2.17	0.66
Trunk - top rear:	36	3.00	0.91
Base of Rear Window:	37	3.08	0.94

1996 CHEVROLET CAMARO 2 DOOR COUPE

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	57	4.75	1.45
Front Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	56	4.67	1.42
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: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	492	41.00	12.50
Steering Ratio: 15.01:1			
Wheel Radius:	12	1.00	0.30
Tire Size (OEM): P215/60R16			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ABS

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

d = 141.0 ft t = 3.2 sec a = -27.4 ft/sec² G-force = -0.85

Acceleration:

	t	a	G-force
0 to 30mph			
0 to 60mph	7.7 sec	11.4 ft/sec²	0.35
45 to 65mph			

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 1997

1996 CHEVROLET CAMARO 2 DOOR COUPE

Other Information

Tip-Over Stability Ratio =	1.46	Stable
NHTSA Star Rating (calculated)		*****

Center of Gravity (No Load):

Inches behind front axle	=	45.45
Inches in front of rear axle	=	55.55
Inches from side of vehicle	=	37.00
Inches from ground	=	20.83
Inches from front corner	=	99.58
Inches from rear corner	=	107.14
Inches from front bumper	=	92.45
Inches from rear bumper	=	100.55

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	2142.53	lb*ft*sec²
Pitch Moment of Inertia	=	2069.49	lb*ft*sec²
Roll Moment of Inertia	=	435.18	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	31.0	deg
Angle Front of Hood to Windshield Base	=	8.6	deg
Angle Front of Hood to Windshield Top	=	14.7	deg
Angle of Windshield	=	25.7	deg
Angle of Steering Tires at Max Turn	=	23.5	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 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,

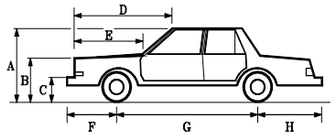
We at 4N6XPRT Systems were pleased to be able to provide you with the preceding data for the crash test vehicles.

Information regarding the Services available to you through our company, 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 40,000 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.

********** [PARTIAL OUTPUT] **********

2001 FORD CROWN VICTORIA 4DR SEDAN

[HORIZONTAL DIMENSIONS]

LENGTH	212 in.
WHEELBASE	115 in.
FRONT BUMPER TO FRONT AXLE	44 in.
FRONT BUMPER TO FRONT OF HOOD	8 in.
FRONT BUMPER TO BASE OF WINDSHIELD	66 in.
FRONT BUMPER TO TOP OF WINDSHIELD	91 in.
FRONT BUMPER TO FRONT WELL	27 in.
REAR BUMPER TO REAR OF TRUNK	8 in.
REAR BUMPER TO BASE OF REAR WINDOW	39 in.
REAR BUMPER TO REAR WELL	37 in.
REAR BUMPER TO REAR AXLE	53 in.

[DEPTH DIMENSIONS]

WIDTH	78 in.
FRONT TRACK	63 in.
REAR TRACK	64 in.

[VERTICAL DIMENSIONS]

HEIGHT	57 in.
GROUND TO:	
FRONT BUMPER (Top)	23 in.
HEADLIGHT - Center	27 in.
HOOD - Top Front	26 in.
BASE OF WINDSHIELD	38 in.
REAR BUMPER (Top)	26 in.
TRUNK - Top Rear	40 in.
BASE OF REAR WINDOW	40 in.

[WEIGHT DIMENSIONS]

CURB WEIGHT	3920 lbs.
Curb Weight Distribution: FRONT = 55% REAR = 45%	
GROSS VEHICLE WEIGHT	5170 lbs.

EXPERT AUTOSTATS(c) Reg.To:4N6XPRT Systems S/N:01R-930512AQ03201

2001 FORD CROWN VICTORIA 4DR SEDAN

[ACCELERATION/BRAKING]

ACCELERATION 0-30 mph	16.9 ft/sec/sec
ACCELERATION 0-60 mph	11.1 ft/sec/sec
ACCELERATION 45-65 mph	6.8 ft/sec/sec
BRAKING 60-0 mph	133 ft

DRIVE WHEELS	REAR
TURNING CIRCLE (DIAMETER)	41 ft.
NUMBER OF WHEELS	4
WHEEL RADIUS	13 in.
TIRE SIZE	P225/60SR16

BUMPER STRENGTH:	5 mph
STEERING RATIO	16.40:1

[INTERIOR DIMENSIONS]

FRONT SHOULDER ROOM	61 in.
FRONT HEAD ROOM	39 in.
FRONT LEG ROOM	43 in.
REAR SHOULDER ROOM	60 in.
REAR HEAD ROOM	38 in.
REAR LEG ROOM	40 in.

ALL DISC - REAR ABS - OPTIONAL
3pt - front and rear, FRONT SEAT AIRBAGS
4spd AUTOMATIC

N.S.D.C. = 1998 - 2001
= Value not in Database

EXPERT AUTOSTATS(c) Reg.To:4N6XPRT Systems S/N:01R-930512AQ03201

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.

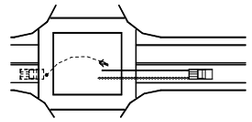
3FAPP1280MR117253

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.

Expert Qwic Calcs®

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

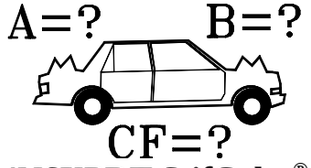
Expert Qwic Calcs® quickly provides answers to questions important in vehicle collision litigation. The user inputs data in response to relevant questions, Expert Qwic Clacs® performs the mathematical calculations required. Both the input data and the calculated result are then displayed, and may be "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 addition to the NHTSA Crash Test data, the program includes a "Sister/Clone List Reader" developed in cooperation with Greg Anderson. This allows quick retrieval of the "Sister/Clone" data for the desired vehicle. This will drive the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module for the initial vehicle selection.

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

To use the program, follow this "Yellow Brick Road":

1) Sister/Clone Reader -

(a) - Select YEAR (b) - Select Manufacturer
(c) - Select Model

▼

2) Click on TEST SELECTION Tab

▼

3) Select a test from the available tests which are displayed

▼

4) View TEST INFORMATION

▼

5) View OCCUPANT DATA

▼

6) View VEHICLE DATA

▼

7) View STIFFNESS CALCS

▼

8) Click on Reports - PRINT REPORT

IT'S THAT SIMPLE .... REALLY!!

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)

Authorized signature: _____

PROGRAM ORDER FORM:

(Pricing effective as of 4/28/10 - prices subject to change without notice)

Expert AutoStats®:	$ 595.00 *	$_____
4N6XPRT BioMeknx™:	$ 495.00 *	$_____
4N6XPRT Ped & Bike Calcs®:	$ 375.00 *	$_____
Expert Qwic Calcs®:	$ 275.00 *	$_____
Expert TireStuf®:	$ 85.00 *	$_____
4N6XPRT StifCalcs®:	$ 570.00 *	$_____
Expert VIN DeCoder®:	$ 525.00 *	$_____
		======
	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 **9.50%** 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:_____

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 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 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

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

Expert VIN DeCoder®
_____ (copies) x $525.00 . . . . . = $_____
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)

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additional cost of $35.00 per disk $_____
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*(California orders delivered by e-mail attachment **DO NOT** owe sales tax)*
TOTAL = $_____

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Expires:_____
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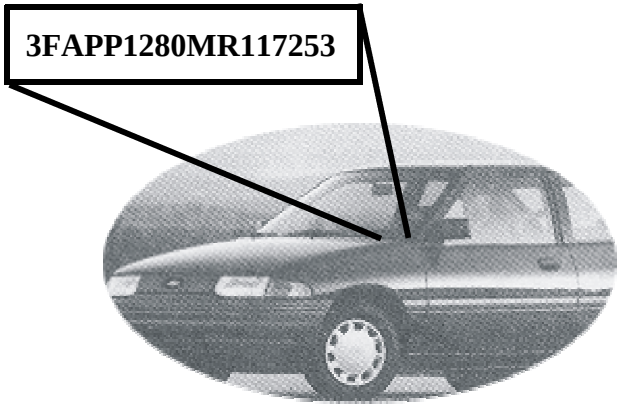
La Mesa, CA 91942-9342
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

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 40,000 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 600 private and 250 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: _____
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E-Mail: _____

AutoStats® _____ (copies) x $595.00 . . = $_____
Handling **: $_____
(Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00)
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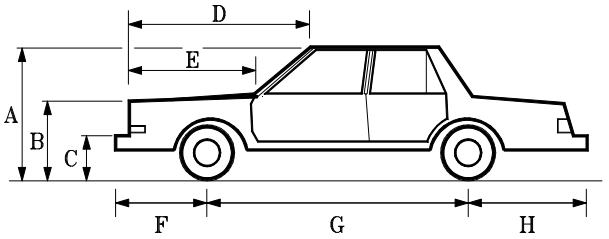
Expert AutoStats®



Over 40,000 cars, pick-ups, vans, and utility vehicles 1940's to the present are represented.

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La Mesa, CA 91942-9342

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

1-800-266-9778

Select Your Vehicle

```
MAKE OF VEHICLE:      FORD
YEAR OF VEHICLE:      2001
BODYSTYLE OF VEHICLE: CAR

More than one model matches the make, year, and body style you specified.
Select the actual model from the list.  Use the arrow keys to highlight the
model, then press Enter.  Press Esc to return to the list of manufacturers.
(You can also begin typing the name of the model to jump directly to it.)

 [ ** AVAILABLE MODELS - 2001 FORD ** ]   [ WB(in)  OAL(in) ]
 CROWN VICTORIA                 4DR SEDAN      115     212
 CROWN VICTORIA (CNG) MSP POLICE PACKAG 4DR SEDAN  115  212
 CROWN VICTORIA 4.6L MSP POLICE PACKAGE 4DR SEDAN  115  212
 CROWN VICTORIA EXTENDED        4DR SEDAN      121     218
 ESCORT                         4DR SEDAN       98     175
 ESCORT ZX2                     2DR COUPE       98     175
 FOCUS                          4DR SEDAN      103     175
 FOCUS                          4DR WAGON      103     178
 FOCUS ZX3                      2DR HATCHBACK  103     168
 MUSTANG                        2DR CONVERTIBLE 101    183
 MUSTANG                        2DR COUPE      101     183
 MUSTANG COBRA                  2DR CONVERTIBLE 101    183
 MUSTANG COBRA                  2DR COUPE      101     183
```

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

Screen 1

```
        2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN
--------[ HORIZONTAL DIMENSIONS ]--------[ VERTICAL DIMENSIONS ]------
 LENGTH                          212 in.  | HEIGHT                  57 in.
 WHEELBASE                       115 in.  | GROUND TO:
 FRONT BUMPER TO FRONT AXLE       44 in.  |  FRONT BUMPER (Top)     23 in.
 FRONT BUMPER TO FRONT OF HOOD     8 in.  |  HEADLIGHT - Center     27 in.
 FRONT BUMPER TO BASE OF WINDSHIELD 66 in. |  HOOD - Top Front      29 in.
 FRONT BUMPER TO TOP OF WINDSHIELD 91 in. |  BASE OF WINDSHIELD    38 in.
 FRONT BUMPER TO FRONT WELL       27 in.  |  REAR BUMPER (Top)     26 in.
 REAR BUMPER TO REAR OF TRUNK      8 in.  |  TRUNK - Top Rear      40 in.
 REAR BUMPER TO BASE OF REAR WINDOW 39 in. |  BASE OF REAR WINDOW   40 in.
 REAR BUMPER TO REAR WELL         37 in.  |
 REAR BUMPER TO REAR AXLE         53 in.  |----[ WEIGHT DIMENSIONS ]------
                                          | CURB WEIGHT          4020 lbs.
-----------[ DEPTH DIMENSIONS ]-----------| Curb Weight Distribution:
 WIDTH                           78 in.   |      FRONT = 55%   REAR = 45%
 FRONT TRACK                     63 in.   |
 REAR TRACK                      64 in.   |
                                          | GROSS VEHICLE WEIGHT  5170 lbs.
            P)rint this screen,      ANY OTHER KEY = Continue
```

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

```
        2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN
--------[ ACCELERATION/BRAKING ]---------|  BUMPER STRENGTH:          5 mph
 ACCELERATION 0-30 mph   13.8 ft/sec/sec  |  STEERING RATIO          16.40:1
 ACCELERATION 0-60 mph   10.1 ft/sec/sec  |
 ACCELERATION 45-65 mph   6.7 ft/sec/sec  |-------[ INTERIOR DIMENSIONS ]-----
 BRAKING 60-0 mph       145   ft          |  FRONT SHOULDER ROOM      61 in.
------------------------------------------|  FRONT HEAD ROOM          39 in.
 DRIVE WHEELS                 REAR        |  FRONT LEG ROOM           43 in.
 TURNING CIRCLE (DIAMETER)     41 ft.     |  REAR SHOULDER ROOM       60 in.
 NUMBER OF WHEELS               4         |  REAR HEAD ROOM           38 in.
 WHEEL RADIUS                  13 in.     |  REAR LEG ROOM            40 in.
 TIRE SIZE              P225/60R16         |
------------------------------------------------------------------------------
 ALL DISC - ALL WHEEL ABS
 3pt - front and rear, FRONT SEAT AIRBAGS
 4spd AUTOMATIC

 N.S.D.C. = 2001 - 2001
 ___ = Value not in Database
==============================================================================
   B)ack a screen,      P)rint this screen,      ANY OTHER KEY = Continue
```

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

```
        2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN
==============================================================================
-------------------------[ ANGLE MEASUREMENTS ]-------------------------------
 ANGLE FRONT BUMPER TO HOOD FRONT          =  36.9   deg
 ANGLE FRONT OF HOOD TO WINDSHIELD BASE    =   8.8   deg
 ANGLE FRONT OF HOOD TO WINDSHIELD TOP     =  17.4   deg
 ANGLE OF WINDSHIELD                       =  34.2   deg
 ANGLE OF STEERING TIRES AT MAX TURN       =  26.8   deg
-------------------------[ CENTER OF GRAVITY ]--------------------------------
 Inches from ground        =  22.37 | Inches from side of vehicle  =  39.00
 Inches behind front axle  =  51.75 | Inches in front of rear axle =  63.25
 Inches from front bumper  =  95.75 | Inches from rear bumper      = 116.25
 Inches from front corner  = 103.39 | Inches from rear corner      = 122.62

 TIP-OVER STABILITY RATIO                  =   1.42     STABLE
 NHTSA Static Stability Factor (calculated) Star Rating:   ****
-------------------------[ MOMENTS OF INERTIA ]-------------------------------
 YAW MOMENT OF INERTIA                     =  2934.60  lb-ft-sec^2
 PITCH MOMENT OF INERTIA                   =  2830.80  lb-ft-sec^2
 ROLL MOMENT OF INERTIA                    =   573.60  lb-ft-sec^2
==============================================================================
   B)ack a screen,      P)rint this screen,      ANY OTHER KEY = Continue
```

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.

Screen 4

```
        2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN
==============================================================================
-------------------------[ ANGLE MEASUREMENTS ]-------------------------------
 ANGLE FRONT BUMPER TO HOOD FRONT          =  36.9   deg
 ANGLE FRONT OF HOOD TO WINDSHIELD BASE    =   8.8   deg
 ANGLE FRONT OF HOOD TO WINDSHIELD TOP     =  17.4   deg
 ANGLE OF WINDSHIELD                       =  34.2   deg
 ANGLE OF STEERING TIRES AT MAX TURN       =  26.8   deg
-------------------------[ CENTER OF GRAVITY ]--------------------------------
 Inches from ground        =  22.37 | Inches from side of vehicle  =  39.00
 Inches behind front axle  =  51.75 | Inches in front of rear axle =  63.25
 Inches from front bumper  =  95.75 | Inches from rear bumper      = 116.25
 Inches from front corner  = 103.39 | Inches from rear corner      = 122.62

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 NHTSA Static Stability Factor (calculated) Star Rating:   ****
-------------------------[ MOMENTS OF INERTIA ]-------------------------------
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 PITCH MOMENT OF INERTIA                   =  2830.80  lb-ft-sec^2
 ROLL MOMENT OF INERTIA                    =   573.60  lb-ft-sec^2
==============================================================================
 N)ext Car, Print to - P)rinter or to F)ile, E)xchange File, D)XF File, Q)uit
```
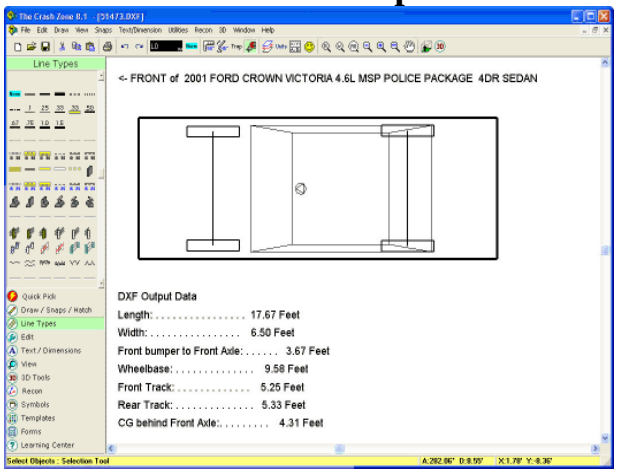

From within the Expert AutoStats program you have the ability to output the data to a 2-D DXF file for importation into your CAD Scene Drawings. The screen below shows an import of the DXF file with Text into the CAD Zone program.

CADZONE Import



4N6XPRT StifCalcs®

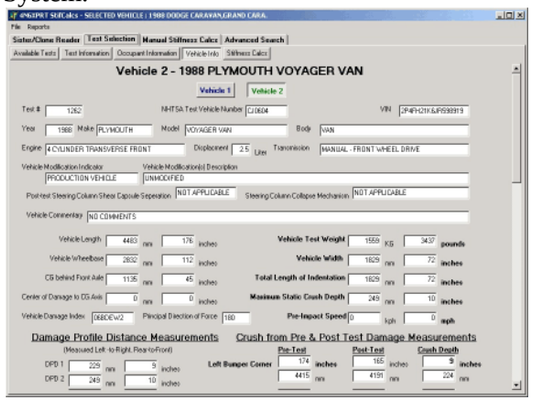
Introducing ..... 4N6XPRT StifCalcs®. A program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet!

In addition to the NHTSA Crash Test data, the program includes a "Sister/Clone List Reader" developed in cooperation with Greg Anderson. This allows quick retrieval of the "Sister/Clone" data for the desired vehicle. This will drive the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module for the initial vehicle selection.

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

SYSTEM REQUIREMENTS

4N6XPRT StifCalcs® is a MS-Windows program designed to work under a 32 bit (95/98/Me/NT/ 2000/XP/Vista) Windows System.



To use the program, follow this "Yellow Brick Road":

1) Sister/Clone Reader -
(a) - Select YEAR
(b) - Select Manufacturer
(c) - Select Model

▼

2) Click on TEST SELECTION Tab

▼

3) Select a test from the available tests which are displayed

▼

4) View TEST INFORMATION

▼

5) View OCCUPANT DATA

▼

6) View VEHICLE DATA

▼

7) View STIFFNESS CALCS

▼

8) Click on Reports - PRINT REPORT

IT'S THAT SIMPLE ....
REALLY!!

PLEASE PRINT

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

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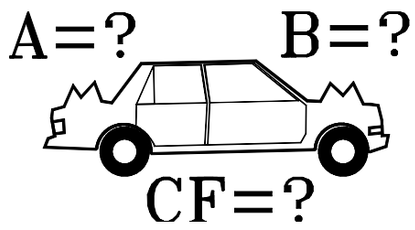
4N6XPRT StifCalcs®



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

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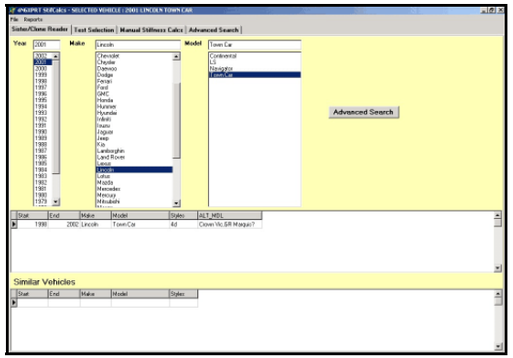
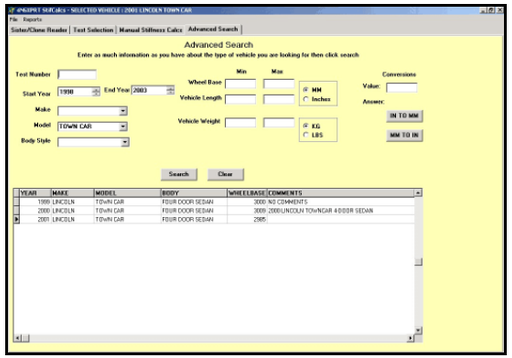
Web: http://www.4n6xprt.com
E-Mail: stifcalcs@4n6xprt.com

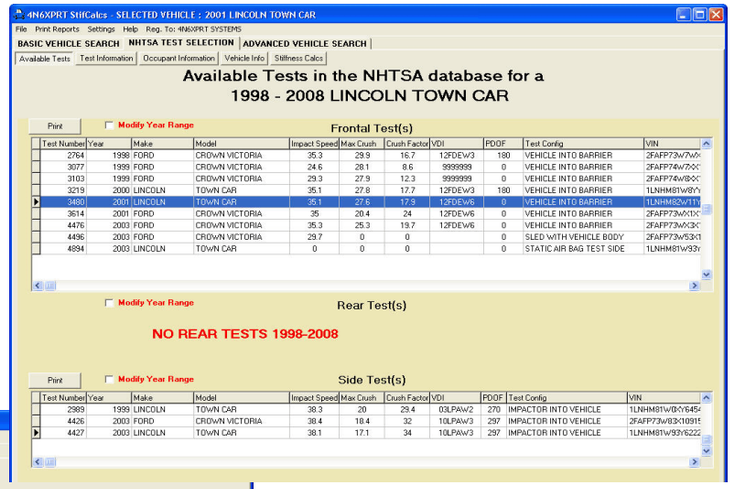
1-800-266-9778

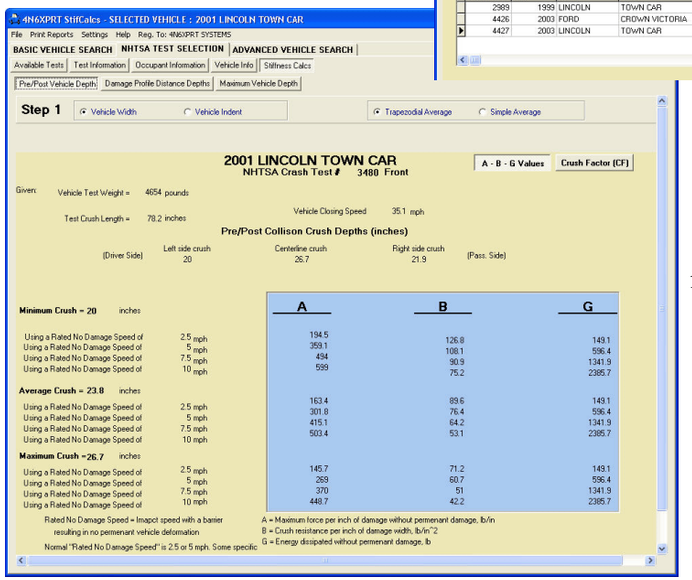
Select the desired vehicle through either our SISTER/CLONE READER or our ADVANCED SEARCH tab.



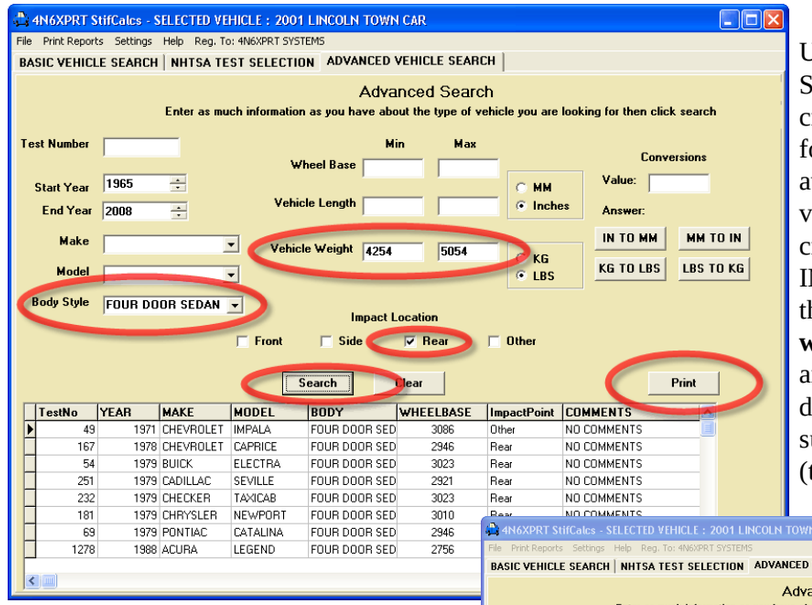


Once the desired vehicle is found/selected, click on the Test Selection tab. From here, select the test to be viewed

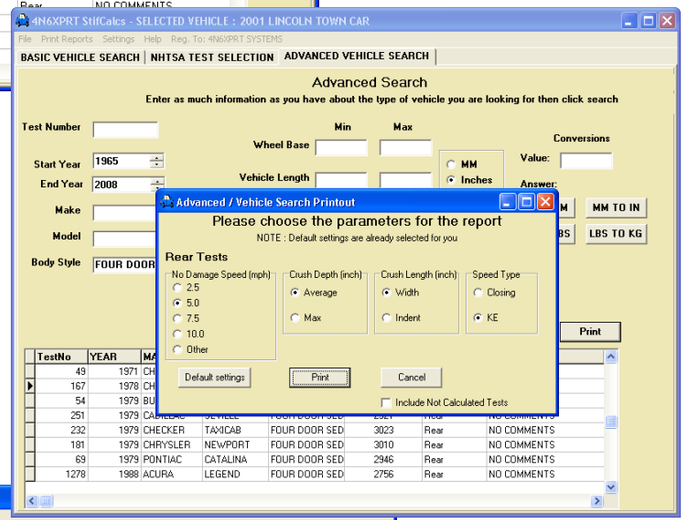




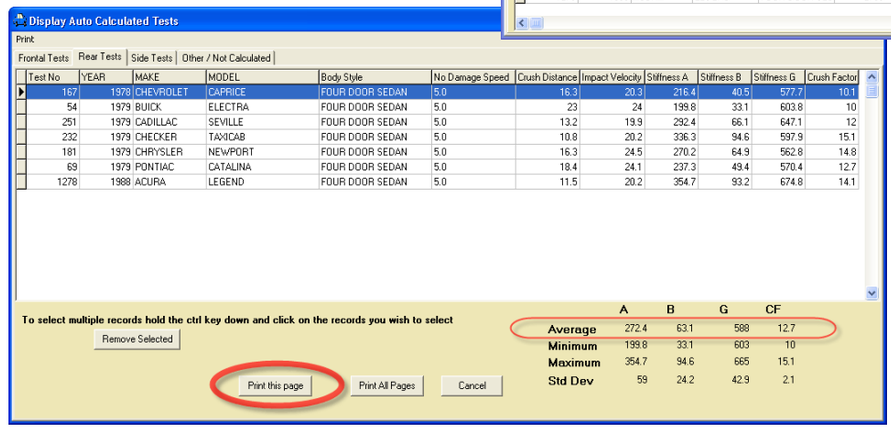
Once a test is selected, the available data for the Test, Occupant(s), Vehicle(s), and Stiffness data can be viewed. The stiffness values are automatically generated from the available test data.



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

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91941-3842

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***

2010 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®:	$ 595.00 *	$_____
4N6XPRT BioMeknx™:	$ 495.00 *	$_____
4N6XPRT Ped & Bike Calcs®:	$ 375.00 *	$_____
Expert Qwic Calcs®:	$ 275.00 *	$_____
Expert TireStuf®:	$ 85.00 *	$_____
4N6XPRT StifCalcs®:	$ 570.00 *	$_____
Expert VIN DeCoder®:	$ 525.00 *	$_____
		======
	SUB-TOTAL	$_____

California shipping addresses add **9.50%** sales tax $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)

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** $_____

======

TOTAL $_____

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

Card #_____ Expires_____
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.

A Division of Expert Witness Services, Inc.

Effective: March 2010

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 also be made by e-mail, which reaches us when we are "on the road" as well as in the office..

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 vehicle information on the sample order form 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.

VIN DeCoding Information

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 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

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

PAYMENT INFORMATION
Visa/MasterCard / American Express:

_____

Expires: _____ / _____

Name & Address:

_____

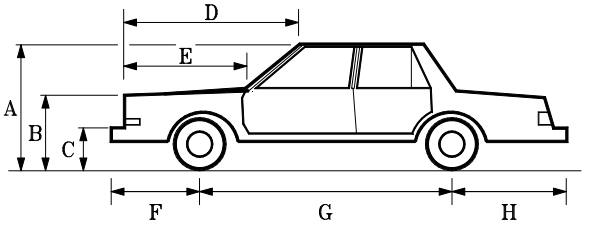
_____

_____

_____

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.

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

FAX: (619) 464-2206
Phone: (619) 464-3478 / 1-800-266-9778

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

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

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	Safety Equipment
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 <u>ALL OPTIONS</u> 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 <u>ALL OPTIONS</u> 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:_____

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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