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 45,000 different vehicles and 203 different manufacturers spanning more than 70 years.

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

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



#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



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

The Fourth through Fifth characters (ND) indicate a Malibu Classic

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 5. The VIN appears Valid, the calculated value is 5.

The Tenth character (5) indicates the model year 2005

- The Eleventh character (M) indicates the vehicle was made in the assembly plant in Lansing (A), MI
- The Twelfth through Seventeenth characters (228271) indicate the Serial Number and are unique to this vehicle.

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

> > 9/4/2015

#### 2005 CHEVROLET MALIBU 4 DOOR SEDAN

Curb Weight:	<b>3262</b> 1bs.		<b>1480</b> kg.
Curb Weight Distribution - Front:	<b>62</b> %	Rear:	38 %
Gross Vehicle Weight Rating:	<b>4267</b> 1bs.		<b>1935</b> kg.
Number of Tires on Vehicle:	4		
Drive Wheels:	FRONT		
Horizontal Dimensions	Inches	Feet	Meters
Total Length	188	15.67	4.78
Wheelbase:	106	8.83	2.69
Front Bumper to Front Axle:	39	3.25	0.99
Front Bumper to Front of Front Well:	24	2.00	0.61
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:	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:	25	2.08	0.64
Width Dimensions			
Maximum Width:	70	5.83	1.78
Front Track:	60	5.00	1.52
Rear Track:	59	4.92	1.50
Vertical Dimensions			
Height:	58	4.83	1.47
Ground to -			
Front Bumper (Top)	21	1.75	0.53
Headlight - center	29	2.42	0.74
Hood - top front:	30	2.50	0.76
Base of Windshield	38	3.17	0.97
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	42	3.50	1.07
Base of Rear Window:	43	3.58	1.09

#### 2005 CHEVROLET MALIBU 4 DOOR SEDAN

Interior Dimensions Front Seat Shoulder Width Front Seat to Headliner Front Leg Room - seatback to floor (max) Rear Seat Shoulder Width Rear Seat to Headliner Front Leg Room - seatback to floor (min)	Inches 57 40 42 56 38 39	Feet 4.75 3.33 3.50 4.67 3.17 3.25	Meters 1.45 1.02 1.07 1.42 0.97 0.99
Seatbelts: <b>3pt - front and rear</b>			
Airbags: FRONT SEAT AIRBAGS			
Steering Data Turning Circle (Diameter) Steering Ratio: 15.90:1 Wheel Radius: Tire Size (OEM): P205/65R15	456 12	38.00	11.58 0.30
Acceleration & Braking Information			
Brake Type: ALL DISC			
ABS System: ALL WHEEL ABS - OPTIONAL			
Braking, 60 mph to 0 (Hard pedal, no skid, d = <b>139.0</b> ft t = <b>3.2</b> sec	dry pavement): a = <b>-27.8</b> ft/s	sec² G-fo	rce = -0.86
Acceleration:			
0 to 30mph $t = 2.7$ sec	a = <b>16.3</b> ft/s	sec <sup>2</sup> G-fo	rce = 0.51
0 to 60mph $t = 7.6$ sec	a = 11.6 ft/s	sec <sup>2</sup> G-to	rce = 0.36
$45 \text{ to 65mpn} \qquad t = 4.2 \text{ sec}$		Sec- G-TO	rce = 0.22
Transmission Type: 4spd AUTOMATIC			
Notes: Federal Bumper Standard Requirements: This vehicles Rated Bumper Strength:	2.5	mph mph	

N.S.D.C = 2004 - 2007

#### 2005 CHEVROLET MALIBU 4 DOOR SEDAN

Other Information			
Tip-Over Stability Ratio =	1.31	Stable	
NHTSA Star Rating (calculated)		****	
Center of Gravity (No Load):			
Inches behind front axle	=	40.28	
Inches in front of rear axle	=	65.72	
Inches from side of vehicle	=	35.00	
Inches from ground	=	22.77	
Inches from front corner	=	86.66	
Inches from rear corner	=	114.21	
Inches from front bumper	=	79.28	
Inches from rear bumper	=	108.72	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	2153.86 lb*ft*sec	2
Pitch Moment of Inertia	=	2080.38 lb*ft*sec	2
Roll Moment of Inertia	=	437.16 lb*ft*sec	2
Front Profile Information			
Angle Front Bumper to Hood Front	=	<b>56.3</b> deg	
Angle Front of Hood to Windshield Base	=	<b>10.5</b> deg	
Angle Front of Hood to Windshield Top	=	<b>19.6</b> deg	
Angle of windshield	=	<b>31.0</b> deg	
Angle of Steering Tires at Max Turn	=	<b>26.6</b> 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	=	27 CF
(Tested for Rear/Side Impact only)		

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 #4863

# 2004 CHEVROLET MALIBU

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

# You entered: 2005 CHEVROLET MALIBU

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

Year Range	Make	Model	Body Styles	Wheelbase
2003 - 2011 Remarks: CONV IS	SAAB OLD BODY in 2003	9-3 3, new convertible body begins in	4D, 5D, CONV 2004.	105.3
2004 - 2007 Remarks:	CHEVROLET	MALIBU	2D, 4D, SW	106.3, 116
2004 - 2007 Remarks: Quasi-sta	CHEVROLET ation wagon version	MALIBU MAXX n of Malibu with extended WB	5D	112.3
2005 - 2009 Remarks:	PONTIAC	G6	2D, 4D, CONV	112.3
2007 - 2010 Remarks:	SATURN	AURA	4D	112.3
2008 - 2012 Remarks:	CHEVROLET	MALIBU	2D, 4D, SW	106.3, 116

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

#### **Test Information**

Test # <b>4863</b>		NHTSA Tes	st Reference	Guide Versio	on #[	V5			
Test Date 2003-12-1	5 Contract # DTNH22-01-D-32005								
Contract/Study Title	NEW CAR A	SSESMENT PR	ROGRAM FI	RONTAL BAI	RRI	ER IMPACT T	EST		
Test Objective(s)	<b>TO OBTAIN</b>	VEHICLE CRA	SHWORTH	IINESS AND	) OC	CUPANT RES	TRAINT	INFORMATIC	<b>DN</b>
Test Type	NEW CAR A	SSESSMENT T	EST			Configuration	VEHICL	E INTO BARF	RIER
Impact Angle	0		S	ide Impact Po	oint [	9999	mm	0.0	] inches
				Offset Dista	ance[	0	mm	0.0	] inches
				Closing Sp	eed[	57.1	Km/Hr	35.50	] MPH
Test Performer	CALSPAN								
Test Reference #	RUN2104								
Test Track Surface	CONCRETE			Conditi	ion [	DRY			
Ambient Temperature	<b>21</b> C	<b>69.8</b> F	Total N	umber of Cur	ves [	193			
Data Recorder Type	DIGITAL D	ATA ACQUISIT	ION			Data Link	UMBIL	ICAL CABLE	
Test Commentary	FY 04 NCAP	- 2004 CHEV	ROLET MA	LIBU M4010	04				

## **Fixed Barrier Information**

Barrier Type <b>RIGID</b>	Pole Barrier Diameter <b>9999</b>	mm	9999	] inches
Barrier Shape LOAD CELL BARRIER		]		
Barrier Commentary FRONTAL FLAT BARRIER WI	TH 36 LOADCELLS			

# 2004 CHEVROLET MALIBU LEFT FRONT SEAT OCCUPANT

Test #	4863		
Vehicle #	1		Sex MALE
Location	LEFT FRONT SE	AT	Age <b>99</b>
Position	CENTER POSITI	ON	Height <b>9999</b> mm <b>0.0</b> inches
Туре	HYBRID III DUM	MY	Weight <b>999.0</b> kg <b>2202</b> pounds
Size	50 PERCENTILE		
Cal	ibration Method	HYBRID III	
Occupar	nt Manufacturer	MFG: VECTOR S/I	/N:061
Occupa	ant Modification	NO COMMENTS	
Occu	pant Description	NO COMMENTS	
Occupa	ant Commentary	CNTRH2: HEAD R	RESTRAINT
Head to -		<u>He</u>	ead
Windshie	elder Header 368	mm14.5	inches Head Injury Criteria (HIC)
	WindShield 673	mm26.5	inches HIC Lower Time Interval (ms)
	Seatback 999	9 mm 0.0	inches HIC Upper Time Interval (ms) 99.3
	Side Header 223	mm8.8	_ inches
	Side Window 315	mm <b>_12.4</b>	inches
Neck to Se	atback <b>9999</b> r	mm [ <b>0.0</b> inche	es
	First Contact Re	egion (Head)	BAG
ę	Second Contact Re	gion (Head)	
		Che	<u>est</u>
Chest to -			
	Dash <u>540</u> n	nm 21.3 inche	es Arm to Door <b>108</b> mm <b>4.3</b> inches
Steering V	Wheel 326 n	nm 12.8 inche	es Hip to Door <b>143</b> mm <b>5.6</b> inches
Sea	tback <b>9999</b> n	nm <b>0.0</b> inche	es
Chest S	Severity Index 43	2	Pelvic Peak Lateral Acceleration (g's)
Thoracic Tr	rauma Index		Thorax Peak Acceleration (g's) 44.5
	Lap E	Belt Peak Load	934 Newtons 1558.8 pound Force
	Shoulder B	elt Peak Load	Newtons 0.0 pound Force
First C	ontact Region (Che	st/Abdomen)	BAG
Second Co	ontact Region (Ches	st/Abdomen) [NON	IE
		L	Legs
Knees to	Dash <b>170</b> n	nm <b>6.7</b> inche	es Knees to Seatback 9999 mm 0.0 inches
Left Fem	ur Peak Load -2	167 Newtor	ns -487.2 pounds Force
Right Femu	r Peak Load	937 Newtor	ns -435.5 pounds Force
	First Contact R	Region (Legs)	HPANEL
	Second Contact Re	egion (Legs)	

#### 2004 CHEVROLET MALIBU LEFT FRONT SEAT OCCUPANT

Test # 4863						
Vehicle # 1			Sex	MALE		
Location LEFT	FRONT SE	AT	Age	99		
Position CENT	ER POSITI	ON	Height	<b>9999</b> mm	0.0 inches	
Туре НҮВР	ND III DUMM	MY	Weight	<b>999.0</b> kg	2202 pounds	
Size 50 PE	RCENTILE					
Calibration	I Method	HYBRID III				
Occupant Man	ufacturer	MFG: VECTOR S/N:061				
Occupant Mo	dification	NO COMMENTS				
Occupant D	escription	NO COMMENTS				
Occupant Cor	nmentary	CNTRH2: HEAD RESTRA				
		Restraints	<u>.</u>			
Restraint # 1	<b>3 POINT </b>	BELT				
Mounted	BELT - CO	ONVENTIONAL MOUNT				
Deployment	DEPLOYE	ED PROPERLY				
Restraint Corr	imentary	SHOULDER BELT PRET	ENSIONER AND FO		2	
Restraint # 2		AIRBAG				
Mounted	STEERIN	G WHEEL				
Deployment	DEPLOY	ED PROPERLY				

**Restraint Commentary** 

NONE

# 2004 CHEVROLET MALIBU RIGHT FRONT SEAT OCCUPANT

Test #	4863		
Vehicle #	1		Sex MALE
Location	<b>RIGHT FRONT S</b>	EAT	Age <b>99</b>
Position	CENTER POSITI	ON	Height 9999 mm 0.0 inches
Туре	HYBRID III DUM	۸Y	Weight <b>999.0</b> kg <b>2202</b> pounds
Size	50 PERCENTILE		
Cal	ibration Method	HYBRID III	
Occupar	nt Manufacturer	MFG: VECTOR S/	/N:064
Occupa	ant Modification	NO COMMENTS	
Occu	pant Description	NO COMMENTS	
Occupa	ant Commentary	CNTRH2: HEAD R	RESTRAINT
Head to -		<u>He</u>	ead
Windshie	elder Header 361	mm _ <b>14.2</b>	inches Head Injury Criteria (HIC) 397
	WindShield 613	mm _ <b>1</b>	inches HIC Lower Time Interval (ms) 64.9
	Seatback 999	<u>9                                    </u>	inches HIC Upper Time Interval (ms) 100.9
	Side Header 221	mm <b>8.7</b>	inches
	Side Window 320	mm <b>_12.6</b>	inches
Neck to Se	atback <b>9999</b> r	nm <b>0.0</b> inche	es
	First Contact Re	egion (Head)	BAG
ę	Second Contact Re	gion (Head)	
		<u>Ch</u>	<u>est</u>
Chest to -	[]		
<i>.</i>	Dash <b>539</b> n	nm <u>21.2</u> inche	es Arm to Door [110 mm [4.3] inches
Steering V	Wheel <b>9999</b> n	nm <u>0.0</u> inche	es Hip to Door [140 mm [5.5 Inches
Sea	tback [ <b>9999</b> ] n	nm [ <b>0.0</b> ] inche	
	everity index 43	<u>/</u>	Pelvic Peak Lateral Acceleration (g's)
I noracic I i	rauma index [U		Newtone 1592.9 neurod Force
	Lap E Chouldor D	Selt Peak Load	Newtons 1362.9 pound Force
First C	Shoulder B		
First G	ontact Region (Che	st/Abdomen)	
Second Co			
		<u>L</u>	Legs
Knees to	Dash 186 n	nm 7.3 inche	es Knees to Seatback [9999 mm [0.0 inches
Left Fem	ur Peak Load	251 Newton	ons 2281.2 pounds Force
Right Femu	ur Peak Load	998 Newton	ons pounds Force
	First Contact R	egion (Legs)	SHPANEL
	Second Contact Re	egion (Legs)	

# 2004 CHEVROLET MALIBU RIGHT FRONT SEAT OCCUPANT

Test #	4863								
Vehicle #	1			Sex	MALE				
Location	RIGHT	FRONT S	EAT	Age	99	]			
Position	CENTE	R POSITIO	ON	Height	9999	mm	0.0	inches	
Туре	HYBRID		ſΥ	Weight	999.0	kg	2202	pounds	
Size	<b>50 PER</b>	CENTILE							
Cal	ibration M	lethod	HYBRID III						
Occupar	nt Manufa	octurer	MFG: VECTOR S/N:064						
Occupa	ant Modifi	cation	NO COMMENTS						
Occu	pant Des	cription	NO COMMENTS						
Occupa	ant Comm	nentary	CNTRH2: HEAD RESTRA	AINT					
			Restraints	<u>.</u>					
Restrai	int # 1	3 POINT E	BELT						
Mounte	Mounted BELT - CONVENTIONAL MOUNT								
Deployment DEPLOYED PROPERLY									
Restrai	nt Comm	entary	SHOULDER BELT PRET	ENSIONER AND FO		IITER			
Restrai	nt # 2	FRONTAL	AIRBAG						
Mounte	ed [	DASH PA	NEL - MID						

DEPLOYED PROPERLY

NONE

Deployment

**Restraint Commentary** 

# 2004 CHEVROLET MALIBU RIGHT REAR SEAT OCCUPANT

Test #	4863		
Vehicle #	1		Sex NOT APPLICABLE
Location	<b>RIGHT REAR SE</b>	AT	Age 1
Position	NON-ADJUSTAB	LE SEAT	Height 9999 mm 0.0 inches
Туре	HYBRID III DUMM	/IY	Weight <b>999.0</b> kg <b>2202</b> pounds
Size	3 YEAR OLD CH	LD	
Cal	ibration Method	HYBRID III	
Occupar	nt Manufacturer	MFG: DENTON	N S/N:044
Occupa	ant Modification	UNMODIFIED	
Occu	pant Description	SUBPART C TH	HREE YEAR OLD CHILD
Occupa	ant Commentary	CONTACTS: C	CNTRH1: CHEST, CNTRH2: CRS
Head to -			Head
Windshie	elder Header 999	9 mm 0.0	inches Head Injury Criteria (HIC) 1027
	WindShield 999	9 mm 0.0	inches HIC Lower Time Interval (ms) 68.7
	Seatback 580	mm <b>_22.8</b>	8inchesHIC Upper Time Interval (ms)104.7
	Side Header 999	<u>9                                    </u>	inches
S	Side Window 383	mm <u>15.1</u>	1 inches
Neck to Sea	atback <b>9999</b> r	nm <b>0.0</b> in	nches
	First Contact Re	gion (Head)	OTHER
S	Second Contact Reg	gion (Head)	
			Chest
Chest to -			
Steering V	Dasn <u>9999</u> n Nhool <b>9999</b> n	1m <u>0.0</u> in	nches Arm to Door 232 mm 9.1 inches
Steering v	thook <b>593</b>	100 0.0 10	
Choct S		<u> </u>	Relvic Rock Lateral Acceleration (a'c)
Thoracic Tr		+	Thorax Peak Acceleration (g's) <b>52.2</b>
	Shoulder B	elt Peak I oad	Newtons     O     pound Force
First Co	ontact Region (Che	st/Abdomen)	
Second Co	ontact Region (Ches	st/Abdomen)	NONE
Knoopto	Deeb 0000 -		Legs
Loft Eom			nucles rules to Seatback (417 IIIII 10.4 IIICHES
Right Femu			awtons 0.0 pounds Force
Nynt Feillu	First Contact P		
	Second Contact Re	radion (Legs) []	

# 2004 CHEVROLET MALIBU RIGHT REAR SEAT OCCUPANT

Test #	4863					
Vehicle #	1		Sex	NOT APPLIC	ABLE	
Location	<b>RIGHT REAR</b>	SEAT	Age	1		
Position	NON-ADJUST	ABLE SEAT	] Height	<b>9999</b> mm	0.0 inches	
Туре	HYBRID III DU	MMY	] Weight	<b>999.0</b> kg	2202 pounds	
Size	3 YEAR OLD C	HILD	]			
Cali	ibration Method	HYBRID III				
Occupar	nt Manufacturer	MFG: DENTON S/N:044				
Occupa	Occupant Modification UNMODIFIED					
Occupant Description SUBPART C THREE YEAF			AR OLD CHILD			
Occupa	ant Commentary	CONTACTS: CNTRH1: C	HEST, CNTRH2: CI	RS		
		<u>Restraints</u>	<u>5</u>			
Restrai	nt # 1 CONVE	RTIBLE CHILD SAFETY SE	AT, FRONT FACING	6		
Mounte	d LATCH	- LOWER ANCHORAGES A	ND TOP TETHER			
Deploy	ment NOT A	PPLICABLE				
Restrai	Restraint Commentary EVENFLO VANGAURD V LATCH					
Restrai	nt # 2 5 POIN	T BELT				
Mounte	d CHILD	SEAT				
Deploy	ment NOT A	PPLICABLE				

EVENFLO VANGAURD V LATCH

Restraint Commentary

# 2004 CHEVROLET MALIBU LEFT REAR SEAT OCCUPANT

Test #	4863				
Vehicle #	1		Sex	NOT APPLICABLE	
Location	LEFT REAR SEA	T	Age	1	
Position	NON-ADJUSTAB		Height	9999 mm 0.0 in	iches
Туре	HYBRID III DUM	MY	Weight	999.0 kg 2202 p	ounds
Size	3 YEAR OLD CH	ILD			
Cal	ibration Method	HYBRID III			
Occupar	nt Manufacturer	MFG: DENTON S/	N:142		
Occupa	ant Modification	UNMODIFIED			
Occu	pant Description	SUBPART C THRE	EE YEAR OLD CHILD		
Occupa	ant Commentary	CONTACTS: CNT	<u>RH1: CHEST, CNTRH2: CI</u>	RS	
Head to -		<u>He</u>	ad		
Windshie	elder Header 999	9 mm <b>0.0</b>	inches Head Injury C	Criteria (HIC) 806	
	WindShield 999	9 mm <b>0.0</b>	inches HIC Lov	wer Time Interval (ms)	6.6
	Seatback 563	mm <b>_22.2</b>	inches HIC Up	per Time Interval (ms)	02.6
	Side Header 999	. <u>9                                    </u>	inches		
ę	Side Window 355	mm <u>14.0</u>	inches		
Neck to Se	atback <b>9999</b> r	mm <b>0.0</b> inche	S		
	First Contact Re	egion (Head)	ER		
S	Second Contact Re	gion (Head)			
		<u>Che</u>	<u>est</u>		
Chest to -					
or : ,	Dash <b>9999</b> n	nm <u>0.0</u> inche	es Arm to Door 2	05 mm 8.1 incr	ies
Steering V	/vneel <b>9999</b> n	nm <u>0.0</u> inche	es Hip to Door [2]	67 mm 10.5 incr	ies
Sea	tback [ <u>538</u> ] n	nm [ <u>21.2</u> ] Inche	S Debie Deele Leterel Ar		
Chest S	sevenity index 57	<u>×</u>	Pelvic Peak Lateral Ad	cceleration (g's)	=
Thoracic Tr	rauma index [U			Acceleration (gs) [51./	
	Lap E Shouldor D			pound Force	
Firet C		eit Feak Loau			
First C	uniaci Region (Che	st/Abdomen)	<u>E</u>		<u> </u>
Second Co			E		
		<u>L</u>	.egs		
Knees to	Dash [9999 n	nm [ <b>0.0</b> ] inche	es Knees to Seatback 3	80   mm  15.0   inch _	nes
Left Fem	ur Peak Load	Newtor	ns [0.0 ] pound	s Force	
Right Femu	ur Peak Load		ns [ <b>0.0</b> ] pound	s Force	
	First Contact R	(Legs)	E		
	Second Contact Re	egion (Legs)			

# 2004 CHEVROLET MALIBU LEFT REAR SEAT OCCUPANT

Test #	4863										
Vehicle #	1					Sex	NOT AF	PLIC	ABLE		
Location	LEFT R	EAR SEA	Г	]		Age	1				
Position	NON-A	DJUSTAB	LE SEAT		]	Height	9999	mm	0.0	inches	
Туре	HYBRIC	D III DUMM	IY		]	Weight	999.0	kg	2202	] pounds	
Size	3 YEAR	OLD CHI	LD		]						
Cali	ibration N	lethod	HYBRID III								
Occupar	nt Manufa	acturer	MFG: DENTO	N S/N:142							
Occupant Modification UNMODIFIED											
Occu	pant Des	cription	SUBPART C 1	THREE YEA	AR OLD CHI	LD					
Occupa	ant Comn	nentary	CONTACTS: 0	CNTRH1: C	HEST, CNT	RH2: CF	RS				
				Restraints	5						
Restrai	nt # 1 [	CONVER	IBLE CHILD S	AFETY SE	AT, FRONT I	FACING	i				
Mounte	ed [	LATCH - L	OWER ANCHO	ORAGES A	ND TOP TET	HER					
Deploy	ment [	NOT APP	LICABLE								
Restrai	nt Comm	entary	BRITAX ROU	NDABOUT	LATCH						
Restrai	nt # 2 [	5 POINT E	BELT								
Mounte	ed [	CHILD SE	AT								
Deploy	ment [										
Restrai	nt Comm	entary	BRITAX ROUI	NDABOUT	LATCH						

# Vehicle 1 2004 CHEVROLET MALIBU

Test #	4863								
VIN [	1G1ZS52F24F	129806			NHTSA Te	est Vehicle Number	1		
Year	2004				Vehicle Mo	dification Indicator	PRODUCTIO	N VEHIC	LE
Make	CHEVROLET		Post-test	Steering Co	lumn Shear C	apsule Seperation	UNKNOWN		
Model	MALIBU			Steerir	ng Column Co	llapse Mechanism	UNKNOWN		
Body [	FOUR DOOR	SEDAN							
Engine	4 CYLINDER	TRANS	/ERSE F	RONT					
Displacement	2.2 Liter	· Tra	ansmissic	on <b>AUTOM</b>	IATIC - FRON	IT WHEEL DRIVE			
Vehicle Modifica	tion(s) Descrip	otion	NONE						
Vehicle Comme	ntary <b>2004 C</b>	HEVRO	LET MA	LIBU M4010	4				
Vehicle Leng	th <b>4779</b>	mm	188.1	inches	CG	behind Front Axle	<b>1156</b> mm	45.5	inches
Vehicle W	'idth <b>1775</b>	mm	69.9	inches	Center of D	amage to CG Axis	<b>9999</b> mm	0.0	inches
Vehicle Wheelb	base 2700	mm	106.3	inches	Total Leng	th of Indentation	<b>9999</b> mm	0.0	inches
Vehicle Test We	eight <b>1635</b>	KG	3604	pounds	Maximum S	Static Crush Depth	<b>585</b> mm	23.0	inches
						Pre-Impact Speed	<b>57</b> kph	35.5	mph
Veh	icle Damage Ir	ndex 1	2FDEW3		Princi	pal Direction of For	rce <b>0</b>		
Damage Pro	file Distance	Moas	uromon	te	Crush from	n Dra & Dost Ta	st Damage M	ageuran	onte
Magerro		t Nicas		13			St Damage Int	Cruch	Denth
			$\frac{1}{1}$	Loff Du	maar Carpor	<u>Pre-rest</u>	Post-Test		<u>Depin</u> Tinchoo
	<u>35</u> mm	13.2		Leit Bu	mper Comer	185.5 Inches	169.6 Inches	15.8	
	07 mm	16.0				<b>4/11</b> mm	4309 mm	402	_ mm
	84 mm	19.1			Centerline	188.1 inches	167.4 inches	20.7	inches
	<u>87</u> mm	19.2				<b>4779</b> mm	<b>4252</b> mm	527	mm
	<b>69</b> mm	10.0		Right Bur	mper Corner	185.5 inches	168.7 inches	16.7	inches
		14.5		-		<b>4711</b> mm	<b>4286</b> mm	425	mm
									_
Bumper En	gagement			Sill En	gagement		A-pillar E	Ingageme	ent
(Inline Imp	act Only)			(Side	Impact Only)		(Side Ir	npact On	y)
0.	.0			NOT A	PPLICABLE			0.0	
Moving	Test Cart			Moving T	est Cart/Vehi	cle	Vehicle Ori	entation o	on Cart
An	igle			Crat	bed Angle		Moving	Test Ca	t
DIRECT E	NGAGEMENT	Γ			0.0		NOT AP	PLICABL	.E
Magnitude o	of the Tilt Angle			Magniture c	of the Crabbed Ar	ngle	Magnitud	le of the An	gle
Measured be	etween surface of a	a		Measur	e Clockwise from		Measured between	the Vehicle	e Orientation
Rollover Test C	Jan and the Grour	na	Lor	igituainai večto	r to velocity Vect	or or venicle	and Direction	of Test Car	ι ινιοτιοή

## Vehicle 1 2004 CHEVROLET MALIBU

Test # 4	863										
VIN 1	G1ZS52	F24F1298	06		NH	TSA Test	Vehicle Number	1			
Year 2	2004	Vehicle Modification Indicator         PRODUCTION VEHICLE									
Make	HEVRO	LET	Post-tes	t Steering	) Column S	hear Cap	sule Seperation	UNKN	IOWN		
Model	/IALIBU			Ste	eering Colu	ımn Collap	ose Mechanism	UNKN	IOWN		
Body	OUR DO	OR SEDA	AN								
Engine 4		ER TRAN	SVERSE F	RONT							
Displacement 2	2.2	Liter	Transmissi	on AUI	OMATIC -		WHEEL DRIVE				
Vehicle Modificat	ion(s) De	scription	NONE								
Vehicle Commen	tary 20	04 CHEVE	ROLET MA	LIBU M4	0104						
Vehicle Lengt	h <b>47</b>	<u>79</u> mm	1 <b>88.1</b>	inches		CG be	ehind Front Axle	1156	mm	45.5	inches
Vehicle Wi	dth 17	<u>75</u> mm	6 <b>9.9</b>	inches	Cent	ter of Dam	age to CG Axis	9999	mm	0.0	inches
Vehicle Wheelba	ase <u>27</u>	<u>00</u> mm	106.3	inches	Tot	al Length	of Indentation	9999	mm	0.0	inches
Vehicle Test Wei	ght 16	<b>35</b> KG	3604	pounds	Max	imum Stat	tic Crush Depth	585	mm	23.0	inches
Pre-Impact Speed 57 kph 35.5 mph											
Vehic	cle Dama	ge Index	12FDEW3	3		Principal	Direction of For	ce <b>0</b>			
		<u> </u>	Pre & Po	ost Tes	<u>st Dama</u>	ige Mea	<u>asurements</u>				
(Measurement	ts are taken	in a longitud	dinaldirection.	Except for	Engine Block	, all measure	ements are take from	the Rear	Vehicle S	Surface forwa	rd.)
Lef	t Side				Cente	rline			Righ	t Side	
Pre-Test	Po	ost-Test		Pre-	Test	Post-	Test	Pre-Te	st	Post-	Test
mm inches	mm	inches	6	mm	inches	mm	inches	mm ir	nches	mm	inches
				Leng	th of Vehio	cle at Cent	terline				
				4779	188.1	4252	167.4				
					Engine	e Block					
				384	15.1	384	15.1				
4711 185.5	4309	169.6			Front Bun	nper Corn	er <b>4</b> 7	11 18	35.5	4286	168.7
					Front o	f Engine					
				4250	167.3	3996	157.3				

3307	130.2	3307	130.2
3306	130.2	3321	130.7
3335	131.3	3337	131.4
2210	87.0	2210	87.0
2239	88.1	2249	88.5

3599

141.7

144.5

3671

#### 3662 144.2 Firewall 3664 144.3 3584 141.1 Upper Leading Edge of Door 3294 129.7 Lower Leading Edge of Door 3300 129.9 Bottom of 'A' Post 130.9 3325 Upper Trailing Edge of Door 2195 86.4 Lower Trailing Edge of Door 2224 87.6 Steering Column 2827 111.3 2836 111.7 Center of Seering Column to 'A' Post (Horizontal)

Serial Number: 15R-030201SC02301

3567

3297

3302

3333

2196

2228

140.4

129.8

130.0

131.2

86.5

87.7

# 2004 CHEVROLET MALIBU

NHTSA Crash Test - #4863 - Front Impact

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

Test Vehicle Weight =	3604 pounds
Vehicle Closing Speed =	35.5 mph
Test Crush Length =	69.9 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Deee Side)
(Driver Side)	15.8	20.7	16.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	<u> </u>	G	<u>Kv</u>
Minimum Crush = 15.8 inches					208.7
Using a Rated No Damage Speed of	2.5mph	215.9	180.3	129.2	
Using a Rated No Damage Speed of	5.0mph	399.0	154.0	516.8	
Using a Rated No Damage Speed of	7.5mph	549.5	129.8	1162.7	
Using a Rated No Damage Speed of	10.0mph	667.2	107.7	2067.1	
Average Crush = 18.5 inches					152.2
Using a Rated No Damage Speed of	2.5mph	184.4	131.5	129.2	
Using a Rated No Damage Speed of	5.0mph	340.8	112.4	516.8	
Using a Rated No Damage Speed of	7.5mph	469.3	94.7	1162.7	
Using a Rated No Damage Speed of	10.0mph	569.8	78.5	2067.1	
Maximum Crush = 20.7 inches					121.6
Using a Rated No Damage Speed of	2.5mph	164.8	105.1	129.2	
Using a Rated No Damage Speed of	5.0mph	304.6	89.7	516.8	
Using a Rated No Damage Speed of	7.5mph	419.4	75.6	1162.7	
Using a Rated No Damage Speed of	10.0mph	509.3	62.7	2067.1	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	20.7	33.0	-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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

# 2004 CHEVROLET MALIBU

NHTSA Crash Test - #4863 - Front Impact

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

Test Vehicle Weight =	3604 pounds
Vehicle Closing Speed =	35.5 MPH
Test Crush Length =	69.9 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	13.2	16.0	19.1	19.2	16.8	14.5	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness	
		<u> </u>	<u> </u>	G	<u>Kv</u>	
Minimum Crush = 13.2 inches					299.0	
Using a Rated No Damage Speed of	2.5mph	258.4	258.4	129.2		
Using a Rated No Damage Speed of	5.0mph	477.6	220.7	516.8		
Using a Rated No Damage Speed of	7.5mph	657.7	186.0	1162.7		
Using a Rated No Damage Speed of	10.0mph	798.6	154.3	2067.1		
Average Crush = 17.0 inches					180.3	
Using a Rated No Damage Speed of	2.5mph	200.6	155.8	129.2		
Using a Rated No Damage Speed of	5.0mph	370.8	133.1	516.8		
Using a Rated No Damage Speed of	7.5mph	510.7	112.1	1162.7		
Using a Rated No Damage Speed of	10.0mph	620.1	93.0	1444.9		
Maximum Crush = 19.2 inches					141.3	
Using a Rated No Damage Speed of	2.5mph	177.6	122.1	129.2		
Using a Rated No Damage Speed of	5.0mph	328.4	104.3	516.8		
Using a Rated No Damage Speed of	7.5mph	452.2	87.9	1162.7		
Using a Rated No Damage Speed of	10.0mph	549.0	72.9	2067.1		

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	19.2	31.7	-3.7	-11.8

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 26.3

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 StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

F

## **Available Test Results** Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2004 - 2007 Make: CHEVROLET Model: MALIBU

Test	Vehicle	No							
Number	- Info	Damage	Average	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
5183	2004 SAAB 9-3 FOUR DOOR SEDAN	5.0	16.5	29.5	291.3	86.7	489.2	125.7	21.2
6056	2007 SAAB 9-3 FOUR DOOR SEDAN	5.0	19.4	34.7	334.5	102.4	546.6	139.8	24.8
5191	2004 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	16.4	29.7	341.3	102.7	567.0	148.5	21.5
6448	2008 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	11.9	24.7	360.3	119.2	544.3	187.3	20.5
6998	2011 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	18.6	35.1	360.9	117.1	556.0	159.3	26.6
5851	2006 SAAB 9-3 FOUR DOOR SEDAN	5.0	11.3	24.7	364.5	126.8	524.0	199.1	21.6
4863	2004 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	17.0	35.5	371.3	133.4	516.8	180.7	29.7
6268	2008 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	17.7	34.9	378.9	128.0	560.7	174.5	27.5
5271	2005 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	17.4	35.0	387.8	133.5	563.3	181.7	28.1
5250	2005 PONTIAC G6 FOUR DOOR SEDAN	5.0	17.0	35.3	393.2	139.8	552.9	189.7	29.2
5844	2007 SATURN AURA FOUR DOOR SEDAN	5.0	15.6	35.1	442.4	170.2	574.9	231.5	31.5
6997	2011 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	6.4	20.1	496.8	232.8	530.2	412.8	25.0
		Average	(AVG)		376.9	132.7	543.8	194.2	25.6
		Minimum	(MIN)		291.3	86.7	489.2	125.7	20.5
		Maximum	(MAX)		496.8	232.8	574.9	412.8	31.5

Maximum (MAX)						
Standard Deviation (STDev-sample)						
Number of Tests (n)	12					

52.4

38.0

24.7

74.5

3.8

## Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2004 - 2007 Make: CHEVROLET Model: MALIBU

Test	Vehicle	No							
Numbe	n Info	Damage	Max	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	s	Crush
		(mph)	(inch)	(mph)	A	В	G	Kv	Factor
6997	2011 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	15.7	20.1	202.9	38.8	530.2	68.9	10.2
5183	2004 SAAB 9-3 FOUR DOOR SEDAN	5.0	18.2	29.5	263.7	71.1	489.2	103.0	19.2
4863	2004 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	23.0	35.5	273.7	72.5	516.8	98.2	21.9
5250	2005 PONTIAC G6 FOUR DOOR SEDAN	5.0	22.6	35.3	296.0	79.2	552.9	107.5	22.0
5191	2004 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	18.9	29.7	296.5	77.5	567.0	112.1	18.7
5851	2006 SAAB 9-3 FOUR DOOR SEDAN	5.0	13.6	24.7	303.6	87.9	524.0	138.2	18.0
6448	2008 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	14.1	24.7	304.8	85.3	544.3	134.1	17.4
6268	2008 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	21.8	34.9	307.2	84.1	560.7	114.7	22.3
6056	2007 SAAB 9-3 FOUR DOOR SEDAN	5.0	20.9	34.7	310.9	88.4	546.6	120.7	23.0
6998	2011 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	21.3	35.1	313.8	88.5	556.0	120.4	23.1
5271	2005 CHEVROLET MALIBU FOUR DOOR SEDAN	5.0	19.9	35.0	339.7	102.4	563.3	139.4	24.6
5844	2007 SATURN AURA FOUR DOOR SEDAN	5.0	18.7	35.1	369.3	118.7	574.9	161.3	26.3
		Average (	AVG)		298.5	82.9	543.8	118.2	20.6
		Minimum	(MIN)		202.9	38.8	489.2	68.9	10.2

Maximum (MAX)	
Standard Deviation (STDev-sample)	
Number of Tests (n)	12

369.3

40.7

118.7

19.0

574.9

24.7

161.3

23.7

26.3

4.2

#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



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

The Fourth through Fifth characters (AK) indicate a Cobalt

The Sixth character (5) indicates a 4 Door Sedan

The Seventh character (5) indicates Manual Belts W/Driver & Passenger and Side 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 5. The VIN appears Valid, the calculated value is 5.

The Tenth character (7) indicates the model year 2007

- The Eleventh character (7) indicates the vehicle was made in the assembly plant in Lordstown, OH
- The Twelfth through Seventeenth characters (203940) indicate the Serial Number and are unique to this vehicle.

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

9/4/2015

#### 2007 CHEVROLET COBALT 4 DOOR SEDAN

Curb Weight:	<b>3216</b> 1bs.		<b>1459</b> kg.
Curb Weight Distribution - Front:	<b>59</b> %	Rear:	<b>41</b> %
Gross Vehicle Weight Rating:	<b>3895</b> 1bs.		<b>1767</b> kg.
Number of Tires on Vehicle:	4		
Drive Wheels:	FRONT		
Horizontal Dimensions	Inches	Feet	Meters
Total Length	180	15.00	4.57
Wheelbase:	103	8.58	2.62
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:	46	3.83	1.17
Front Bumper to Top of Windshield:	77	6.42	1.96
Rear Bumper to Rear Axle:	39	3.25	0.99
Rear Bumper to Rear of Rear Well:	24	2.00	0.61
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	21	1.75	0.53
Width Dimensions			
Maximum Width:	68	5.67	1.73
Front Track:	59	4.92	1.50
Rear Track:	58	4.83	1.4/
Vertical Dimensions			
Height:	57	4.75	1.45
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	26	2.17	0.66
Hood - top front:	29	2.42	0.74
Base of Windshield	37	3.08	0.94
Rear Bumper - top:	28	2.33	0.71
Trunk - top rear:	41	3.42	1.04
Base of Rear Window:	43	3.58	1.09

### 2007 CHEVROLET COBALT 4 DOOR SEDAN

Interior Dimensions Front Seat Shoulder ( Front Seat to Headli Front Leg Room - sea Rear Seat Shoulder W Rear Seat to Headlin Front Leg Room - sea	width ner tback to floor (max) idth er tback to floor (min)	Inches 53 39 42 51 38 34	Feet 4.42 3.25 3.50 4.25 3.17 2.83	Meters 1.35 0.99 1.07 1.30 0.97 0.86
Seatbelts: 3pt -	front and rear			
Airbags: <b>FRONT</b>	SEAT AIRBAGS			
<b>Steering Data</b> Turning Circle (Diam Steering Ratio: Wheel Radius: Tire Size (OEM):	eter) <b>16.60:1</b> <b>195/60R15</b>	408 12	34.00 1.00	<b>10.36</b> <b>0.30</b>
Acceleration & Braking	Information			
Brake Type: <b>FRONT</b> ABS System: <b>ALL WH</b>	DISC – REAR DRUM EEL ABS – OPTIONAL			
Braking, 60 mph to 0 d = <b>138.0</b> ft	(Hard pedal, no skid, t = <b>3.1</b> sec	<pre>dry pavement): a = -28.0 ft/s</pre>	sec <sup>2</sup> G-fo	rce = -0.87
$0 \pm 0$ 30mph	t = 2.6 sec	a = 16.9 ft/s	sec <sup>2</sup> G-fo	rce = 0.53
0 to 60mph	t = 6.1 sec	a = 14.4  ft/s	sec <sup>2</sup> G-fo	rce = 0.45
45 to 65mph	t = <b>3.0</b> sec	a = <b>9.8</b> ft/s	sec <sup>2</sup> G-fo	rce = 0.31
Transmission Type:	5spd MANUAL			
Notes: Federal Bumper Sta This vehicles Rate	ndard Requirements:	2.5	mph mph	

N.S.D.C = 2005 - 2010

#### 2007 CHEVROLET COBALT 4 DOOR SEDAN

Other Information			
Tip-Over Stability Ratio =	1.31	Stable	
NHTSA Star Rating (calculated)		****	
Center of Gravity (No Load):			
Inches behind front axle	=	42.23	
Inches in front of rear axle	=	60.77	
Inches from side of vehicle	=	34.00	
Inches from ground	=	22.37	
Inches from front corner	=	87.14	
Inches from rear corner	=	105.40	
Inches from front bumper	=	80.23	
Inches from rear bumper	=	99.77	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	2106.48	lb*ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	2034.84	lb*ft*sec <sup>2</sup>
Roll Moment of Inertia	=	428.88	lb*ft*sec <sup>2</sup>
Front Profile Information			
Angle Front Bumper to Hood Front	=	52.1	deg
Angle Front of Hood to Windshield Base	=	11.6	deg
Angle Front of Hood to Windshield Top	=	20.4	deg
Angle of Windshield	=	30.1	deg
Angle of Steering Tires at Max Turn	=	28.9	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) = √(30 * CF * MID)		
KE Equivalent Speed (Front/Rear/Side)	=	21 CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY	=	27 CF
(Tested for Rear/Side Impact only)		

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 #4827

# 2003 SATURN ION

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

# You entered: 2007 CHEVROLET COBALT

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

Year Range	Make	Model	<b>Body Styles</b>	Wheelbase
2003 - 2007 Remarks: Ion 1, I	SATURN on 2, Ion 3. Coupe h	ION nas 4 doors. RED LINE is perfo	2D, 4D prmance package.	103.2
2005 - 2010 Remarks:	CHEVROLET	COBALT	2D, 4D	103.3, 133
2007 - 2009 Remarks:	PONTIAC	G5	2D	103.3

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

#### **Test Information**

Test # <b>4827</b>		NHTSA Test Re	ference	Guide Version #	V5			
Test Date 2003-08-0	7			Contract #	DTNH22-01-	C-01025		
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 FUE	L SYSTEM IN	TEGRIT	ſY	Configuration	IMPACT	OR INTO VEH	ICLE
Impact Angle	180	]	S	ide Impact Point	9999	mm	0.0	inches
				Offset Distance	9999	mm	0.0	inches
				Closing Speed	48.1	Km/Hr	29.89	MPH
Test Performer	CALSPAN							
Test Reference #	RUN2081							
Test Track Surface	CONCRETE			Condition	DRY			
Ambient Temperature	<b>26</b> C <b>78</b>	<b>.8</b> F	Total Nu	umber of Curves	98			
Data Recorder Type	<b>DIGITAL DATA</b>	ACQUISITION	N		Data Link	UMBIL	CAL CABLE	
Test Commentary	FY 2003 FMVSS	301R TEST -	2003 S	SATURN ION C	30112			

# **Fixed Barrier Information**

Barrier Type	Pole Barrier Diameter	mm	inches
Barrier Shape			
Barrier Commentary			

# 2003 SATURN ION LEFT FRONT SEAT OCCUPANT

Test # 4827	
Vehicle # 2 Sex MALE	
Location LEFT FRONT SEAT Age 99	
Position CENTER POSITION Height 9999 mm 0.0 inches	
Type HYBRID III DUMMY Weight 999.0 kg 2202 pounds	
Size 50 PERCENTILE	
Calibration Method HYBRID III	
Occupant Manufacturer MFG: FTSS S/N:206	
Occupant Modification NO COMMENTS	
Occupant Description NO COMMENTS	
Occupant Commentary CNTRH2: HEAD RESTRAINT	
Head to -	
Windshielder Header 396 mm 15.6 inches Head Injury Criteria (HIC) 49	
WindShield 778 mm 30.6 inches HIC Lower Time Interval (ms) 119	
Seatback 9999 mm 0.0 inches HIC Upper Time Interval (ms) 155	
Side Header 210 mm 8.3 inches	
Side Window 361 mm 14.2 inches	
Neck to Seatback 9999 mm 0.0 inches	
First Contact Region (Head) OTHER	
Second Contact Region (Head)	
<u>Chest</u>	
Chest to -	
Dash 726 mm 28.6 inches Arm to Door 109 mm 4.3 inches	
Steering Wheel 320 mm 12.6 inches Hip to Door 126 mm 5.0 inches	
Seatback 9999 mm 0.0 inches	
Chest Severity Index 35 Pelvic Peak Lateral Acceleration (g's) 0	
Thoracic Trauma Index       0       Thorax Peak Acceleration (g's)       16.2	
Lap Belt Peak Load 127 Newtons 28.6 pound Force	
Shoulder Belt Peak Load <b>0</b> Newtons <b>0.0</b> pound Force	
First Contact Region (Chest/Abdomen) NONE	
Second Contact Region (Chest/Abdomen) NONE	
Leas	
Knees to Dash 154 mm 6.1 inches Knees to Seatback 9999 mm 0.0 inches	
Left Femur Peak Load -1530 Newtons -344.0 pounds Force	
Right Femur Peak Load -717 Newtons -161.2 pounds Force	
First Contact Region (Legs) NONE	

# 2003 SATURN ION LEFT FRONT SEAT OCCUPANT

Test #	4827						
Vehicle #	2			Sex	MALE		
Location	LEFT F	RONT SEA	AT	Age	99		
Position	CENTE	R POSITIC	DN	] Height	<b>9999</b> mm	0.0 inches	
Туре	HYBRI	D III DUMM	IY	Weight	<b>999.0</b> kg	2202 pounds	3
Size	<b>50 PER</b>	CENTILE		]			
Cal	ibration N	/lethod	HYBRID III				
Occupar	nt Manufa	acturer	MFG: FTSS S/N:206				
Occupa	ant Modif	ication	NO COMMENTS				
Occu	pant Des	cription	NO COMMENTS				
Occupa	ant Comn	nentary	CNTRH2: HEAD RESTRA	AINT			
			Restraints	<u>6</u>			
Restrai	int # 1 [	3 POINT B	ELT				
Mounte	ed [	BELT - CC	NVENTIONAL MOUNT				
Deploy	ment [	NOT DEPL	_OYED				
Restrai	int Comm	entary	EQUIPPED WITH BELT	PRETENSIONER			
Restrai	int # 2 [	FRONTAL	AIRBAG				
Mounte	ed [	STEERING	G WHEEL				
Deploy	ment [	NOT DEPL	OYED				
Restrai	int Comm	entary	NONE				
Restrai	int# 3 [	OTHER					
Mounte	-d [	SEAT BAC	K				
Deploy	ment [						
Restrai	int Comm	entary					
Restrai	int Comm	ientary	HEAD RESTRAINT				

# 2003 SATURN ION RIGHT FRONT SEAT OCCUPANT

Test #	4827			
Vehicle #	2		Sex FEMALE	
Location	<b>RIGHT FRONT S</b>	EAT	Age <b></b>	
Position	CENTER POSITIO	ON	Height <b>9999</b> mm <b>0.0</b> inches	
Туре	HYBRID III DUM	ИY	Weight <b>999.0</b> kg <b>2202</b> pounds	
Size	<b>5 PERCENTILE</b>			
Cal	ibration Method	HYBRID III		
Occupar	nt Manufacturer	MFG: FTSS S	<u>3/N:505</u>	
Occupa	ant Modification	NO COMMEN	<u>VTS</u>	
Occu	pant Description	NO COMMEN	<u>NTS</u>	
Occupa	ant Commentary	CNTRH2: HE	AD RESTRAINT	
Head to -			Head	
Windshie	elder Header 454	mm <b>17</b> .	'.9     inches     Head Injury Criteria (HIC)     115	
	WindShield 925	mm <u>36</u> .	inches HIC Lower Time Interval (ms) 79.9	
	Seatback 999	<u>9                                    </u>	D         inches         HIC Upper Time Interval (ms)         115.9	
	Side Header 278	mm <b>_10</b> .	).9 inches	
e e	Side Window 388	mm <u>15.</u>	i.3 inches	
Neck to Se	atback <b>9999</b> r	nm <b>0.0</b> i	inches	
	First Contact Re	egion (Head)	OTHER	
5	Second Contact Re	gion (Head)		
			<u>Chest</u>	
Chest to -				
	Dash <b>524</b> n	nm <b>20.6</b>	inches Arm to Door <b>155</b> mm <b>6.1</b> inches	
Steering V	Wheel <b>9999</b> n	nm <u>0.0</u>	inches Hip to Door [152] mm [6.0] inches	
Sea	tback [ <b>9999</b> ] n	nm [ <b>0.0</b>		
Chest S	Severity Index 58		Pelvic Peak Lateral Acceleration (g's)	
Thoracic Tr	rauma Index [0			
	Lap E	Selt Peak Load	457 Newtons 102.7 pound Force	
First O	Snoulder B		U Newtons U.O pound Force	
First C	ontact Region (Che	st/Abdomen)		
Second Co	ontact Region (Ches	svAbdomen)	NONE	
			Legs	
Knees to	Dash 216 n	nm <u>8.5</u>	inches Knees to Seatback 9999 mm 0.0 inches	
Left Fem	ur Peak Load	<u>45</u> Ne	iewtons pounds Force	
Right Femu	r Peak Load	<u>36</u> Ne	iewtons pounds Force	
	First Contact R	legion (Legs)		
	Second Contact Re	egion (Legs)		

# 2003 SATURN ION RIGHT FRONT SEAT OCCUPANT

Test #	4827									
Vehicle #	2				Sex	FEMAL	E			]
Location		RONT SE	AT		Age	99				-
Position	CENTER		DN		Height	9999	mm	0.0	inches	
Туре	HYBRID		IY		Weight	999.0	kg	2202	_ pounds	3
Size	5 PERC	ENTILE								
Calib	bration M	ethod	HYBRID III							
Occupan	t Manufa	cturer	MFG: FTSS S/N:50	5						
Occupa	nt Modifi	cation	NO COMMENTS							
Occup	oant Desc	cription	NO COMMENTS							
Occupa	nt Comm	entary	CNTRH2: HEAD RI	STRAINT						
			Res	traints						
Restrain	nt # 1 [	B POINT B	ELT							
Mounted	d 🛛	BELT - CC	NVENTIONAL MOL	JNT						
Deployn	nent 🛛		OYED							
Restrain	nt Comm	entary	EQUIPPED WITH E	BELT PRET	ENSIONER					
Restrain	nt# 2 [									
Mounter										
Deploym	nent [									
Restrain	nent <u>n</u>	ontary								
i testi all		entary	NONL							
Restrain	nt#3 [	OTHER								
Mountee	d [	SEAT BAC	CK							
Deployn	nent [	NOT APPL								
Restrain	nt Comme	entary	HEAD RESTRAINT							

# Vehicle 1 0 NHTSA FLAT IMPACTOR

Test #	4827										
VIN	9999				NHTSA Te	est Vehicl	e Number	1			
Year	0				Vehicle Mo	dification Indicator RESEARCH VEHICLE					
Make	NHTSA         Post-test Steering Column Shear Capsule Seperation         NOT APPLICABLE										
Model	FLAT IMPACTOR         Steering Column Collapse Mechanism         NOT APPLICABLE										
Body	NOT AF	PLICABLE									
Engine	NOT AF	PLICABLE									
Displacement	99.9	] Liter T	ransmissio	NOT AF	PLICABLE						
Vehicle Modific	ation(s) E	Description	NONE								
Vehicle Comme	entary	MOVING BA	RRIER IMP	ACTOR							
Vehicle Len	gth 🔤	<b>99999</b> mm	0.0	inches	CG	6 behind F	ront Axle	1344	mm	52.9	inches
Vehicle V	Vidth	<b>1981</b> mm	78.0	inches	Center of D	amage to	CG Axis	0	mm	0.0	inches
Vehicle Wheel	lbase	<b>3048</b> mm	120.0	inches	Total Leng	gth of Inde	entation	99999	mm	0.0	inches
Vehicle Test W	'eight	1797 KG	3961	pounds	Maximum S	Static Cru	sh Depth	9999	mm	0.0	inches
						Pre-Impa	ct Speed	48	kph	29.9	mph
Vel	Vehicle Damage Index 99999999 Principal Direction of Force 0										
Domogo Dr	ofilo Die	tanco Moa	euromont	<b>^</b>	Cruch from	n Dro 8	Doct To	et Doma		acurom	onto
				<u>5</u>	Clushillon		<u>- 1051 10</u>				
(Measu	Jrea Lett-	to-Right, Rea	r-to-⊢ront)	L . (1 D	0	Pre-Tes	<u>t</u>	Post-le	<u>st</u> Linnen er	Crush L	<u>Jeptn</u> 1 :
	9999	mm <u>0.0</u>		Left Bu	mper Corner	0.0	inches	0.0	inches	N/A	j inches
	9999	mm <u>10.0</u>				9999	mm	99999	j mm	-90000	] mm
	9999	mm <u>0.0</u>			Centerline	0.0	inches	0.0	inches	N/A	inches
	9999	mm <u>0.0</u>				9999	mm	99999	mm	-90000	] mm
	9999	mm <u>0.0</u>		Right Bur	mper Corner	0.0	inches	0.0	inches	N/A	linches
	9999	mm [ <b>0.0</b>				9999	mm	99999	mm	-90000	lmm
									]		1
Bumper E	ngageme	ent		Sill En	agement			А	-pillar E	ngageme	nt
(Inline Im	pact Only	()		(Side Impact Only)				(Side Impact Only)			
	.0.	7			PPLICABLE			]	<u>`</u>	<u>.</u> 0.0	Ĵ
		_						-			-
Moving	g Test Ca	rt		Moving T	est Cart/Vehi	cle		Veh	icle Orie	ntation o	n Cart
Α	ngle			Crab	bed Angle				Moving	Test Car	t
DIRECT	ENGAGE	MENT			0.0			NOT APPLICABLE			
Magnitude	e of the Tilt	Angle		Magniture c	of the Crabbed Ar	ngle			Magnitude	e of the Ang	ile
Measured b	etween sur	face of a		Measur	e Clockwise from	1 		Measured	between	the Vehicle	Orientation
Rollover Test	Cart and th	ne Ground	Lon	gitudinal Vecto	r to Velocity Vect	tor of Vehicl	e	and l	Direction o	I I est Cart	Motion

# Vehicle 1 0 NHTSA FLAT IMPACTOR

Test #	4827											
VIN	9999				NH	TSA Test	Vehicle Num	ber 1				
Year	0				Vehi	cle Modifie	cation Indicat	or <b>R</b>	SEARCH	VEHICLE		
Make	NHTSA		Post-test St	eering C	olumn S	hear Caps	sule Seperation	on NO	OT APPLIC	ABLE		
Model	FLAT IMPAC	LAT IMPACTOR         Steering Column Collapse Mechanism         NOT APPLICABLE										
Body	NOT APPLIC	ABLE										
Engine	NOT APPLIC	ABLE										
Displacement	99.9 Lite	er Tr	ansmission	NOT A	APPLICA	BLE						
Vehicle Modifie	cation(s) Descri	ption	NONE									
Vehicle Comm	entary MOVI	NG BAR	RIER IMPA	CTOR								
Vehicle Ler	ngth <b>99999</b>	) mm	<b>0.0</b> in	ches		CG be	ehind Front A	xle 134	<b>4</b> mm	52.9	inches	
Vehicle	Width 1981	mm	<b>78.0</b> in	ches	Cent	ter of Dam	nage to CG A	xis 0	mm	0.0	inches	
Vehicle Whee	elbase <b>3048</b>	mm	<b>120.0</b> in	ches	Tot	al Length	of Indentatior	n <b>999</b>	<b>99</b> mm	0.0	inches	
Vehicle Test V	/eight 1797	KG	<b>3961</b> po	ounds	Maxi	imum Stat	tic Crush Dep	th <b>999</b>	<b>9</b> mm	0.0	inches	
		_				Pre	e-Impact Spe	ed <b>48</b>	kph	29.9	mph	
Ve	hicle Damage I	Index S	9999999			Principal	I Direction of	Force	0			
		<u>P</u>	<u>re &amp; Pos</u>	<u>t Test</u>	Dama	ige Mea	asuremen	<u>its</u>				
(Measuren	ients are taken in a	longitudin	aldirection. Exc	ept for En	gine Block,	, all measure	ements are take	from the F	Rear Vehicle S	urface forwa	rd.)	
	_eft Side				Cente	rline			Right	t Side		
Pre-Test	Post-	Test		Pre-Te	est	Post-	-Test	Pre	e-Test	Post-	Test	
mm inche	es mm	inches		mm	inches	mm	inches	mm	inches	mm	inches	
				Length	of Vehic	cle at Cent	terline					
			99	999 0	0.0	99999	0.0					
					Engine	Block						
			99	999 0	).0	99999	0.0					
9999 0.0	99999	0.0		F	ront Bun	nper Corn	er	9999	0.0	99999	0.0	
					Front o	f Engine						
			99	999 (	).0	99999	0.0					
9999 0.0	99999	0.0			Fire	wall		9999	0.0	99999	0.0	
			99	999 (	).0	99999	0.0					
9999 0.0	99999	0.0		Upper	Leading	Edge of [	Door	9999	0.0	99999	0.0	
9999 0.0	99999	0.0		Lower	Leading	Edge of D	Door	9999	0.0	99999	0.0	
9999 0.0	99999	0.0		В	ottom of	'A' Post		9999	0.0	99999	0.0	
9999 0.0	99999	0.0		Uppe	er Trailing	g Edge of I	Door	9999	0.0	99999	0.0	
9999 0.0	99999	0.0		Lowe	er Trailing	g Edge of I	Door	9999	0.0	99999	0.0	
					Steering	g Column						
			99	999 (	0.0	99999	0.0					
			Center	of Seerir	ng Colum	nn to 'A' Po	ost (Horizonta	al)				
			99	999 (	).0	99999	0.0					

Center of Steering Column to Headliner (Vertical)

9999 0.0 99999 0.0

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

Serial Number: 15R-030201SC02301

# Vehicle 2 2003 SATURN ION

Test #	4827											
VIN	1G8AF52F03	Z138200	)		NHTSA Te	est Vehicle	e Number	2				
Year	2003				Vehicle Modification Indicator				PRODUCTION VEHICLE			
Make	SATURN         Post-test Steering Column Shear Capsule Seperation         UNKNOWN											
Model	ION	ION Steering Column Collapse Mechanism UNKNOWN										
Body	FOUR DOOR	SEDAN										
Engine	4 CYLINDER	TRANS	VERSE FF	RONT								
Displacement	2.2 Lite	r Tr	ansmissio	n MANUA	L - FRONT W	HEEL DF	RIVE					
Vehicle Modific	ation(s) Descri	ption [	NONE									
Vehicle Comme	entary <b>2003 s</b>	SATURN	ION C30	)112								
Vehicle Leng	gth <b>4683</b>	mm	184.4	inches	CG	behind F	ront Axle	1010	mm	39.8	inches	
Vehicle V	Vidth 1707	mm	67.2	inches	Center of D	amage to	CG Axis	9999	mm	0.0	inches	
Vehicle Wheel	lbase <b>2622</b>	mm	103.2	inches	Total Leng	th of Inde	ntation	99999	mm	0.0	inches	
Vehicle Test W	eight 1431	KG	3154	pounds	Maximum S	Static Crus	sh Depth	9999	mm	0.0	inches	
						Pre-Impa	ct Speed	0	kph	0.0	mph	
Vel	hicle Damage I	ndex 9	999999		Princi	pal Direct	ion of For	rce <b>180</b>				
Damage Pr	ofile Distance	o Mose	uramant	e	Crush fron	n Dro &	Doct To	et Dama		asuram	onte	
		t Nicas		. <u></u>							<u>lente</u>	
			$\frac{1}{2}$	Loff Dur	nnor Cornor		inchoo		<u>Si</u> inchoo		<u>Jepin</u> Tinghag	
	<u>9999</u> mm	0.0		Leit Bui	nper Comer		mm	0.0		N/A	] inches ]	
	<u>9999</u> mm	0.0				9999	[[][]]	99999		-90000	- 1	
	<u>9999</u> mm	0.0			Centerline	0.0	inches	0.0	inches	N/A	inches	
	9999 mm	0.0				9999	mm	99999	mm	-90000	] mm	
	<b>9999</b> mm	0.0		Right Bun	nper Corner	0.0	inches	0.0	inches	N/A	inches	
	<u></u>	0.0		-		9999	mm	99999	mm	-90000		
											-	
Bumper E	ngagement			Sill Eng	gagement			А	-pillar E	ngageme	ent	
(Inline Im	pact Only)			(Side I	mpact Only)				(Side Im	pact Onl	y)	
	0.0			NOT A	PPLICABLE				-	0.0	]	
Moving	Test Cart			Moving Te	est Cart/Vehic	cle		Veh	icle Orie	entation o	n Cart	
Α	ngle			Crab	bed Angle				Moving	Test Car	<u>t</u>	
DIRECT	ENGAGEMEN	T			0.0			NOT APPLICABLE				
Magnitude	of the Tilt Angle			Magniture of	f the Crabbed An	ngle		Magnitude of the Angle				
Measured b	etween surface of	a	,	Measure	e Clockwise from		_	Measureo	between	the Vehicle	Orientation	
Rollover lest	Cart and the Grou	ITIQ	LON	giluainal vector	to velocity vect	or of venicle	7	and		n Test Cart	νιοτιοή	
# 4N6XPRT StifCalcs®

# Vehicle 2 2003 SATURN ION

Test #	4827								
VIN [	1G8AF52I	F03Z138200	)	NH	TSA Test Vehic	le Number	2		
Year [	2003			Vehi	cle Modification	Indicator	PRODUCTIO	ON VEHIC	LE
Make	SATURN		Post-test Steering	g Column S	hear Capsule S	Seperation	UNKNOWN		
Model	ION		St	eering Colu	ımn Collapse M	lechanism	UNKNOWN		
Body [	FOUR DO	OR SEDAN	I						
Engine	<u>4 CYLIND</u>	ER TRANS	VERSE FRONT					_	
Displacement [	2.2	Liter Tr	ansmission MA	NUAL - FR	ONT WHEEL D	DRIVE		]	
Vehicle Modifica	tion(s) De	scription	NONE						
Vehicle Comme	ntary 20	03 SATURN	NION C30112						
Vehicle Leng	th <b>46</b>	<b>83</b> mm	184.4 inches		CG behind	Front Axle	<b>1010</b> mm	39.8	inches
Vehicle W	idth 17	<b>07</b> mm	67.2 inches	Cen	ter of Damage t	o CG Axis	<b>9999</b> mm	0.0	inches
Vehicle Wheelb	base 26	<b>22</b> mm	103.2 inches	Tot	al Length of Inc	lentation	<b>99999</b> mm	0.0	inches
Vehicle Test We	eight 14	<b>31</b> KG	3154 pounds	s Max	imum Static Cru	ush Depth	<b>9999</b> mm	0.0	inches
		_			Pre-Imp	act Speed	0 kph	0.0	mph
Veh	icle Dama	ge Index	9999999		Principal Dire	ction of Ford	e <b>180</b>		
		-							
		<u>P</u>	re & Post Te	st Dama	ige Measur	rements			
(Measuremei	nts are taken	in a longitudin	aldirection. Except for	Engine Block	, all measurements	are take from	the Rear Vehicle	Surface forwa	ard.)
Le	ft Side			Cente	rline		Righ	nt Side	
Pre-Test	Po	ost-Test	Pre	-Test	Post-Test		Pre-Test	Post	-Test
mm inches	mm	inches	mm	inches	mm incl	nes m	nm inches	mm	inches
			Leng	gth of Vehic	cle at Centerline	<u>)</u>			
			9999	0.0	99999 0.0				
				Engine	e Block				
			9999	0.0	99999 0.0				
9999 0.0	99999	0.0		Front Bun	nper Corner	999	99 0.0	99999	0.0
			. <u> </u>	Front c	f Engine				
			9999	0.0	99999 0.0				- J. — — — — — — — — — — — — — — — — — —
9999 0.0	99999	0.0		Fire	ewall	999	99 0.0	99999	0.0

9999	0.0	99999	0.0
9999	0.0	99999	0.0
9999	0.0	99999	0.0
9999	0.0	99999	0.0
9999	0.0	99999	0.0

Front Bumper Corner	9999 0.0	99999 0.0
Front of Engine		
9999 0.0 99999 0.0		
Firewall	9999 0.0	99999 0.0
9999 0.0 99999 0.0		
Upper Leading Edge of Door	9999 0.0	99999 0.0
Lower Leading Edge of Door	9999 0.0	99999 0.0
Bottom of 'A' Post	9999 0.0	99999 0.0
Upper Trailing Edge of Door	9999 0.0	99999 0.0
Lower Trailing Edge of Door	9999 0.0	99999 0.0
Steering Column		
9999 0.0 99999 0.0		
Center of Seering Column to 'A' Post (Horizor	ntal)	

# **MODIFIED - 2003 SATURN ION**

NHTSA Crash Test # 4827 Rear Impact - MODIFIED

Pre/Post Depths - Vehicle Width - KE Equivalent Speed - Trapezoidal Average

Test Vehicle Weight =	3154 pounds	Impactor Weight =	3961
KE Equivalent Speed =	22.3 mph	Impactor Test Speed =	29.9
Test Crush Length =	67.2 inches		

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Dece Cide)
(Driver Side)	16.2	18.5	12.9	(Pass. Side)

		CRASH	3 Stiffness Coe	fficents	SMAC Stiffness
		<u>A</u>	B	G	<u>Kv</u>
Minimum Crush = 12.9 inches					112.4
Using a Rated No Damage Speed of	2.5 mph	144.4	88.6	117.6	
Using a Rated No Damage Speed of	5.0 mph	252.3	67.7	470.3	
Using a Rated No Damage Speed of	7.5 mph	323.8	49.5	1058.2	
Using a Rated No Damage Speed of	10.0 mph	358.8	34.2	1881.3	
Average Crush = 16.5 inches					68.5
Using a Rated No Damage Speed of	2.5 mph	112.7	54.0	117.6	
Using a Rated No Damage Speed of	5.0 mph	196.9	41.2	470.3	
Using a Rated No Damage Speed of	7.5 mph	252.7	30.2	1058.2	
Using a Rated No Damage Speed of	10.0 mph	280.1	20.8	1881.3	
Maximum Crush = 18.5 inches					54.7
Using a Rated No Damage Speed of	2.5 mph	100.7	43.1	117.6	
Using a Rated No Damage Speed of	5.0 mph	175.9	32.9	470.3	
Using a Rated No Damage Speed of	7.5 mph	225.8	24.1	1058.2	
Using a Rated No Damage Speed of	10.0 mph	250.2	16.6	1881.3	

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, Ib/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	Maximum Crush	Calculated Impact Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	18.5	31.2	8.9	28.4

### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 10.8

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

#### REPORT NUMBER: 301-CAL-03-05

#### SAFETY COMPLIANCE TESTING FOR FMVSS 301 FUEL SYSTEM INTEGRITY

SATURN CORPORATION 2003 SATURN ION 4-DOOR SEDAN

#### NHTSA NUMBER: C30112

VERIDIAN TEST NUMBER: 8655-F301-14

August 7, 2003

VERIDIAN ENGINEERING P.O. BOX 400 BUFFALO, NEW YORK 14225



#### FINAL REPORT

#### PREPARED FOR:

U. S. Department of Transportation National Highway Traffic Safety Administration Safety Assurance Office of Vehicle Safety Compliance 400 Seventh Street, S. W. Room No. 6115 (NVS-220) Washington, DC 20590 This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By:	Lawrence Q. Valvo, Project Engineer
Approved By:	David J. Travale, Program Manager Transportation Sciences Center
Approval Date:	
FINAL REPORT	ACCEPTANCE BY OVSC:
Accepted By:	
Acceptance Date:	

# TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.		3. Recipient's Catalog No	
4 Title and Subtitle			5 Report Date	
Final Report of FMVSS 301 Compliance Testing of a 2003 Saturn Ion 4- Door Sedan			August 7, 2003	
NHTSA No. C30112			6. Performing Organization CAL	on Code
7. Author(s)			8. Performing Organization	on Report No.
Lawrence Q. Valvo, Project Engine David J. Travale, Program Manager	er		8655-F301-14	
9. Performing Organization Name and Address			10. Work Unit No.	
Veridian Engineering				
4455 Genesee Street Buffalo, New York 14225			11. Contract or Grant No. DTNH22-01-C-01	025
12. Sponsoring Agency Name and Address U.S. Department of Transportation Administration Office of Vehicle Sa	National Highway Traffic Saf afety Compliance (NVS-220)	ety	13. Type of Report and Pe Final Test Repor	riod Covered t
400 Seventh St , S.W., Rm. 6115, V	Washington, D.C. 20590		14. Sponsoring Agency Code NVS-220	
16. Abstract Compliance tests were conducted or of the Office of Vehicle Safety Con compliance. For the purpose of acq Devices (ATDs) were placed in the test vehicle. Test failures identified	n the subject 2003 Saturn Ion apliance Test Procedure No. T uiring information for applied front occupant seating positio were as follows:	4-Door 3 P-301-0 researc ns and y	Sedan in accordance wi 3 for the determination h, two instrumented An arious instrumentation	th the specifications of FMVSS 301 thropomorphic Test was added to the
The test vehicle appeared to comply	with all requirements of FM	/SS 301	"Fuel System Integrity	. "
17. Key Words	18. Distribution Stateme	ent		
Compliance Testing	Copies of this report	t are av	ailable from:	
Safety Engineering FMVSS 301	NHTSA Techn Room 5108 (N Washington, D Telephone No.	1cal Ref PO-230 .C. 203 (202) 3	erence Division ), 400 Seventh , S.W., 590 66-4946	
19. Security Classif. (of this report)	20. Security Classif. (of this page)		21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED		40	

# TABLE OF CONTENTS

Section		Page No.
1	PURPOSE OF COMPLIANCE TEST	1-1
2	COMPLIANCE TEST RESULTS SUMMARY	2-1
3	COMPLIANCE TEST DATA	3-1
	Data Sheet 1 – Test Vehicle Specifications	3-2
	Data Sheet 2 – Pre-Test Data	3-3
	Data Sheet 3 – Moving Barrier Data	3-5
	Data Sheet 4 – Post Test Data	3-6
	Data Sheet 5 – Static Rollover Test Data	3-8
	Data Sheet 6 – High Speed Camera Locations	3-9
APPENDIX A	PHOTOGRAPHS	A-1

#### **SECTION 1**

### PURPOSE OF COMPLIANCE TEST

This 30 mph rear moving barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by Veridian Engineering under Contract No. DTNH22-01-C-01025. The purpose of this test was to determine if the subject vehicle, a 2003 Saturn Ion 4-Door Sedan, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-301-03, dated February 28, 2003.

#### **SECTION 2**

#### COMPLIANCE TEST RESULTS SUMMARY

A 1431.5 kg 2003 Saturn Ion 4-Door Sedan was impacted from the rear by an 1797 pound moving barrier at a velocity of 48.1 kph (29.9 mph). The test was performed by Veridian Engineering on August 7, 2003.

The test vehicle was equipped with a 51.5 liter fuel tank which was filled to 92 percent capacity with stoddard fluid prior to impact. Additional ballast was not required to achieve vehicle test weight. For the purpose of acquiring information for applied research, one instrumented Part 572 E 50th percentile male Anthropomorphic Test Device (ATD) and one instrumented Part 572 O 5th percentile female ATD were placed in the front occupant seating positions and various instruments were added to the test vehicle. Research data is presented in a separate report.

The crash event was recorded by ten high-speed cameras and one real-time camera. Camera locations and other pertinent camera information are found on pages 3-9 and 3-10 of this report. Pre- and post-test photographs of the vehicle can be found in Appendix A.

There was no fuel system fluid spillage following the impact or during any portion of the static rollover test. The average vehicle longitudinal crush was 403 millimeters. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

# SECTION 3

# COMPLIANCE TEST DATA

# TEST VEHICLE SPECIFICATIONS

# TEST VEHICLE INFORMATION:

Year/Make/Model/Boo	ly Style:		2	003 Saturn I	on 4-Do	or Sedan			
NHTSA No.:	C30112	; Color:		Silver					
Engine Data:	4	Cylinders;		CID;	2.2	2 Liters	;	-	CC
Placement:	-	Longitudinal	or In-Line	;	Х	Trans	verse of	r Lateral	
Transmission Data:	5	Speeds;	<u> </u>	anual;		Automatic;		Over	drive
Final Drive:	- Rear V	Wheel Drive;	<u> </u>	ont Wheel D	rive;	-	Four V	Vheel Driv	'e
Major Options:	- <u>A/C</u>		<u> </u>	wer Steering	;; _	Х	Power	Brakes	
	<u>-</u> Pov	ver Windows;	<u>- Po</u>	wer Door Lo	ocks;	Х	Tilt W	heel	
Date Received:	04/	10/03	; 0	dometer Rea	ding	18	37	km	
Selling Dealer:			Satı	rn of Orchar	d Park				
& Address:		3559 So	outhwestern	Blvd., Orch	ard Park	k, NY 1412	7		
DATA FROM VEHIC	LE'S CERTIF	ICATION LABI	EL:						
Vehicle Manufa	actured by:			Saturn C	Corporati	ion			
Date of Manufa	icture:			0	1/03				
VIN:				1G8AF52	F03Z138	8200			
GVWR: 1	<u>644</u> kg;	GAWR-FRO	ONT:	833 kg	g; C	GAWR-REA	AR:	811	kg
DATA FROM VEHIC	LE'S TIRE LA	ABEL:							
Location of Pla	card on Vehicle	e: Glove compa	artment do	or					
Recommended	Tire Size:	P185/70R14	S						
* Recommended	Cold Tire Pres	sure:		FRONT:	210	kPa; R	EAR:	210	kPa
DATA FROM TIRE S	SIDEWALL:								
Size of Tires or	n Test Vehicle:	P1	85/70R14	87S	Mar	nufacturer:			
Tire Pressure w	ith Maximum	Capacity Vehicle	e Load:	FRONT:	300	kPa; F	REAR:	300	kPa
Type of Spare 7	Гire:	Tempo	rary T115	70R14	_				
VEHICLE CAPACIT	Y DATA:								
Type of Front S	leats:		Bench;	Х	Buc	ket;	-	Split Bend	ch
Number of Occ	upants:	2	Front;	3	Rea	r;	5	Total	
Vehicle Capaci	ty Weight (VC	CW) =		40	8	kg			
No. of Occupar	its x 68.04 kg	=		340	).2	kg			
Rated Cargo/Lu	iggage Weight	(RCLW) =		67.	.8	kg			

\*Tire pressure used for test

### PRE-TEST DATA

WEIGHT OF	FEST VEHICL	E AS RECEIVED	FROM DEA	LER (with maxim	um fluids)=	UDW:	
Right	ront =	359.5	kg	Right Rear =		247.0	kg
Left F	ont =	364.5	kg.	Left Rear =		249.0	kg
TOTA	FRONT =	724.0	kg	TOTAL REAR	=	496.0	kg
TOTA	DELIVERED	WEIGHT =	1220.0	kg			
% of 7	otal Front of Ve	ehicle Weight =	59.3%	of Total Rear W	veight =	40	.7%
CALCULAT	ON OF VEHIC	LE'S TARGET TE	ST WEIGHT	:			
Total l	elivered Weigh	t	:	= 1220.0	kg		
Rated	argo/Luggage	Weight (RCLW)		= 67.8	kg		
Weigh	of 2 p.572 Dum	nmies, 74.4 kg	=	= 148.8	kg		
TARG	ET TEST WEIG	ЭНТ	:	= 1436.6	kg		
WEIGHT OF	FEST VEHICL	E WITH TWO DU	MMIES ANI	D <u>62.7</u> K	G OF CAR	GO WEIGI	HT:
Right	ront =	430.5	kg	Right Rear =		267.5	kg
Left F	ont =	449.5	kg	Left Rear =		284.0	kg
TOTA	FRONT =	880.0	kg	TOTAL REAR	=	551.5	kg
TOTA	L TEST WEIGH	-IT =	1431.5	kg			
% of 7	otal Front of Ve	ehicle Weight =	61.5%	of Total Rear W	/eight =	38	.5%
* Weigh	of Ballast Secu	red in Vehicle Tru	nk Area =	0	kg		
T	pe of Ballast:		None				
М	thod of Securin	g Ballast:			-		
Vehicl	Components R	emoved for Weigh	t Reduction:	Bumper	cover, front nd glass, eng	t door glass gine air inta	, rear door tr ke ducts.
VEHICLE A	TITUDE (all di	mension in millim	eters):				
AS DE	LIVERED:	RF 715	LF	714 RR	714	LR	711
AS TE	STED:	RF 673	LF	663 RR	700	LR	698
Vehicl	's Wheel Base:	2622	_mm				
Locati	n of Vehicle's C	C.G.: <u>1010</u>	millimet	ers rearward of fro	ont wheel cer	nter.	
FUEL SYST	M DATA:						
Fuel S	stem Capacity J	From Owner's Man	ual =	51.1	liters		
Usable	Capacity Figure	e Furnished by CO	ΓR =	51.5	liters		
Test V	lume Range (9	1 to 94% of Usable	Capacity) =	46.87	to 4	48.41 lite	ers
ACTU	AL TEST VOL	UME=	47.3 li	iters (with entire f	uel system f	illed)	
			0.1.1.1				

\* Ballast weight includes the RCLW, the weight of drained vehicle fluids and the weight of any removed vehicle components less the weight of onboard instrumentation, cameras, and hardware.

# DATA SHEET 2 (continued)

# PRE-TEST DATA

FUEL SYSTEM DATA	(continued):
------------------	--------------

Test Fluid Type:	/pe: Stoddard Solution							
Test Fluid Specific Gravity:								
Test Fluid Kinematic Viscosity:	0.96	centistokes						
Test Fluid Color:	Orange	("red" is preferred)						
Type of Vehicle Fuel Pump:	El	ectric						
Electric Fuel Pump Operation with Igniti	ion Switch ON and Engine OFF	-						
When ignition is switched on without sta	arting the engine, the fuel pump of	operates for several seconds then shuts						
off.								
Details of Fuel System: Fuel filler is lo	ocated on the left rear quarter pan	el aft of the rear axle; Fuel tank is						
located on the vehicle underbody beneatl	h the rear seat and forward of the	rear axle; Fuel lines are routed along						
the left side of the vehicle underbody.								
Comments: None								

# MOVING BARRIER DATA

# WEIGHT OF MOVING BARRIER:

Right Front =	504.9	kg	Right Rear	=	393.7	kg.
Left Front =	499.9	kg	Left Rear	=	398.3	kg
TOTAL FRONT =	1004.8	kg	TOTAL REA	AR =	792.0	kg
TOTAL BARRIER WEIGHT =	_	1796.8	kg			
MOVING BARRIER DIMENSIONS:						
Barrier Face Height:	1524	_mm				
Barrier Face Width:	1981	_mm				
Barrier Face Ground Clearance:	127	mm				
Tread Width:	1511	mm				
Wheel Base:	3048	mm				
Location of C.G.:	X: <u>1</u>	344 mm rear	rward of front	wheel cente	er.	
	Y:	0 mm from	m longitudinal	-vertical pla	ne of symmetry.	
	Z:4	14 mm abo	ve ground.			
MOVING BARRIER TIRES:						
Manufacturer:			Classic			
Model:			Poly IV			
Size:			215/75D15			
Recommended Max Pressure:	240	kPa:				

# MOVING BARRIER ABORT SYSTEM:

Type: Trailing cable



# POST TEST DATA

### TYPE OF TEST:

Type of Test:	pe of Test: Rear Barrier		Impact A	ngle:	0°	0°		
Test Date:	August 7, 20	003	Time:	: 11:5	58	Temperature:	26.1	°C
Vehicle NHTSA No	D.: C30112		VIN:		1G8A	F52F03Z13820	0	
Required Impact Velocity Range:		46.51	to	48.12	kph			

# BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 =	48.1	kph;	Trap I	No. $2 =$	48.1	kph
Average Impact Speed	=	4	8.1	kph		

# VEHICLE STATIC CRUSH:

Vehicle Length:

Pre-Test	Left =	4523	; C/L =	4683	Right =	4525
Post-Test	Left =	4112	; C/L =	4212	_Right =	4198
Crush	Left =	411	; C/L =	471	Right =	327
AVERAGE	=	403	millimeters			

# DATA SHEET 4 (continued)

# POST TEST DATA

TEST VEHICLE NHTSA NO.:	(	C30112	TEST DATE:	August 7, 2003
Vehicle Mfgr./Make/Model:		2003 Saturn I	on 4-Door Sedan	
Test vehicle fuel tank filled to 91% to 94% will operate without engine operation). Pa	o of ma art 572	nufacturer's "usable" cap test dummies located at e	acity and with elect each front designate	ric fuel pump operating (if it d seating position.
*****	*****	******	*****	*****
TEST VEHICLE IMPACT TYPE:	_	Frontal (42.28 kph targ	et velocity)	
	_	Oblique (42.28 kph targ	et velocity) with	- <sup>o</sup> barrier face first
		contacting	(driv	ver/passenger) side
	-	_ Lateral Moving Barrier	(32.19 kph target vo	elocity)
FUEL SPILLAGE MEASUREMENT:			ACTUAL	MAX ALLOWED
t <sub>o</sub> t <sub>m</sub> + 5	1.	From impact until vehicle motion ceases	0	28 g
	2.	For five minute period after vehicle motion ceases	0	28 g.
	3.	For next 25 minutes	0	28 g/min.
$(t_m + 5) + 25$				

SOLVENT SPILLAGE DETAILS:

None

### STATIC ROLLOVER TEST DATA

### Table 7 FMVSS NO. 301 - STATIC ROLLOVER DATA SHEET

# Vehicle: 2003 Saturn Ion 4-Door Sedan

### NHTSA No.: C30112



### I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

RolloverRotation TimeStage(spec. 1 -3 min)			FMVS Hold	FMVSS 301     Total Time       Hold Time			Next Whole Minute Interval					
0° - 90°	1	minutes	14	seconds	5	minutes	6	minutes	14	seconds	7	minutes
90° - 180°	1	minutes	4	seconds	5	minutes	6	minutes	4	seconds	7	minutes
180°-270°	1	minutes	2	seconds	5	minutes	6	minutes	2	seconds	7	minutes
270°-360°	1	minutes	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes

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

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

### III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

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

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

### IV. SOLVENT SPILLAGE LOCATION(S):

Rollover	Spillage Location
0° - 90°	None
90° - 180°	None
180°-270°	None
270°-360°	None

### HIGH SPEED CAMERA LOCATIONS



LEFT SIDE VIEW

### DATA SHEET 6 (continued)

### HIGH SPEED CAMERA LOCATIONS

CAMERA		CAMER		JS (mm)*	ANGLE**	LENS	SPEED
NO.	VIEW	X	Y	Z	(degrees)	(mm)	(fps)
1	Real-Time Camera	-	-	-	-	-	24
2	Right Side View	15480	1690	1095	-1	35	1000
3	Left Side View	16512	2078	1000	1	35	1000
4	Vehicle Front Underbody View	0	3380	-1956	90	13	995
5	Vehicle Mid-Section Underbody View	0	1938	-1956	90	13	1005
6	Vehicle Rear Underbody View	0	992	-1956	90	13	1030
7	Moving Barrier View	0	0	2515	-105	13	1000
8	Overhead Overall View	-508	0	9804	-90	13	1000
9†	Onboard Driver View	855	2715	970	-6	8	1000
10†	Onboard Passenger View	855	2702	975	-5	8	1000

### NHTSA No. : C30112 Vehicle : 2003 Saturn Ion 4-Door Sedan

\* X =film plant to monorail centerline (+ to left of rail)

Y = film plane to impact location (+ ahead of impact location)

Z = film plane to ground (+ above ground)

\*\* = referenced to horizontal plane

† Research cameras.

Appendix A

# PHOTOGRAPHS

# LIST OF PHOTOGRAPHS

<u>Figure</u>	Photograph Title	Page
A-1	PRE-TEST FRONT VIEW	A-3
A-2	POST-TEST FRONT VIEW	A-4
A-3	PRE-TEST LEFT SIDE VIEW	A-5
A-4	POST-TEST LEFT SIDE VIEW	A-6
A-5	PRE-TEST RIGHT SIDE VIEW	A-7
A-6	POST-TEST RIGHT SIDE VIEW	A-8
A-7	PRE-TEST REAR VIEW	A-9
A-8	POST-TEST REAR VIEW	A-10
A-9	PRE-TEST LEFT FRONT THREE-QUARTER VIEW	A-11
A-10	POST-TEST LEFT FRONT THREE-QUARTER VIEW	A-12
A-11	PRE-TEST RIGHT REAR THREE-QUARTER VIEW	A-13
A-12	POST-TEST RIGHT REAR THREE-QUARTER VIEW	A-14
A-13	PRE-TEST FRONT UNDERBODY VIEW	A-15
A-14	POST-TEST FRONT UNDERBODY VIEW	A-16
A-15	PRE-TEST REAR UNDERBODY VIEW	A-17
A-16	POST-TEST REAR UNDERBODY VIEW	A-18
A-17	CERTIFICATION PLACARD	A-19
A-18	TIRE PLACARD	A-20
A-19	ROLLOVER 90°	A-21
A-20	ROLLOVER 180°	A-22
A-21	ROLLOVER 270°	A-23
A-22	ROLLOVER 360°	A-24









Figure A-4 POST-TEST LEFT SIDE VIEW







Figure A-7 PRE-TEST REAR VIEW



Figure A-8 POST-TEST REAR VIEW







A-13



Figure A-12 POST-TEST RIGHT REAR THREE-QUARTER VIEW





Figure A-14 POST-TEST FRONT UNDERBODY VIEW



Figure A-15 PRE-TEST REAR UNDERBODY VIEW




TIRE-LOADING INFORMATION OCCUPANTS VEHICLE CAPACIT R RR. TOTAL LBS KG 0 899 OA D NG GUWR: A VEHICLE A S CAPACITY WEIGHT ZZHB COLD TIRE PRESSURE SPEED RATING PS SS 30 M 0 4 PSI (28)KPA) ADD HOT, D F Q ADDITIONAL FOR MANUAL S

Figure A-18 TIRE PLACARD

A-20

8655-F301-14



Figure A-19 ROLLOVER 90°



8655-F301-14

A-22

Figure A-20 ROLLOVER 180°



Figure A-21 ROLLOVER 270°



Figure A-22 ROLLOVER 360°

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test #4984

## 2004 SATURN ION

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

### Similar Vehicle database reader

#### You entered: 2007 CHEVROLET COBALT

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

Year Range	Make	Model	<b>Body Styles</b>	Wheelbase
2003 - 2007 Remarks: Ion 1, I	SATURN on 2, Ion 3. Coupe h	ION nas 4 doors. RED LINE is perfo	2D, 4D prmance package.	103.2
2005 - 2010 Remarks:	CHEVROLET	COBALT	2D, 4D	103.3, 133
2007 - 2009 Remarks:	PONTIAC	G5	2D	103.3

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

#### **Test Information**

Test # <b>4984</b>		NHTSA Test I	Reference Guide Vers	ion #	V5								
Test Date 2004-03-1	.8		Contra	act #	DTNH22-03-	D-01002	2						
Contract/Study Title	Contract/Study Title VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION C40113												
Test Objective(s) DETERMINE IF SUBJECT VEHICLE MEETS FMVSS 208 REQUREMENT IN CRASH TEST													
Test Type	FMVSS 208	OCCUPANT CR	ASH PROTECTION		Configuration	VEHICL	E INTO BARR	IER					
Impact Angle	0		Side Impact	Point	0	mm	0.0	inches					
			Offset Dis	stance	0	mm	0.0	inches					
			Closing S	Speed	40.0	Km/Hr	24.85	MPH					
Test Performer	TRC OF OH	10											
Test Reference #	040318-1												
Test Track Surface	CONCRETE		Cond	ition	DRY								
Ambient Temperature	<b>22</b> C	<b>71.6</b> F	Total Number of C	urves	74								
Data Recorder Type	DIGITAL D	ATA ACQUISITIO	N		Data Link	UMBIL	ICAL CABLE						
Test Commentary	NO COMME	NTS											

#### **Fixed Barrier Information**

Barrier Type <b>RIGID</b>	Pole Barrier Diameter <b>0</b>	mm	0	inches
Barrier Shape <b>LOAD CELL BARRIER</b>		]		
Barrier Commentary 36 LCB				

#### 2004 SATURN ION LEFT FRONT SEAT OCCUPANT

Test #	4984				
Vehicle #	1		Sex	MALE	
Location	LEFT FRONT SE	AT	Age	0	
Position	CENTER POSITIO	N	Height	0 mm 0.0	inches
Туре	HYBRID III DUMM	ſΥ	Weight	0.0 kg 0	pounds
Size	<b>50 PERCENTILE</b>				
Cal	ibration Method	HYBRID III			
Occupa	nt Manufacturer	HUMANOID, S/N: 229			
Occup	ant Modification	UNMODIFIED			
Occu	pant Description	NO COMMENTS			
Occupa	ant Commentary				
Head to -		Head			
Windshie	elder Header 390	mm inc	hes Head Injury C	Criteria (HIC) [142	
	WindShield 739	mm [ <u>29.1</u> inc	hes HIC Lov	wer Time Interval (ms)	96.72
	Seatback 0	mm inc	hes HIC Up	per Time Interval (ms)	132.72
	Side Header 195		hes		
	Side Window 337	mm [ <u>13.3</u> inc	hes		
Neck to Se	atback [0] r	nm [ <u>0.0</u> ] inches			
	First Contact Re	egion (Head)			
2	Second Contact Reg				
		Ohaat			
Chaot to		Cnest			
Chest to -		m <b>29.0</b> inches	Arm to Door	11 mm [1.4	linghag
Stooring \	Dasii <u>710</u> ii Naci 212 m	$\frac{111}{20.0}$ inches		05 mm 4.4	
Steering V	thack 0 n	m <b>00</b> inches		<u>05   11111  4.1</u>	
Chest S	everity Index 18		Polvic Poak Lateral Ar	cceleration (a's)	
Thoracic T	rauma Index		Thorax Peak	$\frac{1}{3}$	
	Lan P	Selt Peak Load		nound Force	
	Shoulder B	elt Peak Load	Newtons 00	pound Force	
First C	ontact Region (Che	st/Abdomen)			
Second Co	ontact Region (Ches	st/Abdomen) NONE			
Knorete	Deeh 440	Legs			linghag
				mm [ <b>0.0</b>	Inches
		Newtons	<b>1470 0</b> pound	s Force	
RIGHT Fem	First Contact D		[- <u>11/9.8</u> ] pound	SFOICE	
	Second Contact Re				

#### 2004 SATURN ION LEFT FRONT SEAT OCCUPANT

Test #	4984							
Vehicle #	1		Sex	MALE				
Location	LEFT FRONT SE	AT	Age	0				
Position	<b>CENTER POSIT</b>	ON	] Height	0	mm	0.0	inches	
Туре	<b>HYBRID III DUM</b>	MY	] Weight	0.0	kg	0	pounds	
Size	<b>50 PERCENTILE</b>		]					
Cal	ibration Method	HYBRID III						
Occupa	nt Manufacturer	HUMANOID, S/N: 229						
Occup	ant Modification	UNMODIFIED						
Occu	pant Description	NO COMMENTS						
Occupa	ant Commentary							
		Pootroint	_					

	Restraints						
Restraint # 1	FRONTAL AIRBAG						
Mounted	STEERING WHEEL						
Deployment	DEPLOYED PROPERLY						
Restraint Comr	nentary NO COMMENTS						

#### 2004 SATURN ION RIGHT FRONT SEAT OCCUPANT

Test # <b>4984</b>		
Vehicle # 1	Sex MALE	
Location <b>RIGHT FRONT SE</b>	EAT Age 0	
Position <b>CENTER POSITIO</b>	DN Height 0 mm 0.0 inches	
Type HYBRID III DUMM	MY Weight 0.0 kg 0 pounds	
Size 50 PERCENTILE		
Calibration Method		
Occupant Manufacturer	HUMANOID, S/N: 230	
Occupant Modification	UNMODIFIED	
Occupant Description	NO COMMENTS	
Occupant Commentary	CNTRH2=SUN VISOR, HEADER & A-PILLAR	
Head to - Windshielder Header 391	Head mm 15.4 inches Head Injury Criteria (HIC) 259	
Sootbook	mm 28.3 inches HIC Lower Time Interval (ms) 106.96	
Sealback U	mm <b>7.9</b> inches FIC Opper filme interval (fils) <b>142.96</b>	
Side Window 233	mm 13.1 inches	
Neck to Seatback <b>0</b> r	$\square$ $\square$ $\square$ $\square$ inches	
First Contact Rec	prion (Head) AIR BAG	
Second Contact Reg	nion (Head)	
	Chest	
Chest to - Dash 531 m Steering Wheel 0 m Seatback 0 m	Im       20.9       inches       Arm to Door       94       mm       3.7       inches         Im       0.0       inches       Hip to Door       104       mm       4.1       inches         Imm       0.0       inches       Hip to Door       104       mm       4.1       inches	
Chest Severity Index 191	Pelvic Peak Lateral Acceleration (d's)	
Thoracic Trauma Index 0	Thorax Peak Acceleration (g's) <b>34.6</b>	
Lap Be	elt Peak Load <b>0</b> Newtons <b>0.0</b> pound Force	
Shoulder Be	elt Peak Load <b>0</b> Newtons <b>0.0</b> pound Force	
First Contact Region (Ches	st/Abdomen) AIR BAG	
Second Contact Region (Chest	t/Abdomen) NONE	
Č (		
Knees to Dash 150 m	um <b>59</b> inches Knees to Seathack <b>0</b> mm <b>00</b> inches	
Left Femur Peak Load	<b>390</b> Newtons -1436.5 pounds Force	
Right Femur Peak Load	789 Newtons -1301 4 pounds Force	
First Contact Re	egion (Legs) DASHPANEL	

#### 2004 SATURN ION RIGHT FRONT SEAT OCCUPANT

Test #	4984					
Vehicle #	1		Sex	MALE		]
Location	<b>RIGHT FRONT S</b>	EAT	Age	0		
Position	<b>CENTER POSITI</b>	ON	Height	<b>0</b> mm	0.0 inches	
Туре	HYBRID III DUMI	MY	Weight	<b>0.0</b> kg	0 pounds	3
Size	<b>50 PERCENTILE</b>					
Cali	ibration Method	HYBRID III				
Occupar	nt Manufacturer	HUMANOID, S/N: 230				
Occupa	ant Modification	UNMODIFIED				
Occu	pant Description	NO COMMENTS				
Occupa	ant Commentary	CNTRH2=SUN VISOR, H	EADER & A-PILLAF	र		
Dootroi		Restraints	<u>s</u>			
Resiral						

Restraint # 1	FRONTAL	RONTAL AIRBAG								
Mounted	DASH PAN	NEL - MID								
Deployment	DEPLOYE	EPLOYED PROPERLY								
Restraint Comr	nentary	NO COMMENTS								

#### Vehicle 1 2004 SATURN ION

VIN       IG8AF52F542155463       NHTSA Test Vehicle Number       1         Year       2004       Vehicle Modification Indicator       PRODUCTION VEHICLE         Make       Saturn       Post-test Steering Column Shear Capsule Seperation       UNKNOWN         Body       FOUR DOOR SEDAN       IUNKNOWN       UNKNOWN         Body       FOUR DOOR SEDAN       IUNKNOWN       UNKNOWN         Body       FOUR DOOR SEDAN       IUNKNOWN       UNKNOWN         Brighte       4 CYLINDER TRANSVERSE FRONT       IUNKNOWN       UNKNOWN         Displacement       12.2       Itter       Transmission       MANUAL - FRONT WHEEL DRIVE         Vehicle Modification(s) Description       UNMODIFIED       Steering Column States       CG behind Front Axle 1169       mm       6.0       inches         Vehicle Vehicle Vehicle Somm       66.7       inches       Center of Damage to CG Axis       0       mm       0.0       inches         Vehicle Weelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       503.3       inches         Vehicle Weelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       9.3       inches       167.3 </th <th>Test #</th> <th>4984</th> <th></th>	Test #	4984										
Year       2004       Vehicle Modification Indicator       PRODUCTION VEHICLE         Make       SATURN       Post-test Steering Column Shear Capsule Separation       UNKNOWN         Model       ION       Steering Column Collapse Mechanism       UNKNOWN         Body       FOUR DOOR SEDAN       Engine       4 CYLINDER TRANSVERSE FRONT         Displacement       2.2       Liter       Transmission       MANUAL - FRONT WHEEL DRIVE         Vehicle Modification(s) Description       UNNODIFIED       Vehicle Commentary       Vehicle Commentary         Vehicle Wildth       4648       mm       163.0       inches       C G behind Front Axle       1169       mm       46.0       inches         Vehicle Wildth       1698       mm       66.7       inches       Creater of Damage to CG Axis       0       mm       59.3       inches         Vehicle Wildth       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       0       inches         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       142.0       inches	VIN	1G8AF52F54Z	Z155463	;		NHTSA Te	est Vehicle	Number	1			
Make       SATURN       Post-test Steering Column Shear Capsule Seperation       UnKNOWN         Model       ION       Steering Column Collapse Mechanism       UNKNOWN         Body       FOUR DOOR SEDAN       UNKOURN       UNKNOWN         Engine       4 CYLINDER TRANSVERSE FRONT       UNMODIFIED         Vehicle Modification(s) Description       UNMODIFIED       Vehicle Commentary       Vehicle Length       4648       mm       183.0       inches       CG behind Front Axle       1169       mm       46.0       inches         Vehicle Width       1695       mm       66.7       inches       Center of Damage to CG Axis       0       mm       50.3       inches         Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       50.3       inches         Vehicle Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         (Measured Left-to-Right, Rear-to-Front)       Pre-Impact Speed       40       kph 24.9       mph         DPD 1       253       mm       10.0       inches       14423       mm       143.0       inches         DPD 2       3371 <td>Year</td> <td>2004</td> <td></td> <td></td> <td></td> <td>Vehicle Mo</td> <td>dification I</td> <td>ndicator</td> <td>PRODU</td> <td>JCTION</td> <td>I VEHICL</td> <td>.E</td>	Year	2004				Vehicle Mo	dification I	ndicator	PRODU	JCTION	I VEHICL	.E
Model       ION       Steering Column Collapse Mechanism       UNKNOWN         Body       FOUR DOOR SEDAN       Engine       4 CYLINDER TRANSVERSE FRONT         Displacement       2.2       Liter       Transmission       MANUAL - FRONT WHEEL DRIVE         Vehicle Modification(s)       Description       UNMODIFIED         Vehicle Commentary	Make	SATURN		Post-test	Steering Co	umn Shear C	apsule Se	peration	UNKNO	OWN		
Body Engine       FOUR DOOR SEDAN         Engine       4 CYLINDER TRANSVERSE FRONT         Displacement       2.2         Liter       Transmission         MANUAL - FRONT WHEEL DRIVE         Vehicle Modification(s) Description         Uvehicle Length       4648         4648       mm         Vehicle Length       4648         Vehicle Vehicle Vidth       1695         Vehicle Vehicle Vidth       1695         Vehicle Vehicle Vidth       1695         Vehicle Veheelbase       2615         Vehicle Damage Index       12FDEW2         Pre-Impact Speed       40         Keasured Left-to-Right, Rear-to-Front)       Pre-Test         PDP 1       253         Mm       10.0         DPD 2       323         Measured Left-to-Right, Rear-to-Front)       Pre-Test         Post-Test       Crush from Pre & Post-Test         DPD 4       358	Model	ION			Steerir	ig Column Co	llapse Me	chanism	UNKNO	OWN		
Engine       4 C2LINDER TRANSVERSE FRONT         Displacement       2.2       Liter       Transmission       MANUAL - FRONT WHEEL DRIVE         Vehicke Modification(s) Description       UMMODIFIED       Vehicke Commentary       Image: Commentary         Vehicke Length       4648       mm       183.0       inches       CG behind Front Axle       1169       mm       46.0       inches         Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       0       0       inches         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       10.0       inches         DPD 1       253       mm       12.7       inches       Centerline       183.0       mm       167.3       inches       10.0       inches         DPD 3       371       mm       14.6       inches       Genterline       183.0       inches <td>Body</td> <td>FOUR DOOR</td> <td>SEDAN</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Body	FOUR DOOR	SEDAN									
Displacement 2.2 Liter Transmission MANUAL - FRONT WHEEL DRIVE Vehicle Modification(s) Description UNMODIFIED Vehicle Commentary Vehicle Length 4648 mm 183.0 inches CG behind Front Axle 1169 mm 46.0 inches Vehicle Width 1695 mm 66.7 inches Center of Damage to CG Axis 0 mm 0.0 inches Vehicle Width 1695 mm 66.7 inches Center of Damage to CG Axis 0 mm 0.0 inches Vehicle Width 1695 mm 103.0 inches Total Length of Indentation 1505 mm 59.3 inches Vehicle Test Weight 1444 KG 3183 pounds Maximum Static Crush Depth 371 mm 14.6 inches Pre-Impact Speed 40 kph 24.9 mph Vehicle Damage Index 12FDEW2 Principal Direction of Force 0 Damage Profile Distance Measurements (Measured Left-to-Right, Rear-to-Front) DPD 1 253 mm 10.0 inches Left Bumper Corner 174.1 inches 164.2 inches 10.0 inches DPD 2 3371 mm 14.6 inches DPD 3 371 mm 14.6 inches DPD 4 358 mm 14.1 inches 4448 mm 4250 mm 398 mm DPD 5 314 mm 12.4 inches DPD 6 [235 mm 9.3 inches Right Bumper Corner 174.3 inches 165.1 inches 9.3 inches DPD 6 [235 mm 9.3 inches Right Bumper Corner 174.3 inches 165.1 inches 9.3 inches Moving Test Cart Moving Test Cart/Vehicle Vehicle Orientation on Cart Angle Crabbed Angle Magniture of the Crabbed Angle Magnitude of the Angle Magnitude of the Tilt Angle Magniture of the Crabbed Angle Magnitude of the Angle Measure Detween surface of a Measure Corkwise from Measure Detwice Orientation on Test Cart Motion Moving Test Cart Weiking Vector Vehicle Vehicle orientation and Direction of Test Cart Motion	Engine	4 CYLINDER	TRANS	VERSE FI	RONT							
Vehicle Modification(s) Description       UNMODIFIED         Vehicle Commentary       4648       mm       183.0       inches       CG behind Front Axle       1169       mm       46.0       inches         Vehicle Vehicle Vidth       1895       mm       163.7       inches       Center of Damage to CG Axis       0       mm       0.0       inches         Vehicle Wheelbase       2215       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Test Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       0       0       0       0       0       inches       1642.2       inches       10.0       inches         (Measured Left-to-Right, Rear-to-Front)       Pre-Test       Post-Test       Crush from Pre & Post Test       Damage Measurements       10.0       inches       10.0	Displacement	2.2 Liter	Tra	ansmissio	n MANUA	L - FRONT V	VHEEL DF	RIVE				
Vehicle Commentary       Vehicle Length       4648       mm       183.0       inches       CG behind Front Axle       1169       mm       46.0       inches         Vehicle Width       1695       mm       66.7       inches       Center of Damage to CG Axis       0       mm       0.0       inches         Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Test Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       0       0       0.0       inches         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       164.2       inches       10.0       inches         DPD 2       323       mm       12.7       inches       4423       mm       4170       mm       263       mm         DPD 3       371       mm       14.6       inches       Centerline       183.0       inches       157.7       inches         DPD 4 <t< td=""><td>Vehicle Modific</td><td>ation(s) Descrip</td><td>otion [</td><td>UNMODI</td><td>FIED</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Vehicle Modific	ation(s) Descrip	otion [	UNMODI	FIED							
Vehicle Length       4648       mm       183.0       inches       CG behind Front Axie       1163       mm       46.0       inches         Vehicle Width       1695       mm       66.7       inches       Center of Damage to CG Axis       0       mm       0.0       inches         Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Test Weight       1444       KG       3183       pounds       Maximus Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       0       0       inches         Measured Left-to-Right, Rear-to-Front)       Pre-Test       Post-Test       Crush from Pre & Post Test       Damage Measurements         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       166.2       inches       167.3       inches       157       inches         DPD 2       323       mm       12.4       inches       Centerline       183.0       inches       167.3       inches       16.5.1       inches       16.5.1       inches	Vehicle Comme	entary										
Vehicle Width       1695       mm       66.7       inches       Center of Damage to CG Axis       mm       0.0       inches         Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Test Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       mph         Damage Profile Distance Measurements       Crush from Pre & Post Test Damage Measurements       (Measured Left-to-Right, Rear-to-Front)       Pre-Test       Post-Test       Crush Depth         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       10.0       inches         DPD 2       323       mm       14.2       inches       Centerline       183.0       inches       157.7       inches         DPD 4       358       mm       14.1       inches       165.1       inches       165.1       inches       9.3       inches         DPD 5       314       mm       12.4       inches       174.3       inches	Vehicle Len	gth <b>4648</b>	mm	183.0	inches	CG	behind F	ront Axle	1169	mm [	46.0	inches
Vehicle Wheelbase       2615       mm       103.0       inches       Total Length of Indentation       1505       mm       59.3       inches         Vehicle Test Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       mph         Damage Profile Distance Measurements       Crush from Pre & Post Test Damage Measurements       Crush Depth       164.2       inches       10.0       inches         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       10.0       inches       15.7       inches       15.7       inches       15.7       inches       165.1       inches       165.1       inches       9.3       inches       165.1       inches       9.3       inches       1423       mm       1235       inches       165.1       inches       165.1       inches       16428       mm       1235       mm       1235       mm       1235       mm <t< td=""><td>Vehicle V</td><td>Vidth <b>1695</b></td><td>mm</td><td>66.7</td><td>inches</td><td>Center of D</td><td>amage to</td><td>CG Axis</td><td>0</td><td>mm</td><td>0.0</td><td>inches</td></t<>	Vehicle V	Vidth <b>1695</b>	mm	66.7	inches	Center of D	amage to	CG Axis	0	mm	0.0	inches
Vehicle Test Weight       1444       KG       3183       pounds       Maximum Static Crush Depth       371       mm       14.6       inches         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0       mph         Damage Profile Distance Measurements       Crush from Pre & Post Test Damage Measurements       0       0       inches       mph         Measured Left-to-Right, Rear-to-Front)       Pre-Test       Post-Test       Crush Depth       164.2       inches       10.0       inches         DPD 1       253       mm       12.7       inches       4423       mm       14170       mm       253       mm         DPD 3       371       mm       14.6       inches       Centerline       183.0       inches       167.3       inches       15.7       inches         DPD 4       358       mm       12.4       inches       Right Bumper Corner       174.3       inches       165.1       inches       9.3       inches         DPD 5       314       mm       12.4       inches       Right Bumper Corner       174.3       inches       165.1       inches       9.3       inches         DPD 6       235       mm       9.3       inches	Vehicle Wheel	lbase <b>2615</b>	mm	103.0	inches	Total Leng	gth of Inde	ntation	1505	mm	59.3	inches
Pre-Impact Speed       40       kph       24.3       mph         Vehicle Damage Index       12FDEW2       Principal Direction of Force       0         Damage Profile Distance Measurements (Measured Left-to-Right, Rear-to-Front)       Crush from Pre & Post Test Damage Measurements         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       164.2       inches       10.0       inches         DPD 2       323       mm       12.7       inches       4423       mm       4170       mm       253       mm         DPD 3       371       mm       14.6       inches       Centerline       183.0       inches       167.3       inches       15.7       inches         DPD 4       358       mm       12.4       inches       1648       mm       4250       mm       398       mm         DPD 5       314       mm       12.4       inches       Right Bumper Corner       174.3       inches       165.1       inches       9.3       inches         DPD 6       235       mm       9.3       inches       Right Bumper Corner       174.3       inches       165.1       inches       9.3       inches         <	Vehicle Test W	'eight <b>1444</b>	KG	3183	pounds	Maximum S	Static Crus	h Depth	371	mm [	14.6	inches
Vehicle Damage Index       12FDEW2       Principal Direction of Force       0         Damage Profile Distance Measurements (Measured Left-to-Right, Rear-to-Front) DPD 1 253 mm       Crush from Pre & Post Test Damage Measurements         0       inches       Left Bumper Corner       174.1       inches       10.0       inches         0       3371 mm       14.6       inches       Centerline       183.0       inches       167.3       inches       15.7       inches         0PD 4 358 mm       14.1       inches       Centerline       183.0       inches       165.1       inches       9.3       inches         0PD 5 314 mm       12.4       inches       Right Bumper Corner       174.3       inches       165.1       inches       9.3       inches         0PD 6 235 mm       9.3       inches       Sill Engagement       Sill Engagement       (Side Impact Only)       (Side Impact Only)       0.0       0 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Pre-Impac</td> <td>t Speed</td> <td>40</td> <td>kph</td> <td>24.9</td> <td>mph</td>							Pre-Impac	t Speed	40	kph	24.9	mph
Damage Profile Distance Measurements (Measured Left-to-Right, Rear-to-Front)       Crush from Pre & Post Test Damage Measurements         DPD 1       253       mm       10.0       inches       Left Bumper Corner       174.1       inches       10.0       inches         DPD 2       323       mm       12.7       inches       4423       mm       164.2       inches       10.0       inches         DPD 3       371       mm       14.6       inches       Centerline       183.0       inches       167.3       inches       15.7       inches         DPD 4       358       mm       14.1       inches       4648       mm       4250       mm       398       mm         DPD 5       314       mm       12.4       inches       165.1       inches       9.3       inches         DPD 6       335       mm       9.3       inches       Right Bumper Corner       174.3       inches       9.3       inches         Bumper Engagement       Sill Engagement       Sill Engagement       (Side Impact Only)       (Side Impact Only)       0.0       0.0         Moving Test Cart       Movin	Vehicle Damage Index 12FDEW2 Principal Direction of Force 0											
Damage Profile Distance MeasurementsCrush from Pre & Post Test Damage Measurements(Measured Left-to-Right, Rear-to-Front)Pre-TestPost-TestCrush DepthDPD 1 253mm10.0inchesLeft Bumper Corner174.1inches10.0DPD 2 323mm12.7inches4423mm253mmDPD 3 371mm14.6inchesCenterline183.0inches167.3inches15.7DPD 4 358mm14.1inchesCenterline4648mm398mm398mmDPD 5 314mm12.4inchesAeda165.1inches9.3inchesDPD 6 235mm9.3inchesRight Bumper Corner174.3inches165.1inches9.3inchesBumper EngagementSill EngagementSill EngagementA-pillar Engagement(Side Impact Only)(Side Impact Only)0.00.0Moving Test CartMoving Test CartMoving Test Cart/VehicleVehicle Orientation on CartMoving Test CartAngleCrabbed Angle0.0NOT APPLICABLEMagnitude of the AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture Clockwise fromMeasured Detween the Vehicle OrientationMagnitude of the AngleMagnitude of the AngleBumper EngagementNOT APPLICABLEMagnitude of the Crabbed AngleMagnitude of the AngleMagnitude of the AngleMoving Test CartMoving Test CartMagnitude of the Crabbed												
Damage Profile Distance Measurements       Crush from Pre & Post Test Damage Measurements         (Measured Left-to-Right, Rear-to-Front)       Pre-Test       Post-Test       Crush Depth         DPD 1       253       mm       10.0       inches       164.2       inches       10.0       inches         DPD 2       323       mm       12.7       inches       4423       mm       164.2       inches       10.0       inches         DPD 3       371       mm       14.6       inches       Centerline       183.0       inches       167.3       inches       15.7       inches         DPD 4       358       mm       14.1       inches       4648       mm       4250       mm       398       mm         DPD 5       314       mm       12.4       inches       4648       mm       4250       mm       398       mm         DPD 6       235       mm       9.3       inches       165.1       inches       9.3       inches         DPD 6       235       mm       9.3       inches       165.1       inches       9.3       inches         Bumper Engagement       Sill Engagement       (Side Impact Only)       (Side Impact Only)       0.0		ofile Distance								~~ \/~		t-
(Measured Left-to-Right, Rear-to-Front)Pre-lestPost-lestCrush DepthDPD 1253mm10.0inchesLeft Bumper Corner174.1inches164.2inches10.0inchesDPD 2323mm12.7inches4423mm4170mm253mmDPD 3371mm14.6inchesCenterline183.0inches167.3inches15.7inchesDPD 4358mm14.1inchesCenterline183.0inches165.1inches15.7inchesDPD 5314mm12.4inchesand4428mm4250mm398mmDPD 6235mm9.3inchesRight Bumper Corner174.3inches9.3inchesDPD 6235mm9.3inchesSill Engagement165.1inches9.3inchesBumper EngagementSill Engagement(Side Impact Only)(Side Impact Only)(Side Impact Only)0.00.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the Tilt AngleLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	Damage Pro				<u>lS</u>	<u>Crush Iror</u>			<u>si Dama</u>	<u>ge me</u>	asurem	<u>ients</u>
DPD 1253mm10.0inchesLeft Bumper Corner174.1inches164.2inches10.0inchesDPD 2323mm12.7inches4423mm4170mm253mmDPD 3371mm14.6inchesCenterline183.0inches167.3inches15.7inchesDPD 4358mm14.1inchesCenterline183.0inches167.3inches15.7inchesDPD 5314mm12.4inches4648mm4250mm398mmDPD 6235mm9.3inches165.1inches9.3inchesDPD 6235mm9.3inches4428mm165.1inches9.3inchesBumper EngagementSill Engagement(Side Impact Only)(Side Impact Only)(Side Impact Only)(Side Impact Only)0.00.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the AngleMeasured between surface of aMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the AngleMagnitude of Test Cart MotionRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart	(Measu	ured Left-to-Rig	ht, Rear	-to-⊢ront)			Pre-Test		Post-les	<u>st</u> 	Crush L	<u>)epth</u>
DPD 2323 371 DPD 3mm12.7 14.6 inches inchesinches inches inches4423 centerlinemm14170 mmmm1253 inchesmmDPD 3371 371 DPD 4mm14.6 inches inchesinches inchesCenterline183.0 inchesinches inches167.3 inchesinches inches15.7 inchesinches inchesDPD 4358 358 DPD 514.1 314 mminches inches174.3 inchesinches inches165.1 inchesinches 9.3 inchesinches inchesDPD 6235 235 mm9.3 9.3 inchessinches165.1 inchesinches 9.3 inchesinches inchesBumper Engagement (Inline Impact Only) 0.0Sill Engagement (Side Impact Only)A-pillar Engagement (Side Impact Only)(Side Impact Only) (Side Impact Only)(Side Impact Only) (Side Impact Only)Moving Test Cart AngleMoving Test Cart/Vehicle 0.0Vehicle Orientation on Cart Moving Test Cart Magnitude of the Tilt Angle Magnitude of the Tilt AngleMagniture of the Crabbed Angle Magniture of the Crabbed Angle Magniture of the Crabbed Angle Magnitude of the AngleMagnitude of the Angle Magnitude of the Angle Magnitude of the Angle Magnitude of the AngleMagnitude of the Ground Rollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	DPD 1	2 <u>53</u> mm	10.0		Left Bu	mper Corner	174.1	inches	164.2	inches	10.0	j inches
DPD 3371mm14.6inchesCenterline183.0inches167.3inches15.7inchesDPD 4358mm14.1inches4648mm4250mm398mmDPD 5314mm12.4inches4648mm4250mm398mmDPD 6235mm9.3inchesRight Bumper Corner174.3inches4193mm235mmBumper EngagementSill EngagementSill EngagementA-pillar Engagement(Side Impact Only)(Side Impact Only)(Side Impact Only)0.00.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartMoving Test CartMoving Test CartMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle Orientationand Direction of Test Cart MotionRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion		<u>323</u> mm	12.7				4423	mm	4170	mm	253	] mm
DPD 4       358       mm       14.1       inches         DPD 5       314       mm       12.4       inches         DPD 6       235       mm       9.3       inches         Bumper Engagement       Sill Engagement       174.3       inches         (Inline Impact Only)       (Side Impact Only)       (Side Impact Only)       (Side Impact Only)         0.0       NOT APPLICABLE       0.0       0.0         Moving Test Cart       Moving Test Cart       Moving Test Cart       Moving Test Cart         Angle       Crabbed Angle       Moving Test Cart       Moving Test Cart         Magnitude of the Tilt Angle       Magniture of the Crabbed Angle       Magnitude of the Angle         Measured between surface of a       Measure Clockwise from       Measured between the Vehicle Orientation on Test Cart Motion         Rollover Test Cart and the Ground       Longitudinal Vector to Velocity Vector of Vehicle       and Direction of Test Cart Motion	DPD 3	<u>371</u> mm	14.6			Centerline	183.0	inches	167.3	inches	15.7	] inches
DPD 5       314       mm       12.4       inches         DPD 6       235       mm       9.3       inches       174.3       inches       9.3       inches         Bumper Engagement       Sill Engagement       4428       mm       165.1       inches       9.3       inches         Bumper Engagement       Sill Engagement       A-pillar Engagement       A-pillar Engagement       (Side Impact Only)       (Side Impact Only)       (Side Impact Only)       (Side Impact Only)       0.0       0.0         Moving Test Cart       Moving Test Cart/Vehicle       Vehicle Orientation on Cart       Moving Test Cart       Moving Test Cart         Angle       Crabbed Angle       NOT APPLICABLE       Moving Test Cart       Moving Test Cart         Magnitude of the Tilt Angle       Magniture of the Crabbed Angle       Magnitude of the Angle       Magnitude of the Angle         Measured between surface of a       Measure Clockwise from       Measured between the Vehicle Orientation       and Direction of Test Cart Motion	DPD 4	358 mm	14.1				4648	mm	4250	mm	398	] mm
DPD 6       235       mm       9.3       inches       Hight Bumper Senter       inches	DPD 5 🕃	314 mm	12.4		Right Bur	nner Corner	174.3	inches	165 1	inches	93	linches
Bumper EngagementSill EngagementA-pillar Engagement(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartNOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	DPD 6	235 mm	9.3	inches	T tight Bu		4428	mm	4193	mm	235	] mm
Bumper Engagement (Inline Impact Only)Sill Engagement (Side Impact Only)A-pillar Engagement (Side Impact Only)0.0NOT APPLICABLE0.0Moving Test Cart AngleMoving Test Cart/VehicleVehicle Orientation on Cart Moving Test CartNOT APPLICABLE0.0NOT APPLICABLENOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMagnitude of the Tilt AngleMagnitude of the Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion							4420		4130		200	1
(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartNOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	Bumper E	naagement			Sill En	aaaement			A-	-pillar E	ngageme	ent
Image       Image <th< td=""><td>(Inline Im</td><td>pact Only)</td><td></td><td></td><td>(Side</td><td>Impact Only)</td><td></td><td></td><td>(</td><td>Side Im</td><td>ipact Only</td><td>v)</td></th<>	(Inline Im	pact Only)			(Side	Impact Only)			(	Side Im	ipact Only	v)
Moving Test Cart       Moving Test Cart/Vehicle       Vehicle Orientation on Cart         Angle       Crabbed Angle       Moving Test Cart         NOT APPLICABLE       0.0       NOT APPLICABLE         Magnitude of the Tilt Angle       Magniture of the Crabbed Angle       Magnitude of the Angle         Measured between surface of a       Measure Clockwise from       Measured between the Vehicle Orientation         Rollover Test Cart and the Ground       Longitudinal Vector to Velocity Vector of Vehicle       and Direction of Test Cart Motion		<b>D.0</b>			NOT A	PPLICABLE			Ĺ		0.0	Ϋ́
Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartNOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion						<u> </u>			L_			-
AngleCrabbed AngleMoving Test CartNOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	Moving	Test Cart			Moving T	est Cart/Vehi	cle		Vehi	cle Orie	ntation o	n Cart
NOT APPLICABLE0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	A	ngle			Crab	bed Angle			I	Moving	Test Car	t
Magnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	NOT A	PPLICABLE				0.0			N	<u>OT APF</u>	LICABL	E
Measured between surface of aMeasure Clockwise fromMeasured between the Vehicle OrientationRollover Test Cart and the GroundLongitudinal Vector to Velocity Vector of Vehicleand Direction of Test Cart Motion	Magnitude	of the Tilt Angle			Magniture c	f the Crabbed Ar	ngle		/	Magnitude	e of the Ang	ile
Rollover Test Cart and the Ground Longitudinal Vector to Velocity Vector of Vehicle and Direction of Test Cart Motion	Measured b	etween surface of a	a		Measur	e Clockwise from	7		Measured between the Vehicle Orientation			
	Rollover Test	Cart and the Groui	nd	Lon	igitudinal Vecto	r to Velocity Vec	tor of Vehicle	•	and D	virection o	of Test Cart	Motion

#### Vehicle 1 2004 SATURN ION

Test #	4984												
VIN	1G8AF	52F54Z	155463	3		NHTSA Test Vehicle Number 1							
Year	2004					Vehicle Modification Indicator	Vehicle Modification Indicator PRODUCTION VEHICLE						
Make	SATUR	RN		Post-test	Steering	Column Shear Capsule Seperation UNKNOWN							
Model	ION S					eering Column Collapse Mechanism	UNKN	OWN					
Body	FOUR	FOUR DOOR SEDAN											
Engine	Engine 4 CYLINDER TRANSVERSE FRONT												
Displacement	2.2	Liter	Tr	ansmissio	on MAI	NUAL - FRONT WHEEL DRIVE							
Vehicle Modific	ation(s)	Descrip	tion	UNMOD	FIED								
Vehicle Commo	entary												
Vehicle Len	gth	4648	mm	183.0	inches	CG behind Front Axle	1169	mm	46.0	inches			
Vehicle V	Vidth	1695	mm	66.7	inches	Center of Damage to CG Axis	0	mm	0.0	inches			
Vehicle Whee	lbase	2615	mm	103.0	inches	Total Length of Indentation	1505	mm	59.3	inches			
Vehicle Test W	eight	1444	KG	3183	pounds	Maximum Static Crush Depth	371	mm	14.6	inches			
						Pre-Impact Speed	40	kph	24.9	mph			
Vel	hicle Da	mage In	dex 1	2FDEW2		Principal Direction of Fore	ce 0						

#### Pre & Post Test Damage Measurements

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

	Left	Side			Cente	erline			Righ	t Side	
Pre	e-Test	Pos	st-Test	Pre	-Test	Post	-Test	Pre	e-Test	Post	-Test
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
				Len	gth of Vehi	cle at Cen	terline				
				4648	183.0	4250	167.3				
					Engin	e Block					
				484	19.1	484	19.1				
4423	174.1	4170	164.2		Front Bur	mper Corr	ier	4428	174.3	4193	165.1
					Front of	of Engine					
				3888	153.1	3783	148.9				
3523	138.7	3532	139.1		Fire	ewall		3548	139.7	3512	138.3
				3558	140.1	3571	140.6				
3148	123.9	3144	123.8	Up	per Leading	g Edge of	Door	3140	123.6	3143	123.7
3138	123.5	3120	122.8	Low	ver Leading	g Edge of	Door	3134	123.4	3118	122.8
3138	123.5	3131	123.3		Bottom of	f 'A' Post		3134	123.4	3134	123.4
2152	84.7	2143	84.4	Up	per Trailin	g Edge of	Door	2149	84.6	2151	84.7
2198	86.5	2172	85.5	Lo	wer Trailin	g Edge of	Door	2185	86.0	2170	85.4
					Steerin	g Column					
				2753	108.4	2770	109.1				
Center of Seering Column to 'A' Post (Horizontal)											
333 13.1 312 12.3											
				Center of Ste	ering Colur	mn to Hea	dliner (Vert	ical)			
				455	17.9	442	17.4				

NHTSA Crash Test - #4984 - Front Impact

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

Test Vehicle Weight =	3183 pounds
Vehicle Closing Speed =	24.9 mph
Test Crush Length =	66.7 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Dece Side)
(Driver Side)	10.0	15.7	9.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	<u> </u>	G	<u>Kv</u>
Minimum Crush = 9.3 inches					273.1
Using a Rated No Damage Speed of	2.5mph	229.8	220.9	119.5	
Using a Rated No Damage Speed of	5.0mph	408.1	174.3	477.9	
Using a Rated No Damage Speed of	7.5mph	535.1	133.1	1075.4	
Using a Rated No Damage Speed of	10.0mph	610.7	97.6	1911.8	
Average Crush = 12.6 inches					148.8
Using a Rated No Damage Speed of	2.5mph	169.6	120.4	119.5	
Using a Rated No Damage Speed of	5.0mph	301.3	94.9	477.9	
Using a Rated No Damage Speed of	7.5mph	395.0	72.5	1075.4	
Using a Rated No Damage Speed of	10.0mph	450.8	53.1	1911.8	
Maximum Crush = 15.7 inches					95.8
Using a Rated No Damage Speed of	2.5mph	136.1	77.5	119.5	
Using a Rated No Damage Speed of	5.0mph	241.8	61.2	477.9	
Using a Rated No Damage Speed of	7.5mph	317.0	46.7	1075.4	
Using a Rated No Damage Speed of	10.0mph	361.8	34.2	1911.8	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	15.7	28.7	3.9	13.4

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 15.7

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

NHTSA Crash Test - #4984 - Front Impact

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

Test Vehicle Weight =	3183 pounds
Vehicle Closing Speed =	24.9 mph
Test Crush Length =	59.3 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Deee Side)
(Driver Side)	10.0	15.7	9.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		<u> </u>	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 9.3 inches					307.6
Using a Rated No Damage Speed of	2.5mph	258.8	248.8	134.6	
Using a Rated No Damage Speed of	5.0mph	459.7	196.3	538.3	
Using a Rated No Damage Speed of	7.5mph	602.7	150.0	1211.1	
Using a Rated No Damage Speed of	10.0mph	687.8	109.9	2153.1	
Average Crush = 12.6 inches					167.6
Using a Rated No Damage Speed of	2.5mph	191.0	135.5	134.6	
Using a Rated No Damage Speed of	5.0mph	339.3	106.9	538.3	
Using a Rated No Damage Speed of	7.5mph	444.8	81.7	1211.1	
Using a Rated No Damage Speed of	10.0mph	507.7	59.9	2153.1	
Maximum Crush = 15.7 inches					107.9
Using a Rated No Damage Speed of	2.5mph	153.3	87.3	134.6	
Using a Rated No Damage Speed of	5.0mph	272.3	68.9	538.3	
Using a Rated No Damage Speed of	7.5mph	357.0	52.6	1211.1	
Using a Rated No Damage Speed of	10.0mph	407.4	38.6	2153.1	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	15.7	28.7	3.9	13.4

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 15.7

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

NHTSA Crash Test - #4984 - Front Impact

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

Test Vehicle Weight =	3183 pounds
Vehicle Closing Speed =	24.9 MPH
Test Crush Length =	66.7 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	10.0	12.7	14.6	14.1	12.4	9.3	(Pass Side)

		CRASH 3 Stiffness Coefficients SN		SMAC Stiffness	
		<u> </u>	<u> </u>	G	<u>Kv</u>
Minimum Crush = 9.3 inches					273.1
Using a Rated No Damage Speed of	2.5mph	229.8	220.9	119.5	
Using a Rated No Damage Speed of	5.0mph	408.1	174.3	477.9	
Using a Rated No Damage Speed of	7.5mph	535.1	133.1	1075.4	
Using a Rated No Damage Speed of	10.0mph	610.7	97.6	1911.8	
Average Crush = 12.7 inches					146.4
Using a Rated No Damage Speed of	2.5mph	168.3	118.5	119.5	
Using a Rated No Damage Speed of	5.0mph	298.9	93.5	477.9	
Using a Rated No Damage Speed of	7.5mph	391.9	71.4	1075.4	
Using a Rated No Damage Speed of	10.0mph	447.2	52.3	1070.1	
Maximum Crush = 14.6 inches					110.8
Using a Rated No Damage Speed of	2.5mph	146.4	89.6	119.5	
Using a Rated No Damage Speed of	5.0mph	260.0	70.7	477.9	
Using a Rated No Damage Speed of	7.5mph	340.9	54.0	1075.4	
Using a Rated No Damage Speed of	10.0mph	389.0	39.6	1911.8	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

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

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

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

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	14.6	27.7	2.8	10.2

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 16.9

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

NHTSA Crash Test - #4984 - Front Impact

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

Test Vehicle Weight =	3183 pounds
Vehicle Closing Speed =	24.9 MPH
Test Crush Length =	59.3 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	10.0	12.7	14.6	14.1	12.4	9.3	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	<u> </u>	G	<u> </u>
Minimum Crush = 9.3 inches					307.6
Using a Rated No Damage Speed of	2.5mph	258.8	248.8	134.6	
Using a Rated No Damage Speed of	5.0mph	459.7	196.3	538.3	
Using a Rated No Damage Speed of	7.5mph	602.7	150.0	1211.1	
Using a Rated No Damage Speed of	10.0mph	687.8	109.9	2153.1	
Average Crush = 12.7 inches					164.9
Using a Rated No Damage Speed of	2.5mph	189.5	133.4	134.6	
Using a Rated No Damage Speed of	5.0mph	336.6	105.3	538.3	
Using a Rated No Damage Speed of	7.5mph	441.3	80.4	1211.1	
Using a Rated No Damage Speed of	10.0mph	503.7	58.9	1205.2	
Maximum Crush = 14.6 inches					124.8
Using a Rated No Damage Speed of	2.5mph	164.8	101.0	134.6	
Using a Rated No Damage Speed of	5.0mph	292.8	79.6	538.3	
Using a Rated No Damage Speed of	7.5mph	383.9	60.8	1211.1	
Using a Rated No Damage Speed of	10.0mph	438.1	44.6	2153.1	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

RE Speed (hiph) = SQRT(30 CF hiax clush in leet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	14.6	27.7	2.8	10.2

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 16.9

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

#### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2005 - 2010 Make: CHEVROLET Model: COBALT

Test	Vehicle	No							
Numbe	er Info	Damage	Average	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
6084	2007 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	14.4	24.7	252.3	69.2	460.0	108.7	17.0
6685	2009 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	13.4	23.2	252.3	68.6	463.7	111.6	16.1
5188	2004 SATURN ION FOUR DOOR SEDAN	5.0	19.7	29.6	262.3	65.3	526.5	94.6	17.7
7443	2006 CHEVROLET COBALT TWO DOOR COUPE	5.0	5.6	14.9	282.8	99.6	401.5	225.4	15.8
4984	2004 SATURN ION FOUR DOOR SEDAN	5.0	12.7	24.9	299.4	93.8	477.9	147.0	19.5
5326	2005 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	16.9	34.9	343.0	121.4	484.7	165.3	28.8
4487	2003 SATURN ION FOUR DOOR SEDAN	5.0	18.0	34.8	434.4	143.6	657.0	195.8	26.9
		Average	(AVG)		303.8	94.5	495.9	149.8	20.3
		Minimum	(MIN)		252.3	65.3	401.5	94.6	15.8
Maximum (MAX)		(MAX)		434.4	143.6	657.0	225.4	28.8	
	Standard Deviation	(STDev-sa	mple)		65.9	29.8	80.2	48.8	5.4
	Nu	mber of Tes	sts (n)	7					

#### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2005 - 2010 Make: CHEVROLET Model: COBALT

Test	Vehicle	No							
Numbe	r Info	Damage	Max	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	e s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
5188	2004 SATURN ION FOUR DOOR SEDAN	5.0	24.5	29.6	211.0	42.3	526.5	61.2	14.3
6084	2007 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	16.2	24.7	223.8	54.4	460.0	85.5	15.1
6685	2009 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	15.0	23.2	224.7	54.5	463.7	88.6	14.3
4984	2004 SATURN ION FOUR DOOR SEDAN	5.0	15.7	24.9	242.2	61.4	477.9	96.2	15.8
7443	2006 CHEVROLET COBALT TWO DOOR COUPE	5.0	5.6	14.9	282.8	99.6	401.5	225.4	15.8
5326	2005 CHEVROLET COBALT FOUR DOOR SEDAN	5.0	17.5	34.9	331.6	113.5	484.7	154.6	27.9
4487	2003 SATURN ION FOUR DOOR SEDAN	5.0	22.2	34.8	352.5	94.6	657.0	128.9	21.8
Average (AVG)		(AVG)		267.0	74.3	495.9	120.1	17.8	
		Minimum	(MIN)		211.0	42.3	401.5	61.2	14.3
Maximum (MAX)		MAX)		352.5	113.5	657.0	225.4	27.9	
	Standard Deviation	(STDev-sa	mple)		56.5	27.6	80.2	55.6	5.1
	Nu	mber of Tes	sts (n)	7					

#### Expert VIN DeCoder®

Copyright© 1991-2010 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.0.2.4



The First through Third characters (2FT) indicate a Ford Truck made in Canada

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

The Fifth through Seventh characters (F15) indicate a F150 4x2 and a Regular Cab Pick-Up

The Eighth character (Y) indicates the OEM engine: 4.9 L/ 300 cu.in., L6, OHC

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 (G) indicates the model year 1986

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

The Twelfth through Seventeenth characters (A80524) indicate the Serial Number and are unique to this vehicle.

Version 5.1.0.6 Copyright 2011 - All Rights Reserved

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

#### 9/17/2015

#### 1986 FORD F150 LWB 2 DOOR 4X2 PICKUP

Curb Weight:	<b>3507</b> 1bs.		<b>1591</b> kg.
Curb Weight Distribution - Front:	<b>58</b> %	Rear:	42 %
Gross Vehicle Weight Rating:	<b>5450</b> 1bs.		<b>2472</b> kg.
Number of Tires on Vehicle:	4		
Drive Wheels:	REAR		
Horizontal Dimensions	Inches	Feet	Meters
Total Length	208	17.33	5.28
Wheelbase:	133	11.08	3.38
Front Bumper to Front Axle:	29	2.42	0.74
Front Bumper to Front of Front Well:	10	0.83	0.25
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:	77	6.42	1.96
Rear Bumper to Rear Axle:	46	3.83	1.17
Rear Bumper to Rear of Rear Well:	32	2.67	0.81
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	101	8.42	2.57
Width Dimensions			
Maximum Width:		6.42	
Front Track:	66		
Rear Track:	66	5.50	68_
Vertical Dimensions			
Height:	72	6.00	1.83
Ground to -			
Front Bumper (Top)	22	1.83	0.56
Headlight - center	34	2.83	0.86
Hood - top front:	42	3.50	1.07
Base of Windshield	49	4.08	1.24
Rear Bumper - top:	25	2.08	0.64
Trunk - top rear:	51	4.25	1.30
Base of Rear Window:	53	4.42	1.35

#### 1986 FORD F150 LWB 2 DOOR 4X2 PICKUP

<b>Interior Dimensions</b> Front Seat Shoulder Width Front Seat to Headliner Front Leg Room - seatback to floor (max)	Inches 65 40 341	Feet     Meters       5.42     1.65       3.33     1.02       3.42     1.04
Rear Seat Shoulder width Rear Seat to Headliner Front Leg Room - seatback to floor (min)		
Seatbelts: <b>3pt LAP &amp; SHOULDER - from</b> Airbags: <b>AIRBAGS UNKNOWN</b>	t, None or Unknown - re	ear
Steering Data Turning Circle (Diameter) Steering Ratio: 24.00:1 Wheel Radius: Tire Size (OEM): P235/75X15XL	<b>564</b>	17.00       14.33         1.00       0.30
Acceleration & Braking Information Brake Type: FRONT DISC - REAR DRUM ABS System: ABS UNKNOWN		
Braking, 60 mph to 0 (Hard pedal, no ski d = <b>180.0</b> ft t = <b>4.1</b> sec	id, dry pavement): a = <mark>-21.5</mark> ft/sec <sup>2</sup>	G-force = -0.67
Acceleration: $t = 4.9$ sec0 to 30mph $t = 14.2$ sec0 to 60mph $t = 9.7$ sec45 to 65mph $t = 9.7$ sec	a = 9.0 ft/sec <sup>2</sup> a = 6.2 ft/sec <sup>2</sup> a = 3.0 ft/sec <sup>2</sup>	G-force = 0.28 G-force = 0.19 G-force = 0.09
Transmission Type: <b>3spd MANUAL</b>		
Notes: Federal Bumper Standard Requirements: This vehicles Rated Bumper Strength:	No <u>Require</u> ment 5 mph	

N.S.D.C = 1980 - 1986

#### 1986 FORD F150 LWB 2 DOOR 4X2 PICKUP

Other Information			
Tip-Over Stability Ratio =	1.19	Reasonably Stable	
NHTSA Star Rating (calculated)		***	
Conton of Cravity (No Lood).			
Center of Gravity (No Load):			
Inches behind front axle	=	55.86	
Inches in front of rear axle	=	77.14	
Inches from side of vehicle	=	38.50	
Inches from ground	=	27.68	
Inches from front corner	=	93.19	
Inches from rear corner	=	129.02	
Inches from front bumper	=	84.86	
Inches from rear bumper	=	123.14	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	<b>2269.21</b> 1b*	ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	<b>2270.84</b> 1b* <sup>.</sup>	ft*sec <sup>2</sup>
Roll Moment of Inertia	=	<b>536.54</b> 1b**	ft*sec²
Front Profile Information			
Angle Front Bumper to Hood Front	=	<b>78.7</b> deg	
Angle Front of Hood to Windshield Base	=	<b>8.5</b> deg	
Angle Front of Hood to Windshield Top	=	<b>21.0</b> deg	
Angle of windshield	=	<b>38.9</b> deg	
Angle of Steering Tires at Max Turn	=	<b>27.0</b> 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	=	27	CF
(Tested for Rear/Side Impact only)			

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 System Software for Litigation

8387 University Avenue La Mesa, CA 91941-3842 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

# There are NO Full Size Pickup Rear Impact Tests in the NHTSA Crash Test database.

# Therefore, NO vehicle specific nor "CLASS" vehicle Stiffness Values can be provided.

#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



The First through Third characters (2G2) indicate a Pontiac Car made in Canada

The Fourth through Fifth characters (WP) indicate a Grand Prix

The Sixth character (5) indicates a 4 Door Sedan

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

The Eighth character (2) indicates the OEM engine: 3.8 L/ 231 cu.in., V6,OHV

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

The Tenth character (8) indicates the model year 2008

- The Eleventh character (1) indicates the vehicle was made in the assembly plant in Oshawa (T&B), ON
- The Twelfth through Seventeenth characters (120328) indicate the Serial Number and are unique to this vehicle.

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

9/4/2015

#### 2008 PONTIAC GRAND PRIX 4 DOOR SEDAN

Curb Weight:	3515	lbs.		1594	kg.
Curb Weight Distribution - Front:	63	%	Rear:	37	%
	4400	— 		2022	
Gross venicle weight Rating:	4480	Ibs.		2032	кд.
Number of Tires on Vehicle:	4				
Drive Wheels:	FRONT				
Horizontal Dimensions	Inc	hes	Fee	t	Meters
Total Length		198	16.5	50	5.03
Wheelbase:		110	9.3	17	2.79
Front Bumper to Front Axle:		44	3.0	57	1.12
Front Bumper to Front of Front Well:		28	2.3	33	0.71
Front Bumper to Front of Hood:		5	0.4	42	0.13
Front Bumper to Base of Windshield:		52	4.3	33	1.32
Front Bumper to Top of Windshield:		87	7.2	25	2.21
Rear Bumper to Rear Axle:		44	3.0	57	1.12
Rear Bumper to Rear of Rear Well:		28	2.3	33	0.71
Rear Bumper to Rear of Trunk:		5	0.4	42	0.13
Rear Bumper to Base of Rear Window:		26	2.3	17	0.66
Width Dimensions					
Maximum Width:		72	6.0	00	1.83
Front Track:		62	5.3	17	1.57
Rear Track:		62	5.3	17	1.57
Vertical Dimensions					
Height:		56	4.0	57	1.42
Ground to -					
Front Bumper (Top)		22	1.8	33	0.56
Headlight - center		27	2.2	25	0.69
Hood - top front:		28	2.3	33	0.71
Base of Windshield		37	3.0	08	0.94
Rear Bumper - top:		24	2.0	00	0.61
Trunk - top rear:		41	3.4	42	1.04
Base of Rear Window:		43	3.!	58	1.09

#### 2008 PONTIAC GRAND PRIX 4 DOOR SEDAN

Interior Dimensions Front Seat Shoulder Width Front Seat to Headliner Front Leg Room - seatback to floor (max) Rear Seat Shoulder Width Rear Seat to Headliner Front Leg Room - seatback to floor (min)	Inches 58 39 42 58 37 37	Feet 4.83 3.25 3.50 4.83 3.08 3.08	Meters 1.47 0.99 1.07 1.47 0.94 0.94
Seatbelts: <b>3pt - front and rear</b>			
Airbags: <b>FRONT SEAT AIRBAGS + OPTION</b>	AL SIDE AIRBAGS		
Steering Data			
Turning Circle (Diameter)	444	37.00	11.28
Steering Ratio: :1			
Wheel Radius:	13	1.08	0.33
Tire Size (OEM): <b>P225/60R16</b>			
Acceleration & Braking Information			
Brake Type: ALL DISC			
ABS System: ALL WHEEL ABS - OPTIONAL			
Braking, 60 mph to 0 (Hard pedal, no skid d = <b>126.0</b> ft t = <b>2.9</b> sec	, dry pavement): a = <b>-30.7</b> ft/s	ec² G-fo	orce = -0.95
Acceleration:			
0 to 30mph t = <b>2.4</b> sec	a = <b>18.3</b> ft/s	ec² G-fo	orce = 0.57
0 to 60mph $t = 6.6$ sec	a = <b>13.3</b> ft/s	ec² G-fo	orce = 0.41
45 to 65mph $t = 3.4$ sec	a = <b>8.6</b> ft/s	ec² G-fo	orce = 0.27
Transmission Type: 4spd AUTOMATIC			
Notes: Federal Bumper Standard Requirements: This vehicles Rated Bumper Strength:	2.5	mph mph	

N.S.D.C = 2004 - 2008

#### 2008 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	=	40.70
Inches in front of rear axle	=	69.30
Inches from side of vehicle	=	36.00
Inches from ground	=	21.98
Inches from front corner	=	92.03
Inches from rear corner	=	118.88
Inches from front bumper	=	84.70
Inches from rear bumper	=	113.30
Moments of Inertia Approximations (No Load):		
Yaw Moment of Inertia	=	2414.45 lb*ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	2330.85 lb*ft*sec <sup>2</sup>
Roll Moment of Inertia	=	<b>482.70</b> 1b*ft*sec <sup>2</sup>
Front Profile Information		
Angle Front Bumper to Hood Front	=	<b>50.2</b> deg
Angle Front of Hood to Windshield Base	=	<b>10.8</b> deg
Angle Front of Hood to Windshield Top	=	<b>17.6</b> deg
Angle of Windshield	=	<b>25.9</b> deg
Angle of Steering Tires at Max Turn	=	<b>28.4</b> 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	=	27 CF
(Tested for Rear/Side Impact only)		

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

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

# Stiffness Values and Test Data

Derived from

## NHTSA Crash Test #7488

## 2012 CHEVROLET IMPALA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

### Similar Vehicle database reader

#### You entered: 2008 PONTIAC GRAND PRIX

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

Year Range	Make	Model	<b>Body Styles</b>	Wheelbase
2005 - 2009 Remarks:	BUICK	LACROSSE	4D	111.7
2006 - 2008 Remarks:	PONTIAC	GRAND PRIX	2D, 4D	110.5
2006 - 2007 Remarks:	CHEVROLET	MONTE CARLO	2D	108
2006 - 2013 Remarks:	CHEVROLET	IMPALA	2D, 4D, SW	110.5, 125

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

#### **Test Information**

Test # <b>7488</b>			NHTS	SA Tes	t Referen	ce Guide Ve	ersion #	V5			
Test Date 2011-10-2	Contract # DTNH22-06-D-00024										
Contract/Study Title	NEW CA	r as	SESSM	ENT P	ROGRAM	1 FRONTA	L BARF	RIER IMPA	CT TEST		
Test Objective(s)	TO OBT	IN ۱	VEHICL	E CRA	SHWOR	THINESS /	AND OC	CCUPANT R	ESTRAINT	INFORMATI	ON
Test Type	NEW CA	r as	SESSM	ENT T	EST			Configurati	on <b>VEHIC</b>	LE INTO BAR	RIER
Impact Angle	0					Side Impa	ct Point	0	mm	0.0	inches
						Offset I	Distance	e <b>O</b>	mm	0.0	inches
						Closin	g Speed	56.2	Km/Hr	34.89	MPH
Test Performer	CALSPA	N									
Test Reference #	<b>RUN254</b>	4									
Test Track Surface	CONCRE	TE				Co	ndition	DRY			
Ambient Temperature	9	C	48.2	F	Total	Number of	Curves	137			
Data Recorder Type	DIGITA	DA	TA ACQ	UISIT	ION			Data Lin	k <b>UMBII</b>	ICAL CABLE	
Test Commentary TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0											
				Fi	xed Bar	rier Inform	nation				
Barrier Type	RIGID				] Po	le Barrier D	Diameter	0	mm	0	inches
Barrier Shape	LOAD C	ELL B	BARRIE	R	-						_

Barrier Commentary FRONTAL FLAT BARRIER WITH 36 LOADCELLS

#### 2012 CHEVROLET IMPALA LEFT FRONT SEAT OCCUPANT

Test # 7488				
Vehicle # 1		Sex	MALE	
Location LEFT FRONT SE	AT	Age	0	
Position CENTER POSITIO	ON	Height	0 mm 0.0	inches
Type HYBRID III DUM	٨Y	Weight	0.0 kg 0	pounds
Size 50 PERCENTILE				
Calibration Method	HYBRID III			
Occupant Manufacturer	MFG: FIRST TECHNOLO	<u>GY SAFETY SYSTE</u>	EMS: 064	
Occupant Modification	NO COMMENTS			
Occupant Description	NO COMMENTS			
Occupant Commentary	CNTRH2 =HEADREST			
Head to -	<u>Head</u>			
Windshielder Header 358	mm <b>14.1</b> inches	s Head Injury C	Criteria (HIC) 223	
WindShield 683	mm <b>26.9</b> inches	s HIC Lov	ver Time Interval (ms	66.7
Seatback 0	mm inches	s HIC Upp	per Time Interval (ms	s) <b>81.7</b>
Side Header 223	mm <b>8.8</b> inches	S		
Side Window 380	mm <b>5.0</b> inches	S		
Neck to Seatback 0 r	nm 0.0 inches			
First Contact Re	egion (Head)			
Second Contact Re	gion (Head)			
	<u>Chest</u>			
Chest to -				_
Dash <b><u>558</u></b> n	nm 22.0 inches	Arm to Door	28 mm <u>5.0</u>	inches
Steering Wheel 311 n	nm 12.2 inches	Hip to Door	<b>19</b> mm <b>5.9</b>	inches
Seatback <b>0</b> n	nm 0.0 inches		_	
Chest Severity Index 38	<u>0</u> Pe	elvic Peak Lateral Ac	celeration (g's)	)
Thoracic Trauma Index 0		Thorax Peak A	Acceleration (g's)	5.6
Lap E	Belt Peak Load	Newtons 1772.6	pound Force	
Shoulder B	elt Peak Load 3563 N	Newtons 801.0	pound Force	
First Contact Region (Che	st/Abdomen) AIR BAG			
Second Contact Region (Ches	st/Abdomen) NONE			
	Legs			
Knees to Dash 180 n	nm 7.1 inches Kn	ees to Seatback	mm <b>0.0</b>	inches
Left Femur Peak Load	08 Newtons -4	46.8 pounds	s Force	
Right Femur Peak Load	63 Newtons -2	216.5 pounds	s Force	
First Contact R	egion (Legs) DASHPANE	L		
Second Contact Re	egion (Legs)			

#### 2012 CHEVROLET IMPALA LEFT FRONT SEAT OCCUPANT

Test #	7488					
Vehicle #	1		Sex	MALE		
Location	LEFT FRONT SE	AT	Age	0		
Position	CENTER POSITI	ON	Height	0 mm 0.0	inches	
Туре	HYBRID III DUMI	MY	Weight	0.0 kg 0	pounds	
Size	<b>50 PERCENTILE</b>		]			
Cali	bration Method	HYBRID III				
Occupar	nt Manufacturer	MFG: FIRST TECHNOLO	GY SAFETY SYST	EMS: 064		
Occupa	ant Modification	NO COMMENTS				
Occu	pant Description	NO COMMENTS				
Occupa	ant Commentary	CNTRH2 =HEADREST				
		Restraints	<u>5</u>			
Restrai	nt # 1 3 POINT I	BELT				
Mounte	ted BELT - CONVENTIONAL MOUNT					
Deployr	yment NOT APPLICABLE					
Restrai	nt Commentary	BELT PRETENSIONER &	& LOAD LIMITER			
Restrai	nt # 2 FRONTAI	AIRBAG				

 Deployment
 DEPLOYED PROPERLY

 Restraint Commentary
 FRONTAL AIRBAG

STEERING WHEEL

Mounted

#### 2012 CHEVROLET IMPALA RIGHT FRONT SEAT OCCUPANT

Test #	7488		
Vehicle #	1		Sex FEMALE
Location	<b>RIGHT FRONT S</b>	EAT	Age 0
Position	FORWARD OF C	ENTER POSITION	Height 0 mm 0.0 inches
Туре	HYBRID III DUM	٨Y	Weight 0.0 kg 0 pounds
Size	<b>5 PERCENTILE</b>		
Cal	ibration Method	HYBRID III	
Occupar	nt Manufacturer	MFG: FIRST TEC	CHNOLOGY SAFETY SYSTEMS S/N:273
Occupa	ant Modification	NO COMMENTS	
Occu	pant Description	NO COMMENTS	
Occupa	ant Commentary	CNTRH2 =HEAD	DREST
Head to -		H	<u>lead</u>
Windshie	elder Header 290	mm <b>11.4</b>	inches Head Injury Criteria (HIC) 236
	WindShield 602	mm <b>23.7</b>	inches HIC Lower Time Interval (ms) 69
	Seatback 0	mm <b>0.0</b>	inches HIC Upper Time Interval (ms) 84
	Side Header 238	mm <b>9.4</b>	inches
ę	Side Window 370	mm <b>14.6</b>	inches
Neck to Se	atback <b>0</b> r	mm <b>0.0</b> incl	hes
	First Contact Re	egion (Head)	R BAG
5	Second Contact Re	gion (Head)	
		<u>C</u>	thest
Chest to -			
	Dash <b>454</b> n	nm <b>17.9</b> inc	ches Arm to Door <b>73</b> mm <b>2.9</b> inches
Steering V	Vheel 0 n	nm <b>0.0</b> inc	ches Hip to Door <b>222</b> mm <b>8.7</b> inches
Sea	tback <b>0</b> n	nm <b>0.0</b> inc	ches
Chest S	everity Index 28	7	Pelvic Peak Lateral Acceleration (g's)
Thoracic Tr	auma Index 0		Thorax Peak Acceleration (g's) 36.5
	Lap E	3elt Peak Load	3503 Newtons 787.5 pound Force
	Shoulder B	elt Peak Load	3469 Newtons 779.9 pound Force
First Co	ontact Region (Che	st/Abdomen)	R BAG
Second Co	ontact Region (Ches	st/Abdomen) NO	DNE
			Legs
Knees to	Dash <b>115</b> n	nm <b>4.5</b> inc	ches Knees to Seatback 0 mm 0.0 inches
Left Femu	ur Peak Load	105 Newt	tons -698.0 pounds Force
Right Femu	Ir Peak Load	406 Newt	tons -316.1 pounds Force
	First Contact R	legion (Legs) DA	ASHPANEL
	Second Contact Re	egion (Legs)	
### 2012 CHEVROLET IMPALA RIGHT FRONT SEAT OCCUPANT

Test #	7488					
Vehicle #	1		Sex	FEMALE		
Location	<b>RIGHT FRONT</b>	SEAT	Age	0		
Position	FORWARD OF	CENTER POSITION	Height	<b>0</b> mm	0.0 inches	
Туре	HYBRID III DU	MMY	Weight	<b>0.0</b> kg	0 pounds	
Size	5 PERCENTIL	E				
Cali	ibration Method	HYBRID III				
Occupar	nt Manufacturer	MFG: FIRST TECHNOLO	GY SAFETY SYST	EMS S/N:273		
Occupa	ant Modification	NO COMMENTS				
Occu	Occupant Description <b>NO COMMENTS</b>					
Occupa	ant Commentary	CNTRH2 =HEADREST				
		Restraints	<u> </u>			
Restrai	nt # 1 3 POIN	T BELT				
Mounte	ed BELT -	CONVENTIONAL MOUNT				
Deploy	Deployment NOT APPLICABLE					
Restrai	Restraint Commentary BELT PRETENSIONER & LOAD LIMITER					
Restrai	nt # 2 FRONT	AL AIRBAG				
Mounte	d DASH	PANEL - TOP				

 Deployment
 DEPLOYED PROPERLY

 Restraint Commentary
 FRONTAL AIRBAG

### Vehicle 1 2012 CHEVROLET IMPALA

VIN     2G1WA5E37C1117437     NHTSA Test Vehicle Number     1       Year     2012     Vehicle Modification Indicator     PRODUCTION VEHICLE
Year 2012 Vehicle Modification Indicator PRODUCTION VEHICLE
Males OUEVEOLET Dest test Otening Onlyng Ober Consult Conserving No. OEDADATION
Make CHEVROLET Post-test Steering Column Shear Capsule Seperation NO SEPARATION
Model IMPALA Steering Column Collapse Mechanism NONE
Body FOUR DOOR SEDAN
Engine V6 TRANSVERSE FRONT
Displacement 3.6 Liter Transmission AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description NONE
Vehicle Commentary TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0
Vehicle Length5094mm200.6inchesCG behind Front Axle1195mm47.0inches
Vehicle Width 1843 mm 72.6 inches Center of Damage to CG Axis 153 mm 6.0 inches
Vehicle Wheelbase <b>2808</b> mm <b>110.6</b> inchesTotal Length of Indentation <b>1399</b> mm <b>55.1</b> inches
Vehicle Test Weight 1851 KG 4080 pounds Maximum Static Crush Depth 674 mm 26.5 inches
Pre-Impact Speed <b>56</b> kph <b>34.9</b> mph
Vehicle Damage Index 12FDEW3 Principal Direction of Force 0
Demage Drefile Distance Measurements
Damage Profile Distance Measurements
(Measured Left-to-Right, Rear-to-Front) <u>Pre-Test</u> <u>Post-Test</u> <u>Crush Depth</u>
DPD 1 479 mm 18.9 inches Left Bumper Corner 197.4 inches 173.0 inches 24.4 inches
DPD 2 [629 mm [24.8 inches [5014 mm [4394 mm [620 mm
DPD 3         666         mm         26.2         inches         Centerline         200.6         inches         174.1         inches         26.5         inches
DPD 4 651 mm 25.6 inches 5094 mm 4421 mm 673 mm
DPD 5 599 mm 23.6 inches Right Bumper Corner 197.6 inches 174.5 inches 23.0 inches
DPD 6 492 mm 19.4 inches ragin bamper conter 10110 inches 1100 inches 10000
Bumper Engagement Sill Engagement A-pillar Engagement
(Inline Impact Only) (Side Impact Only) (Side Impact Only)
(Inline Impact Only) (Side Impact Only) (Side Impact Only) 0.0 NOT APPLICABLE 0.0
(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0
(Inline Impact Only)       (Side Impact Only)       (Side Impact Only)         0.0       NOT APPLICABLE       0.0         Moving Test Cart       Moving Test Cart/Vehicle       Vehicle Orientation on Cart
(Inline Impact Only)       (Side Impact Only)       (Side Impact Only)         0.0       NOT APPLICABLE       0.0         Moving Test Cart       Moving Test Cart/Vehicle       Vehicle Orientation on Cart         Angle       Crabbed Angle       Moving Test Cart
(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartDIRECT ENGAGEMENT0.0NOT APPLICABLE
(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartDIRECT ENGAGEMENT0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the Angle
(Inline Impact Only)(Side Impact Only)(Side Impact Only)0.0NOT APPLICABLE0.0Moving Test CartMoving Test Cart/VehicleVehicle Orientation on CartAngleCrabbed AngleMoving Test CartDIRECT ENGAGEMENT0.0NOT APPLICABLEMagnitude of the Tilt AngleMagniture of the Crabbed AngleMagnitude of the AngleMeasured between surface of aMeasure Clockwise fromMeasured between the Vehicle Orientation

### Vehicle 1 2012 CHEVROLET IMPALA

Test #	7488											
VIN	2G1W	A5E37C <sup>2</sup>	111743	7		N	HTSA Test Ve	hicle Number	1			
Year	2012					Vel	nicle Modificati	ion Indicator	PROD	υςτιο	N VEHICL	.E
Make	CHEV	ROLET		Post-test	Steerin	ng Column	Shear Capsule	e Seperation	NO SE	PARA	TION	
Model	IMPAL	A			s	Steering Co	lumn Collapse	Mechanism	NONE			
Body	FOUR	DOOR S	SEDAN									
Engine	V6 TR	ANSVER	SE FR	ONT								
Displacement	Displacement 3.6 Liter Transmission AUTOMATIC - FRONT WHEEL DRIVE											
Vehicle Modification(s) Description NONE												
Vehicle Commentary TR2544 - MC0100 - 2012 CHEVROLET IMPALA NCAP (FRONTAL) - TARGET 35.0												
Vehicle Len	gth	5094	mm	200.6	inches	s	CG behir	nd Front Axle	1195	mm	47.0	inches
Vehicle V	Vidth	1843	mm	72.6	inches	s Ce	nter of Damag	e to CG Axis	153	mm	6.0	inches
Vehicle Whee	lbase	2808	mm	110.6	inches	s To	otal Length of I	ndentation	1399	mm	55.1	inches
Vehicle Test W	/eight	1851	] KG	4080	pound	ds Ma	ximum Static (	Crush Depth	674	mm	26.5	inches
							Pre-In	npact Speed	56	kph	34.9	mph
Ve	hicle Da	mage Ind	dex 1	2FDEW3			Principal Di	rection of For	ce <b>0</b>			
Pre & Post Test Damage Measurements												
(Measurem	ents are ta	aken in a lo	ongitudina	aldirection.	Except fo	or Engine Bloc	k, all measureme	nts are take from	the Rear V	/ehicle S	urface forwa	rd.)
Left Side				Cent	erline			Righ	t Side			

						-			5		
Pre	e-Test	Pos	st-Test	Pre-Tes	st	Post-	Test	Pre	-Test	Post	-Test
mm	inches	mm	inches	mm in	ches	mm	inches	mm	inches	mm	inches
				Length o	of Vehicle	at Cent	terline				
				5094 20	0.6	4421	174.1				
					Engine B	lock					
				401 15	8	392	15.4				
5014	197.4	4394	173.0	Fro	ont Bumpe	er Corn	er	5018	197.6	4433	174.5
					Front of E	Ingine					
				4430 17	4.4	4136	162.8				
3902	153.6	3844	151.3		Firewa	all		3876	152.6	3826	150.6
				3905 15	3.7 0	)	0.0				
3501	137.8	3503	137.9	Upper L	_eading Ed	dge of [	Door	3504	138.0	3500	137.8
3492	137.5	3493	137.5	Lower L	eading Ec	dge of D	Door	3494	137.6	3488	137.3
3491	137.4	3489	137.4	Bo	ttom of 'A'	' Post		3491	137.4	3488	137.3
2408	94.8	2407	94.8	Upper	Trailing E	dge of	Door	2409	94.8	2406	94.7
2414	95.0	2415	95.1	Lower	Trailing E	dge of	Door	2419	95.2	2411	94.9
				ç	Steering C	Column					
				3000 11	8.1 2	2981	117.4				
				Center of Seering	J Column t	to 'A' Po	ost (Horizo	ntal)			
				281 11	.1 2	249	9.8				
				Center of Steering	J Column <sup>4</sup>	to Head	dliner (Vert	ical)			
				437 17	.2 4	401	15.8				

NHTSA Crash Test - #7488 - Front Impact

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

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

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

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

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

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

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

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

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

Serial Number: 15R-030201SC02301

NHTSA Crash Test - #7488 - Front Impact

#### Pre/Post Depths - Indention Length - Closing Speed - Simple Average

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

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

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

		CRASH	3 Stiffness Coe	efficents	SMAC Stiffness
		<u> </u>	<u> </u>	G	<u>Kv</u>
Minimum Crush = 23.0 inches					136.6
Using a Rated No Damage Speed of	2.5mph	209.1	117.8	185.6	
Using a Rated No Damage Speed of	5.0mph	385.9	100.3	742.3	
Using a Rated No Damage Speed of	7.5mph	530.4	84.2	1670.1	
Using a Rated No Damage Speed of	10.0mph	642.6	69.5	2969.1	
Average Crush = 24.6 inches					119.5
Using a Rated No Damage Speed of	2.5mph	195.5	102.9	185.6	
Using a Rated No Damage Speed of	5.0mph	360.8	87.7	742.3	
Using a Rated No Damage Speed of	7.5mph	495.9	73.6	1670.1	
Using a Rated No Damage Speed of	10.0mph	600.8	60.8	2969.1	
Maximum Crush = 26.5 inches					102.9
Using a Rated No Damage Speed of	2.5mph	181.5	88.7	185.6	
Using a Rated No Damage Speed of	5.0mph	334.9	75.5	742.3	
Using a Rated No Damage Speed of	7.5mph	460.3	63.4	1670.1	
Using a Rated No Damage Speed of	10.0mph	557.7	52.4	2969.1	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

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

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

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #7488 - Front Impact

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

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

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

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

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

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

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

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

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #7488 - Front Impact

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

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

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

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

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

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, Ib/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

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

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

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

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

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2008 Make: PONTIAC Model: GRAND PRIX

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

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2008 Make: PONTIAC Model: GRAND PRIX

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

#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



The First through Third characters (KL1) indicate a Chevrolet Car made in South Korea

The Fourth through Fifth characters (TD) indicate an Aveo Base/LS

The Sixth character (5) indicates a 4 Door Sedan

The Seventh character (6) indicates Manual Belts w/Driver & Passenger Air Bags (F/S)

The Eighth character (6) indicates the OEM engine: 1.6L/ 97.5cu.in., L4 DOHC

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

The Tenth character (7) indicates the model year 2007

The Eleventh character (B) indicates the vehicle was made in the assembly plant in Bupyeong, South Korea

The Twelfth through Seventeenth characters (052417) indicate the Serial Number and are unique to this vehicle.

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

> > 9/4/2015

#### 2007 CHEVROLET AVEO 4 DOOR SEDAN

Curb Weight:	<b>2535</b> 1bs.		1150	kg.
Curb Weight Distribution - Front:	61 %	Rear:	39	%
Gross Vehicle Weight Rating:	<b>3467</b> 1bs.		1573	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			
Horizontal Dimensions	Inches	Feet	M	eters
Total Length	170	14.17		4.32
Wheelbase:	98	8.17		2.49
Front Bumper to Front Axle:	32	2.67		0.81
Front Bumper to Front of Front Well:	18	1.50		0.46
Front Bumper to Front of Hood:	8	0.67		0.20
Front Bumper to Base of Windshield:	38	3.17		0.97
Front Bumper to Top of Windshield:	67	5.58		1.70
Rear Bumper to Rear Axle:	40	3.33		1.02
Rear Bumper to Rear of Rear Well:	27	2.25		0.69
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				1 70
Maximum Width:	67	5.58		1.70
Front Track:	57	4.75		1.45
Rear Track:	56	4.67		1.42
Vertical Dimensions				
Height:	59	4.92		1.50
Ground to -				
Front Bumper (Top)	22	1.83		0.56
Headlight - center	30	2.50		0.76
Hood - top front:	33	2.75		0.84
Base of Windshield	40	3.33		1.02
Rear Bumper - top:	26	2.17		0.66
Trunk - top rear:	43	3.58		1.09
Base of Rear Window:	45	3.75		1.14

### 2007 CHEVROLET AVEO 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder width	54	4.50	1.37
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	41	3.42	1.04
Rear Seat Shoulder Width	53	4.42	1.35
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	35	2.92	0.89
Seatbelts: <b>3pt - front and rear</b>			
Airbags: <b>FRONT SEAT AIRBAGS + SIDE</b>	AIRBAGS		
Steering Data			
Turning Circle (Diameter)	396	33.00	10.06
Steering Ratio: :1			
Wheel Radius:	11	0.92	0.28
Tire Size (OEM): P185/60R14			
Acceleration & Braking Information			
Brake Type: FRONT DISC - REAR DRUM			
ABS System: ALL WHEEL ABS - OPTIONAL			
Braking, 60 mph to 0 (Hard pedal, no ski	d. drv pavement):		
d = 172.0 ft t = 3.9 sec	a = -22.5  ft/s	sec² G-fo	rce = -0.70
Acceleration:			
0 to 30mph $t = 2.7$ sec	a = <b>16.3</b> ft/s	ec² G-fo	rce = <b>0.51</b>
0 to 60mph t = <b>10.8</b> sec	a = <b>8.1</b> ft/s	ec² G-fo	rce = <b>0.25</b>
45 to 65mph t = <b>6.1</b> sec	a = <b>4.8</b> ft/s	sec² G−fo	rce = <b>0.15</b>
Transmission Type: <b>5spd MANUAL</b>			
Notes:			
Federal Bumper Standard Requirements:	2.5	mph	
This vehicles Rated Bumper Strength:	2.5	mph	

N.S.D.C = 2007 - 2011

2007	CHEVROLET	<b>AVEO</b>	4	DOOR	SEDAN
------	-----------	-------------	---	------	-------

Other Information			
Tip-Over Stability Ratio =	1.22 Re	easonably Stal	ole
NHTSA Star Rating (calculated)		***	
Center of Gravity (No Load):			
Inches behind front axle	=	38.22	
Inches in front of rear axle	=	59.78	
Inches from side of vehicle	=	33.50	
Inches from ground	=	23.16	
Inches from front corner	=	77.80	
Inches from rear corner	=	105.25	
Inches from front bumper	=	70.22	
Inches from rear bumper	=	99.78	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	1405.05	lb*ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	1360.65	lb*ft*sec <sup>2</sup>
Roll Moment of Inertia	=	306.30	lb*ft*sec <sup>2</sup>
Front Profile Information			
Angle Front Bumper to Hood Front	=	54.0	deg
Angle Front of Hood to Windshield Base	=	13.1	deg
Angle Front of Hood to Windshield Top	=	22.1	deg
Angle of Windshield	=	30.4	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 Bear/Side Impact only)	=	27 CF
(Tested for Rear/Side impact only)		

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 #6295

## 2008 CHEVROLET AVEO

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

## Similar Vehicle database reader

### You entered: 2007 CHEVROLET AVEO

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

Year Range	Make	Model	<b>Body Styles</b>	Wheelbase
2007 - 2011 Remarks:	CHEVROLET	AVEO	4D, 5D	97.6
2009 - 2009 Remarks:	PONTIAC	G3	5D	97.6

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

### **Test Information**

Test # <b>6295</b>		NHTSA Test	Reference Guide Ve	ersion #	V5			
Test Date 2008-01-3	1		Con	tract #	DTRT57-05-	D-30107		
Contract/Study Title	LEFT 40% (	OFFSET DEFOR	MABLE BARRIER	- 2008	CHEVROLET	AVEO LS 4	4-DOOR	
Test Objective(s)	IN SUPPOR	T OF NHTSA O	FFSET FRONTAL P	ROGRA	AM			
Test Type	RESEARCH	SAFETY VEHIC	LE TEST		Configuration	VEHICL	E INTO BARR	IER
Impact Angle	0		Side Impa	ct Point	0	mm	0.0	inches
			Offset I	Distance	e 669	mm	26.3	inches
			Closing	g Speed	56.0	Km/Hr	34.80	MPH
Test Performer	MGA RESEA	RCH						
Test Reference #	BT0801310	1						
Test Track Surface	CONCRETE		Со	ndition	DRY			
Ambient Temperature	<b>21</b> C	<b>69.8</b> F	Total Number of	Curves	313			
Data Recorder Type	OTHER				Data Link	OTHER		
Test Commentary	DTS TDAS P	RO ON BOARD	DAS					

### **Fixed Barrier Information**

Barrier Type <b>DEFORMABLE</b>	Pole Barrier Diameter <b>0</b>	mm	0	inches
Barrier Shape <b>EEVC OFFSET US LC BA</b>				
Barrier Commentary				

### 2008 CHEVROLET AVEO LEFT FRONT SEAT OCCUPANT

Test #	6295		
Vehicle #	1		Sex MALE
Location	LEFT FRONT SE	AT	Age 0
Position	FORWARD OF C	ENTER POSITION	Height 0 mm 0.0 inches
Туре	HYBRID III DUMM	<b>AY WITH THOR LX L</b>	LEGS Weight 0.0 kg 0 pounds
Size	<b>50 PERCENTILE</b>		
Cali	ibration Method	HYBRID III	
Occupar	nt Manufacturer	FIRST TECHNOLO	DGY S/N 202
Occupa	ant Modification	THOR LX LEGS	
Occu	pant Description		
Occupa	ant Commentary	DUMMY BASE SEA	ATING V1
Head to -		Hea	ad
Windshie	elder Header 434	mm17.1	inches Head Injury Criteria (HIC) 458
	WindShield 756	mm <b>_29.8</b>	inches HIC Lower Time Interval (ms) 253.9
	Seatback 0	mm	inches HIC Upper Time Interval (ms) 256.5
	Side Header 225	mm8.9	inches
S	Side Window 314	mm _ <b>_12.4</b>	inches
Neck to Sea	atback <b>0</b> r	nm 0.0 inche	s
	First Contact Re	gion (Head)	BAG
S	Second Contact Re	gion (Head)	
		<u>Che</u>	est
Chest to -			
	Dash <b>644</b> n	1m 25.4 inche	es Arm to Door 145 mm 5.7 inches
Steering v	Vneel <b>421</b> n	1m <b>16.6</b> inche	es Hip to Door 220 mm 8.7 inches
Seat	tback [0] n	1m [0.0 ] inche	
Chest S	everity index 0		Pelvic Peak Lateral Acceleration (g's)
Inoracic Ir	auma index [U		I horax Peak Acceleration (gs) 32
	Lap E Chouldor D	Sell Peak Load	38 Newtons 1267.5 pound Force
First C	Shoulder B	ell Peak Load 380	64 Newtons 868.7 pound Force
Filst Co	untact Region (Che	st/Abdomen)	
Second Co			Ε
	· · · · · · · · · · · · · · · · · · ·	<u>L</u>	egs
Knees to	Dash 211 n	1m 8.3 inche	s Knees to Seatback [0 ] mm [0.0] inches
Left Femu	ur Peak Load	052 Newton	ns [-1135.7 ] pounds Force
Right Femu	Ir Peak Load	343 Newton	ns [-301.9 ] pounds Force
	First Contact R	egion (Legs)	IPANEL
	Second Contact Re	egion (Legs)	

### 2008 CHEVROLET AVEO LEFT FRONT SEAT OCCUPANT

Test #	6295					
Vehicle #	1		Sex	MALE		
Location	LEFT FRONT SE	AT	Age	0		
Position	FORWARD OF C	ENTER POSITION	Height	<b>0</b> mm	<b>0.0</b> ir	nches
Туре	HYBRID III DUM	IY WITH THOR LX LEGS	Weight	<b>0.0</b> kg	<b>0</b> p	ounds
Size	<b>50 PERCENTILE</b>					
Cali	ibration Method	HYBRID III				
Occupar	nt Manufacturer	FIRST TECHNOLOGY S/	N 202			
Occupa	ant Modification	THOR LX LEGS				
Occu	pant Description					
Occupa	ant Commentary	DUMMY BASE SEATING	V1			
		Restraints	<u>.</u>			
Restrai	nt # 1 3 POINT E	BELT				
Mounte	ed BELT - CO	ONVENTIONAL MOUNT				
Deployr	ment <b>DEPLOYE</b>	D PROPERLY				
Restrai	nt Commentary	PRIMARY				
Restrai	nt # 2 FRONTAL					

 Deployment
 DEPLOYED PROPERLY

 Restraint Commentary
 SECONDARY

STEERING WHEEL

Mounted

### 2008 CHEVROLET AVEO RIGHT FRONT SEAT OCCUPANT

Test #	6295				
Vehicle #	1		Sex	MALE	
Location	<b>RIGHT FRONT S</b>	EAT	Age	0	
Position	CENTER POSITIO	ON	Height	0 mm (	<b>).0</b> inches
Туре	HYBRID III DUMM	ЛY	Weight	0.0 kg (	pounds
Size	50 PERCENTILE				
Cal	ibration Method	HYBRID III			
Occupa	nt Manufacturer	FIRST TECHNOLOGY	S/N 206		
Occup	ant Modification	THOR LX LEGS			
Occu	pant Description				
Occupa	ant Commentary	DUMMY BASE SEATIN	IG V1		
Head to - Windshie Neck to Se	elder Header 355 WindShield 661 Seatback 0 Side Header 228 Side Window 307 atback 0 r First Contact Re	Head         mm       14.0       incl         mm       26.0       incl         mm       0.0       incl         mm       9.0       incl         mm       12.1       inc         mm       0.0       inches         egion (Head)       AIR BAG	hes Head Injury C hes HIC Lov hes HIC Up hes hes	Criteria (HIC) [2 ver Time Interval per Time Interval	201 (ms) 104.1 (ms) 140.1
5	Second Contact Reg	gion (Head)			
Chest to -	5	<u>Chest</u>			
Steering V Sea	Dash <u>536</u> n Wheel <u>0</u> n tback <u>0</u> n	nm <b>21.1</b> inches nm <b>0.0</b> inches nm <b>0.0</b> inches	Arm to Door 13 Hip to Door 2	36 mm 5 10 mm 8	<ul> <li>inches</li> <li>inches</li> </ul>
Chest S	severity index 0		Pelvic Peak Lateral Ad		
I NOFACIC II	rauma index <u>u</u> Lap E Shoulder B	Jelt Peak Load 3639 Jelt Peak Load 3776	Inorax Peak P           Newtons         818.1           Newtons         848.9	pound Force	[23]
First C	ontact Region (Che	st/Abdomen) AIR BAG			
Second Co	ontact Region (Ches	st/Abdomen) NONE			
Knees to Left Fem Right Femu	Dash <u>126</u> n ur Peak Load <u>-3</u> ur Peak Load <u>-10</u> First Contact R Second Contact R	Legs         nm       5.0       inches         627       Newtons         076       Newtons         Region (Legs)       DASHPAI	Knees to Seatback 0 -815.4 pound -241.9 pound NEL	mm <b>0.</b> s Force s Force	D inches
	Second Contact Re				

### 2008 CHEVROLET AVEO RIGHT FRONT SEAT OCCUPANT

Test #	6295						
	0233	]		0			
venicie #	1			Sex			
Location	RIGHT	FRONT SE	AT	Age	0		
Position	CENTE		N	Height	<b>0</b> mm	0.0 inches	
Туре	HYBRI	d III dumm	Y	Weight	<b>0.0</b> kg	0 pounds	
Size	50 PER	CENTILE					
Cali	ibration N	Nethod	HYBRID III				
Occupar	nt Manuf	acturer	FIRST TECHNOLOGY S/	N 206			
Occupa	ant Modi	fication	THOR LX LEGS				
Occu	pant Des	scription					
Occupa	ant Comr	nentary	DUMMY BASE SEATING	V1			
			Restraints	6			
Restrai	nt # 1	3 POINT B	ELT				
Mounte	ed	BELT - CC	NVENTIONAL MOUNT				
Deploy	ment	DEPLOYE	D PROPERLY				
Restrai	nt Comm	nentary	PRIMARY				
Restrai	nt# 2	FRONTAL	AIRBAG				
Mounto							
wounte	u	DASH PAR					
Deploy	ment	DEPLOYE	D PROPERLY				

**Restraint Commentary** 

SECONDARY

### 2008 CHEVROLET AVEO LEFT REAR SEAT OCCUPANT

Test #	6295				
Vehicle #	1		Sex 🚺	NOT APPLICABLE	
Location	LEFT REAR SEA	Г	Age 🖸	0	
Position	NON-ADJUSTAB	LE SEAT	Height 0	0 mm 0.0 ind	ches
Туре	HYBRID III DUMM	IY	Weight 0	<b>0.0</b> kg <b>0</b> po	unds
Size	10 YEAR OLD CH	ILD			
Cal	ibration Method	HYBRID III			
Occupar	nt Manufacturer	FIRST TECHNOLOGY	S/N D001		
Occupa	ant Modification				
Occu	pant Description				
Occupa	ant Commentary	DUMMY BASE SEATI	NG V1		
Head to -		<u>Head</u>			
Windshie	elder Header 0	mm in	ches Head Injury Crit	teria (HIC) <b>502</b>	
	WindShield 0	mm in	ches HIC Lowe	er Time Interval (ms)	).3
	Seatback 431	mm <b></b> in	ches HIC Uppe	er Time Interval (ms) 12	.6.3
	Side Header	mm in	ches		
	Side Window 281	mm <b><u>11.1</u></b> in	ches		
Neck to Se	atback <b>0</b> r	1m 0.0 inches			
	First Contact Re	gion (Head)	R		<u> </u>
Ę	Second Contact Reg	jion (Head)			
		<u>Chest</u>			
Chest to -					
	Dash U n		Arm to Door 164	mm 6.5 inch	es
Steering v	vneel <b>U</b> m	im <b>U.U</b> inches		<b>8.7</b> Inch	25
Sea Choot S	lback <u>410</u> If	im [16.1 ] inches	Delvie Deels Lateral Aces	aloration (gla)	_
Thorpoin Tr				eleration (g s) <b>U</b>	=
THUI ACIC TI		olt Book Lood 2114		aund Force	
	Lap B Shoulder B	elt Peak Load <b>5200</b>	Newtons <b>1189.2</b> pc		
First C	ontact Region (Che	st/Abdomen) NONE	INEWIONS [1109.2] pt		_
Second Co	ontact Region (Ches	t/Abdomen) NONE			╡
	Shidot Region (Onec				
		Legs			
Knees to	Dash [ <b>0</b> ] m	im [ <b>0.0</b> ] inches	Knees to Seatback 152	2 mm_[ <u>6.0</u> inch	es
Lett Femi	ur Peak Load	Newtons	pounds F	Force	
Right Femi	Ir Peak Load	Newtons	[0.0 ] pounds F	Force	_
	First Contact R	egion (Legs) [SEAT B/	ACK		4
	Second Contact Re	gion (Legs)			

### 2008 CHEVROLET AVEO LEFT REAR SEAT OCCUPANT

Test #	6295				
Vehicle #	1		Sex	NOT APPLICABLE	
Location	LEFT REAR SEA	AT	Age	0	
Position	NON-ADJUSTA	BLE SEAT	Height	<b>0</b> mm <b>0.0</b> inches	
Туре	HYBRID III DUM	MY	Weight	0.0 kg 0 pounds	
Size	10 YEAR OLD C	HILD			
Cal	libration Method	HYBRID III			
Occupa	nt Manufacturer	FIRST TECHNOLOGY S/N D001			
Occup	ant Modification				
Occu	pant Description				
Occup	ant Commentary	DUMMY BASE SEATING V1			
		<b>Restraints</b>			
Restra	int # 1 BOOSTE	R SEAT			
Mounte	ed LAP/SHO	OULDER BELT. NO TOP TETHER			

Deployment

Restraint Commentary

NOT APPLICABLE

PRIMARY

### Vehicle 1 2008 CHEVROLET AVEO

Test #	6295										
VIN	KL1TD56698	B001262	2		NHTSA T	est Vehicl	e Number	1			
Year	2008				Vehicle Mo	dification	Indicator	PROD	UCTION	VEHICI	E
Make	CHEVROLET	Γ	Post-test	Steering Col	lumn Shear C	apsule S	eperation	UNKN	OWN		
Model	AVEO			Steerin	ng Column Co	llapse Me	echanism	UNKN	OWN		
Body	FOUR DOOR	SEDAN									
Engine	4 CYLINDER	TRANS	VERSE FF	RONT							
Displacement	<b>1.6</b> Lite	er Tr	ansmissio	n MANUA	L - FRONT V	VHEEL D	RIVE				
Vehicle Modific	ation(s) Descri	iption									
Vehicle Comme	entary										
Vehicle Len	gth <b>4280</b>	mm	168.5	inches	CO	6 behind F	Front Axle	1159	mm	45.6	inches
Vehicle V	Vidth <b>1691</b>	mm	66.6	inches	Center of D	amage to	o CG Axis	0	mm	0.0	inches
Vehicle Wheel	lbase 2480	mm	97.6	inches	Total Leng	gth of Inde	entation	1170	mm	46.1	inches
Vehicle Test W	eight 1433	KG	3159	pounds	Maximum S	Static Cru	sh Depth	591	mm	23.3	inches
						Pre-Impa	ict Speed	56	kph	34.8	mph
Vel	hicle Damage	Index			Princ	ipal Direc	tion of For	ce 0			
Domogo Dr	ofilo Dictoro		uromont	· •	Cruch from	n Dro 8	Doct To	et Dome		Socuror	onto
				.5	<u>Crush nor</u>		<u>FUSLIE</u>				
		gnt, Rear				Pre-Tes	<u>it</u> I :	Post-Tes	<u>St</u>		<u>Jeptn</u> Timehaa
	<b>591</b> mm	23.3		Left Bui	mper Corner	163.9	Inches	140.6	incnes	23.3	
	541 mm	21.3				4162	mm	35/1	mm	591	_ mm
	519 mm	20.4			Centerline	168.5	inches	152.3	inches	16.2	inches
	<u>290</u> mm	11.4				4280	mm	3869	mm	411	] mm
	<u>152</u> mm	6.0		Right Bur	nper Corner	163.8	inches	163.0	inches	0.8	linches
	<u>20</u> mm	0.8		Ū	•	4160	mm	4140	mm	20	] mm
											-
Bumper E	ngagement			Sill En	gagement			A	-pillar E	ingageme	ent
(Inline Im	pact Only)			(Side	Impact Only)				(Side In	npact Onl	y)
Ì	).0		Г		PPLICABLE			Г		0.0	Ϊ
								-			-
Moving	Test Cart			Moving T	est Cart/Vehi	cle		Veh	icle Orie	entation o	n Cart
A	ngle			Crab	bed Angle				Moving	Test Car	t
DIRECT	ENGAGEMEN	Τ			0.0			N	OT AP	PLICABL	.E
Magnitude	of the Tilt Angle			Magniture o	f the Crabbed A	ngle			Magnitud	e of the Ang	gle
Measured b	etween surface of	fa		Measure	e Clockwise from	1		Measured	between	the Vehicle	Orientation
Rollover Test	Cart and the Grou	und	Lon	gitudinal Vector	r to Velocity Vec	tor of Vehici	le	and [	Direction of	of Test Cart	Motion

### Vehicle 1 2008 CHEVROLET AVEO

Test #	6295						
VIN	KL1TD56698B001262	NF	HTSA Test Vehicle Nur	mber <b>1</b>			
Year	2008 Vehicle Modification Indicator PRODUCTION VEHICLE						
Make	CHEVROLET Post-1	est Steering Column	Shear Capsule Sepera	tion <b>UNKNOWN</b>			
Model	AVEO	Steering Col	umn Collapse Mechan	ism <b>UNKNOWN</b>			
Body	FOUR DOOR SEDAN						
Engine	4 CYLINDER TRANSVERS	E FRONT					
Displacement	1.6 Liter Transmi	ssion MANUAL - FF	RONT WHEEL DRIVE				
Vehicle Modific	ation(s) Description						
Vehicle Comme	entary						
Vehicle Leng	gth <b>4280</b> mm <b>168.</b>	5 inches	CG behind Front	Axle <b>1159</b> mm	45.6 inches		
Vehicle V	/idth 1691 mm 66.6	inches Cer	nter of Damage to CG	Axis <b>0</b> mm	0.0 inches		
Vehicle Wheel	base <b>2480</b> mm <b>97.6</b>	inches To	tal Length of Indentation	on <b>1170</b> mm	46.1 inches		
Vehicle Test W	eight <b>1433</b> KG <b>3159</b>	pounds Max	ximum Static Crush De	epth <b>591</b> mm	23.3 inches		
			Pre-Impact Sp	eed 56 kph	<b>34.8</b> mph		
Vel	nicle Damage Index		Principal Direction o	f Force 0			
	<u>Pre &amp;</u>	<u>Post Test Dama</u>	<u>age Measureme</u>	<u>nts</u>			
(Measureme	ents are taken in a longitudinaldirecti	on. Except for Engine Blocl	k, all measurements are tak	e from the Rear Vehicle S	jurface forward.)		
L	eft Side	Cente	erline	Righ	t Side		
Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test		
mm inche	s mm inches	mm inches	mm inches	mm inches	mm inches		
		Lenath of Vehi	icle at Centerline				
		4280 168.5	3869 152.3				
		Engin	ne Block				
		229 9.0	229 9.0				
4162 163.9	3571 140.6	Front Bu	mper Corner	4160 163.8	4140 163.0		
		Front	of Engine				
		3807 149.9	3633 143.0				
3372 132.8	3242 127.6	Fir	ewall	3380 133.1	3398 133.8		
		3419 134.6	0 0.0				
3031 119.3	2982 117.4	Upper Leadin	g Edge of Door	3034 119.4	3042 119.8		
2999 118.1	2962 116.6	Lower Leading	g Edge of Door	2999 118.1	2984 117.5		
3000 118.1	2960 116.5	Bottom o	f 'A' Post	3001 118.1	2985 117.5		
1913 75.3	1899 74.8	Upper Trailin	ig Edge of Door	1921 75.6	1932 76.1		
1962 77.2	1926 75.8	Lower Trailin	g Edge of Door	1969 77.5	1948 76.7		
		Steerin	ng Column				
		2585 101.8	2519 99.2				
	C	enter of Seering Colur	mn to 'A' Post (Horizor	tal)			
		360 14.2	432 17.0				

Center of Steering Column to Headliner (Vertical)

403 15.9 483 19.0

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #6295 - Front Impact

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

Test Vehicle Weight =	3159 pounds
Vehicle Closing Speed =	34.8 mph
Test Crush Length =	66.6 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Deee Side)
(Driver Side)	23.3	16.2	0.8	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		<u>A</u>	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 0.8 inches					71956.0
Using a Rated No Damage Speed of	2.5mph	3838.6	61988.0	118.9	
Using a Rated No Damage Speed of	5.0mph	7083.0	52762.8	475.4	
Using a Rated No Damage Speed of	7.5mph	9733.1	44280.4	1069.7	
Using a Rated No Damage Speed of	10.0mph	11788.9	36540.9	1901.7	
Average Crush = 14.1 inches					231.6
Using a Rated No Damage Speed of	2.5mph	217.8	199.5	118.9	
Using a Rated No Damage Speed of	5.0mph	401.9	169.9	475.4	
Using a Rated No Damage Speed of	7.5mph	552.2	142.5	1069.7	
Using a Rated No Damage Speed of	10.0mph	668.9	117.6	1901.7	
Maximum Crush = 23.3 inches					84.8
Using a Rated No Damage Speed of	2.5mph	131.8	73.1	118.9	
Using a Rated No Damage Speed of	5.0mph	243.2	62.2	475.4	
Using a Rated No Damage Speed of	7.5mph	334.2	52.2	1069.7	
Using a Rated No Damage Speed of	10.0mph	404.8	43.1	1901.7	

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

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	23.3	35.0	0.2	0.5

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.8

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #6295 - Front Impact

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

Test Vehicle Weight =	3159 pounds
Vehicle Closing Speed =	34.8 mph
Test Crush Length =	46.1 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Dece Side)
(Driver Side)	23.3	16.2	0.8	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 0.8 inches					103997.9
Using a Rated No Damage Speed of	2.5mph	5548.0	89591.1	171.8	
Using a Rated No Damage Speed of	5.0mph	10237.1	76258.0	687.1	
Using a Rated No Damage Speed of	7.5mph	14067.2	63998.4	1546.0	
Using a Rated No Damage Speed of	10.0mph	17038.5	52812.6	2748.5	
Average Crush = 14.1 inches					334.8
Using a Rated No Damage Speed of	2.5mph	314.8	288.4	171.8	
Using a Rated No Damage Speed of	5.0mph	580.8	245.5	687.1	
Using a Rated No Damage Speed of	7.5mph	798.1	206.0	1546.0	
Using a Rated No Damage Speed of	10.0mph	966.7	170.0	2748.5	
Maximum Crush = 23.3 inches					122.6
Using a Rated No Damage Speed of	2.5mph	190.5	105.6	171.8	
Using a Rated No Damage Speed of	5.0mph	351.5	89.9	687.1	
Using a Rated No Damage Speed of	7.5mph	483.0	75.4	1546.0	
Using a Rated No Damage Speed of	10.0mph	585.0	62.3	2748.5	

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

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	23.3	35.0	0.2	0.5

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.8

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #6295 - Front Impact

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

Test Vehicle Weight =	3159 pounds
Vehicle Closing Speed =	34.8 MPH
Test Crush Length =	66.6 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	23.3	21.3	20.4	11.4	6.0	0.8	(Pass Side)

		onaon o oniness ocenicents			oniao otimiess
		<u>A</u>	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 0.8 inches					71956.0
Using a Rated No Damage Speed of	2.5mph	3838.6	61988.0	118.9	
Using a Rated No Damage Speed of	5.0mph	7083.0	52762.8	475.4	
Using a Rated No Damage Speed of	7.5mph	9733.1	44280.4	1069.7	
Using a Rated No Damage Speed of	10.0mph	11788.9	36540.9	1901.7	
Average Crush = 14.2 inches					228.4
Using a Rated No Damage Speed of	2.5mph	216.3	196.7	118.9	
Using a Rated No Damage Speed of	5.0mph	399.0	167.5	475.4	
Using a Rated No Damage Speed of	7.5mph	548.3	140.5	1069.7	
Using a Rated No Damage Speed of	10.0mph	664.2	116.0	1317.0	
Maximum Crush = 23.3 inches					84.8
Using a Rated No Damage Speed of	2.5mph	131.8	73.1	118.9	
Using a Rated No Damage Speed of	5.0mph	243.2	62.2	475.4	
Using a Rated No Damage Speed of	7.5mph	334.2	52.2	1069.7	
Using a Rated No Damage Speed of	10.0mph	404.8	43.1	1901.7	

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

CRASH 3 Stiffness Coefficents

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	23.3	35.0	0.2	0.5

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.8

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

SMAC Stiffnoss

NHTSA Crash Test - #6295 - Front Impact

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

Test Vehicle Weight =	3159 pounds
Vehicle Closing Speed =	34.8 MPH
Test Crush Length =	46.1 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	23.3	21.3	20.4	11.4	6.0	0.8	(Pass Side)

		<u> </u>	<u> </u>	G	<u> </u>
Minimum Crush = 0.8 inches					103997.9
Using a Rated No Damage Speed of	2.5mph	5548.0	89591.1	171.8	
Using a Rated No Damage Speed of	5.0mph	10237.1	76258.0	687.1	
Using a Rated No Damage Speed of	7.5mph	14067.2	63998.4	1546.0	
Using a Rated No Damage Speed of	10.0mph	17038.5	52812.6	2748.5	
Average Crush = 14.2 inches					330.1
Using a Rated No Damage Speed of	2.5mph	312.6	284.4	171.8	
Using a Rated No Damage Speed of	5.0mph	576.7	242.0	687.1	
Using a Rated No Damage Speed of	7.5mph	792.5	203.1	1546.0	
Using a Rated No Damage Speed of	10.0mph	959.9	167.6	1903.5	
Maximum Crush = 23.3 inches					122.6
Using a Rated No Damage Speed of	2.5mph	190.5	105.6	171.8	
Using a Rated No Damage Speed of	5.0mph	351.5	89.9	687.1	
Using a Rated No Damage Speed of	7.5mph	483.0	75.4	1546.0	
Using a Rated No Damage Speed of	10.0mph	585.0	62.3	2748.5	

#### 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

CDASH 2 Stiffnors Coofficients

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	23.3	35.0	0.2	0.5

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.8

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

SMAC Stiffnoss

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2007 - 2011 Make: CHEVROLET Model: AVEO

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	V  S t A	ehicle iffness B	Width- Value G	 s  Kv	Crush Factor
5873	2007 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	18.6	35.0	293.0	94.7	453.5	128.9	26.4
6295	2008 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	14.2	34.8	398.1	166.7	475.4	227.4	34.0
6296	2008 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	14.7	37.3	417.5	183.3	475.4	244.5	37.8
		Average	(AVG)		369.5	148.2	468.1	200.2	32.7
		Minimum	(MIN)		293.0	94.7	453.5	128.9	26.4
		Maximum (	MAX)		417.5	183.3	475.4	244.5	37.8
	Standard Deviatio	n (STDev-sa	mple)		67.0	47.1	12.7	62.4	5.8
	N	umber of Tes	sts (n)	3					

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2007 - 2011 Make: CHEVROLET Model: AVEO

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	V  S t A	ehicle iffness B	Width- Value G	 s  Kv	Crush Factor
6296	2008 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	26.8	37.3	229.0	55.1	475.4	73.5	20.7
6295	2008 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	23.3	34.8	243.5	62.4	475.4	85.1	20.8
5873	2007 CHEVROLET AVEO FOUR DOOR SEDAN	5.0	20.0	35.0	272.5	81.9	453.5	111.4	24.5
		Average (	AVG)		248.3	66.5	468.1	90.0	22.0
		Minimum	(MIN)		229.0	55.1	453.5	73.5	20.7
		Maximum (	MAX)		272.5	81.9	475.4	111.4	24.5
	Standard Deviation	n (STDev-sar	nple)		22.1	13.8	12.7	19.4	2.2
	Nu	umber of Tes	ts (n)	3					

#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



The First through Third characters (5NP) indicate a Hyundai Vehicle made in the United
States
The Fourth character (E) indicates a Sonata
The Fifth character (C) indicates a GL series
The Sixth character (4) indicates a 4-Door Sedan
The Seventh character (A) indicates Manual Belts and Air Bags
The Eighth character (C) indicates the OEM engine: 1.6 L/121 cu.in., L4, DOHC
The Ninth character (the check digit) is entered as 1.
The VIN appears Valid, the calculated value is 1.
The Tenth character (B) indicates the model year 2011
The Eleventh character (H) indicates the vehicle was made in the assembly plant in
Montgomery,Alabama

The Twelfth through Seventeenth characters (131182) indicate the Serial Number and are unique to this vehicle.

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

> > 9/4/2015

#### 2011 HYUNDAI SONATA 4 DOOR SEDAN

3225 1463 Curb Weight: lbs. kg. % Curb Weight Distribution -60 40 % Front: Rear: Gross Vehicle Weight Rating: 4307 lbs. 1954 kg. Number of Tires on Vehicle: 4 Drive Wheels: FRONT Horizontal Dimensions Inches Feet Meters Total Length 190 15.83 4.83 wheelbase: 110 2.79 9.17 Front Bumper to Front Axle: 37 3.08 0.94 Front Bumper to Front of Front Well: 22 1.83 0.56 0.75 Front Bumper to Front of Hood: 9 0.23 Front Bumper to Base of Windshield: 47 3.92 1.19 Front Bumper to Top of Windshield: 79 6.58 2.01 1.09 Rear Bumper to Rear Axle: 43 3.58 Rear Bumper to Rear of Rear Well: 0.74 29 2.42 Rear Bumper to Rear of Trunk: 5 0.42 0.13 22 Rear Bumper to Base of Rear Window: 1.83 0.56 Width Dimensions 72 6.00 1.83 Maximum Width: 63 5.25 1.60 Front Track: 63 5.25 1.60 Rear Track: Vertical Dimensions Height: 58 4.83 1.47 Ground to -1.75 Front Bumper (Top) 21 0.53 2.33 Headlight - center 28 0.71 2.67 Hood - top front: 32 0.81 3.33 Base of Windshield 40 1.02 Rear Bumper - top: 26 2.17 0.66 Trunk - top rear: 42 3.50 1.07 Base of Rear Window: 45 3.75 1.14

#### 2011 HYUNDAI SONATA 4 DOOR SEDAN

Interior Dimensions Front Seat Shoulder W Front Seat to Headlin Front Leg Room - seat Rear Seat Shoulder W	vidth ner tback to floor (max) idth ar	Inches 58 40 45 57 38	Feet 4.83 3.33 3.75 4.75 3.17	Meters 1.47 1.02 1.14 1.45 0.97
Front Leg Room - seat	tback to floor (min)	35	2.92	0.89
Seatbelts: <b>3pt -</b> Airbags: <b>FRONT</b>	front and rear SEAT AIRBAGS + SIDE AIF	RBAGS		
Steering Data				
Turning Circle (Diame	eter)	432	36.00	10.97
Steering Ratio:	:1			
Wheel Radius:				
Tire Size (OEM):	205/65R16			
Acceleration & Braking	Information			
Brake Type: ALL DI	SC			
ABS System: ALL WH	EEL ABS			
Braking, 60 mph to 0 d = <b>123.0</b> ft	(Hard pedal, no skid, t = <b>2.8</b> sec	dry pavement): a = <b>-31.4</b> ft/s	ec² G-fo	rce = -0.98
Acceleration:				
0 to 30mph	t = 2.9 sec	a = 15.2  ft/s	ec² G-fo	rce = 0.47
0 to 60mph	t = 7.5 sec	a = 11.7 ft/s	ec² G-to	rce = 0.36
45 to 65mph	t = <b>4.1</b> sec	a = 7.2 ft/s	ec² G-fo	rce = 0.22
Transmission Type:	AUTOMATIC			
Notes: Federal Bumper Sta This vehicles Rate	ndard Requirements: d Bumper Strength:	2.5	mph mph	

2011	HYUNDAI	SONATA	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	=	44.00	
Inches in front of rear axle	=	66.00	
Inches from side of vehicle	=	36.00	
Inches from ground	=	22.77	
Inches from front corner	=	88.64	
Inches from rear corner	=	114.79	
Inches from front bumper	=	81.00	
Inches from rear bumper	=	109.00	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	2115.75	lb*ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	2043.75	lb*ft*sec <sup>2</sup>
Roll Moment of Inertia	=	430.50	lb*ft*sec <sup>2</sup>
Front Profile Information			
Angle Front Bumper to Hood Front	=	50.7	deg
Angle Front of Hood to Windshield Base	=	11.9	deg
Angle Front of Hood to Windshield Top	=	18.9	deg
Angle of Windshield	=	26.6	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:

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 #5453

## 2006 HYUNDAI SONATA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

## Similar Vehicle database reader

### You entered: 2011 HYUNDAI SONATA

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

аке	Model	Body Styles	wheelbase
(UNDAI	SONATA	4D	107.4
	UNDAI	UNDAI SONATA	UNDAI SONATA 4D

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,
#### **Test Information**

Test # <b>5453</b>		NHTS	A Test	Reference	e Guide Ver	sion #	V5				
Test Date 2005-08-25	5 Contract # DTNH22-01-D-32005										
Contract/Study Title	W CAR A	SSESSME	ENT PR	OGRAM	FRONTAL	BARR	IER IMPACT	TEST			
Test Objective(s) <b>TO</b>	OBTAIN	VEHICLE	CRAS	HWORTI	HINESS A	ND OC	CUPANT RES	TRAINT	INFORMATIC	)N	
Test Type <b>NE</b>	W CAR A	SSESSME	ENT TE	ST			Configuration	VEHICL	E INTO BARF	<b>RIER</b>	
Impact Angle <b>0</b>				9	Side Impac	: Point	0	mm	0.0	] inches	
					Offset D	stance	0	mm	0.0	] inches	
					Closing	Speed	56.7	Km/Hr	35.20	] MPH	
Test Performer CA	LSPAN										
Test Reference # <b>RU</b>	N2207										
Test Track Surface	NCRETE				Con	dition	DRY				
Ambient Temperature 21	C	69.8	] F	Total N	lumber of C	Curves	143				
Data Recorder Type	GITAL DA	ATA ACQU	JISITI	ON			Data Link	UMBIL	ICAL CABLE		
Test Commentary <b>FY</b>	06 NCAP	- 2006 H	IYUND	AI SONA	TA - M60	506					

#### **Fixed Barrier Information**

Barrier Type	RIGID	Pole Barrier Diameter	mm	0	inches
Barrier Shape	LOAD CELL BARRIER				
Barrier Commentary	FRONTAL FLAT BARRIER WIT	H 36 LOADCELLS			

# 2006 HYUNDAI SONATA LEFT FRONT SEAT OCCUPANT

Test # 5453	
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: FTSS S/N:143	
Occupant Modification NO COMMENTS	
Occupant Description NO COMMENTS	
Occupant Commentary CNTRH2: HEAD RESTRAINT	
Head to -	
Windshielder Header       305       mm       12.0       inches       Head Injury Criteria (HIC)       268	
WindShield 532 mm 20.9 inches HIC Lower Time Interval (ms) 50	
Seatback 0 mm 0.0 inches HIC Upper Time Interval (ms) 86	
Side Header 185 mm 7.3 inches	
Side Window 308 mm 12.1 inches	
Neck to Seatback 0 mm 0.0 inches	
First Contact Region (Head) [AIR BAG	
Chect	
<u>Chest to</u>	
Dash 518 mm 20.4 inches Arm to Door 112 mm 4.4 inches	
Steering Wheel <b>297</b> mm <b>11.7</b> inches Hip to Door <b>166</b> mm <b>6.5</b> inches	
Seatback 0 mm 0.0 inches	
Chest Severity Index 378 Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index Thorax Peak Acceleration (g's) 42.5	
Lap Belt Peak Load 9463 Newtons 2127.4 pound Force	
Shoulder Belt Peak Load <b>5436</b> Newtons <b>1222.1</b> pound Force	
First Contact Region (Chest/Abdomen) AIR BAG	
Second Contact Region (Chest/Abdomen) NONE	
ang l	
Knees to Dash 137 mm 5.4 inches Knees to Seatback 0 mm 0.0 inches	
Left Femur Peak Load -3239 Newtons -728.2 pounds Force	
Right Femur Peak Load -3414 Newtons -767.5 pounds Force	
Right Femur Peak Load       -3414       Newtons       -767.5       pounds Force         First Contact Region (Legs)       DASHPANEL       Image: Contact Region (Legs)       Image: Contact Region (Legs)	

# 2006 HYUNDAI SONATA LEFT FRONT SEAT OCCUPANT

Test #	5453									
Vehicle #	1		Sex	MALE						
Location	LEFT FRO	NT SEAT	Age	0						
Position	CENTER F	POSITION	] Height	<b>0</b> mm	0.0 inches					
Туре	HYBRID III	DUMMY	] Weight	<b>0.0</b> kg	0 pounds					
Size	<b>50 PERCE</b>	NTILE	]							
Cali	bration Meth	nod HYBRID III								
Occupar	nt Manufactu	irer MFG: FTSS S/N:143								
Occupa	ant Modificat	ion NO COMMENTS								
Occu	pant Descrip	otion NO COMMENTS								
Occupa	ant Commen	tary CNTRH2: HEAD RESTRA	AINT							
		Restraints	<u>8</u>							
Restrai	nt # 1 3 P	OINT BELT								
Mounte	d BE	LT - CONVENTIONAL MOUNT								
Deployr	ment DE	PLOYED PROPERLY								
Restrai	Restraint Commentary SHOULDER BELT PRETENSIONER AND FORCE LIMITER									
Restrai	nt # 2 FR	ONTAL AIRBAG								
Mounte	d ST	EERING WHEEL								

Deployment

Restraint Commentary

DEPLOYED PROPERLY

NONE

# 2006 HYUNDAI SONATA RIGHT FRONT SEAT OCCUPANT

Test #	5453		
Vehicle #	1		Sex MALE
Location	<b>RIGHT FRONT S</b>	EAT	Age 0
Position	CENTER POSITIO	Л	Height 0 mm 0.0 inches
Туре	HYBRID III DUM	ЛY	Weight <b>0.0</b> kg <b>0</b> pounds
Size	<b>50 PERCENTILE</b>		
Cal	ibration Method	HYBRID III	
Occupar	nt Manufacturer	MFG: FTSS S/N	l:150
Occupa	ant Modification	NO COMMENTS	<u>S</u>
Occu	pant Description	NO COMMENTS	<u>S</u>
Occupa	ant Commentary	CNTRH2: SUN V	VISOR
Head to -		Ŀ	Head
Windshie	elder Header 305	mm <b>12.0</b>	inches Head Injury Criteria (HIC) 278
	WindShield 516	mm <b></b> 20.3	inches HIC Lower Time Interval (ms) 61.9
	Seatback 0	mm	inches HIC Upper Time Interval (ms) 97.8
	Side Header 170	mm <u>6.7</u>	inches
9	Side Window 308	mm <u>12.1</u>	inches
Neck to Se	atback <b>0</b> r	nm <b>0.0</b> inc	ches
	First Contact Re	gion (Head)	IR BAG
5	Second Contact Re	gion (Head)	
		C	Chest
Chest to -			
	Dash <b>545</b> n	nm <b>21.5</b> inc	ches Arm to Door <b>120</b> mm <b>4.7</b> inches
Steering V	Vheel 0 n	nm <b>0.0</b> inc	ches Hip to Door 160 mm 6.3 inches
Sea	tback <b>0</b> n	nm <b>0.0</b> inc	ches
Chest S	everity Index 34	0	Pelvic Peak Lateral Acceleration (g's)
Thoracic Tr	auma Index		Thorax Peak Acceleration (g's) 38.5
	Lap E	elt Peak Load	8739 Newtons 1964.6 pound Force
	Shoulder B	elt Peak Load	5733 Newtons 1288.8 pound Force
First Co	ontact Region (Che	st/Abdomen) Alf	R BAG
Second Co	ontact Region (Ches	st/Abdomen) NC	ONE
			Legs
Knees to	Dash 124 n	nm <b>4.9</b> inc	ches Knees to Seatback <b>0</b> mm <b>0.0</b> inches
Left Femu	ur Peak Load -2	033 New	vtons <b>-457.0</b> pounds Force
Right Femu	Ir Peak Load	182 New	vtons -265.7 pounds Force
-	First Contact R	egion (Legs)	ASHPANEL
	Second Contact Re	egion (Legs)	

#### 2006 HYUNDAI SONATA RIGHT FRONT SEAT OCCUPANT

Test #	5453										
Vehicle #	1					Sex	MALE				
Location	<b>RIGHT</b>	RONT S	EAT			Age	0				
Position	CENTER POSITION			Н	leight	0	mm	0.0	inches		
Туре	HYBRID III DUMMY			V	/eight	0.0	kg	0	pounds		
Size	50 PER	CENTILE									
Cali	ibration M	lethod	HYBRID III								
Occupar	nt Manufa	cturer	MFG: FTSS S/N	:150							
Occupa	ant Modifi	cation	NO COMMENTS	6							
Occu	pant Desc	cription	NO COMMENTS	5							
Occupa	ant Comm	entary	CNTRH2: SUN V	/ISOR							
			<u>R</u>	estraints	<u>.</u>						
Restrai	nt # 1 [	3 POINT E	BELT								
Mounte	ed [	d BELT - CONVENTIONAL MOUNT									
Deployr	ment [	DEPLOYE	D PROPERLY								
Restrai	nt Comm	entary	SHOULDER BE	LT PRET	ENSIONER A	ND FC		<b>IITER</b>			
Destad											

 Restraint # 2
 FRONTAL AIRBAG

 Mounted
 DASH PANEL - MID

 Deployment
 DEPLOYED PROPERLY

 Restraint Commentary
 NONE

# Vehicle 1 2006 HYUNDAI SONATA

Test #	5453											
VIN	KMHET4	6CX6A	07813	0		NHTSA T	est Vehicl	e Number	1			
Year	2006					Vehicle Mo	dification	Indicator	PRODU	JCTIO	VEHICI	LE
Make	HYUNDA	AI		Post-tes	t Steering	Column Shear C	Capsule Se	eperation	UNKNO	OWN		
Model	SONATA	1			Ste	ering Column Co	ollapse Me	chanism	UNKNO	OWN		
Body	FOUR D	OOR SE	EDAN									
Engine	4 CYLINI	DER TR	RANSV	ERSE F	RONT							
Displacement	2.4	Liter	Tra	nsmissi	on <b>AUT</b>	OMATIC - FROM	NT WHEE	L DRIVE				
Vehicle Modific	ation(s) De	escriptic	on 📘	NONE								
Vehicle Comme	entary 2	006 HY	UNDA	I SONA	TA - M605	06						
Vehicle Leng	gth 🛃	801	mm	189.0	inches	CC	G behind F	ront Axle	1157	mm	45.6	inches
Vehicle V	Vidth 1	832	mm	72.1	inches	Center of E	Damage to	CG Axis	0	mm	0.0	inches
Vehicle Wheel	lbase 2	727	mm	107.4	inches	Total Leng	gth of Inde	entation	1452	mm	57.2	inches
Vehicle Test W	eight 1	710	KG	3769	pounds	Maximum	Static Crus	sh Depth	431	mm	17.0	inches
							Pre-Impa	ct Speed	57	kph	35.2	mph
Vel	hicle Dama	age Inde	ex 12	2FDEW2	2	Princ	ipal Direct	ion of For	ce <b>0</b>			
Damage Dr	ofilo Diet	anco N	10201	iromor	nte	Crush from	n Dro &	Doct To	et Dama		acuron	oonte
			Deer		<u></u>			<u>1 031 16</u>			Cruch	Denth
(Meast		o-Right,	Rear-	lo-Front	) Loft	Bumper Corner	Pre-res	inchoo	Post-Tes	<u>inchoo</u>		<u>Depin</u> Tinchoo
	<u>291</u> II	100 <u>1</u>	1.5		s Leit	Bumper Comer	186.0	inches	169.0	inches	17.0	
	<u>+25</u> II	100 <u>1</u> 0	<u>6.7</u>		5		4/24	mm	4293	mm	431	_ mm
	<u>92</u> II		<u>5.4</u>		5	Centerline	189.0	inches	173.5	inches	15.5	inches
	<u>5/1</u> II		4.0 2.5	inches	5		4801	mm	4407	mm	394	mm
	243 II	nn <b>1</b>	3.5 2.0		, Right	Bumper Corner	185.9	inches	172.6	inches	13.3	inches
	<b>529</b>	IIII <u>[1</u> ,	3.0		, ,	·	4722	mm	4383	mm	339	
												_
Bumper E	ngagemer	nt			Sill	Engagement			A	-pillar E	ingageme	ent
(Inline Im	pact Only)	)			(Si	de Impact Only)			(	Side In	npact On	ly)
	).0			Г	NO	T APPLICABLE			Г	·	0.0	Ϊ
									_			
Moving	Test Cart	t			Movin	g Test Cart/Vehi	cle		Vehi	cle Orie	entation c	on Cart
Α	ngle					rabbed Angle				Moving	Test Car	rt
DIRECT	ENGAGE	MENT				0.0			N	OT AP	PLICABL	.E
Magnitude	of the Tilt A	ngle			Magnitu	ire of the Crabbed A	ngle		1	Magnitud	e of the An	gle
Measured b	etween surfa	ace of a			Mea	asure Clockwise from	n , , , , , , , , ,		Measured	between	the Vehicle	e Orientation
Rollover Test	Cart and the	e Ground		Lo	ngitudinal Ve	ector to Velocity Vec	tor of Vehicl	e	and D	Direction of	of Test Carl	t Motion

### Vehicle 1 2006 HYUNDAI SONATA

Test #	5453									
VIN	KMHE	T46CX6	A07813	30		NHTSA Test Vehicle Number	1			
Year	2006					Vehicle Modification Indicator	PROD	UCTIO	N VEHICL	E
Make	HYUN	DAI		Post-test	Steering	g Column Shear Capsule Seperation	UNKNOWN			
Model	SONA	ТА			Ste	eering Column Collapse Mechanism	UNKN	OWN		
Body FOUR DOOR SEDAN										
Engine 4 CYLINDER TRANSVERSE FRONT										
Displacement 2.4 Liter Transmission AUTOMATIC - FRONT WHEEL DRIVE										
Vehicle Modification(s) Description NONE										
Vehicle Comm	entary	2006 H	YUND	AI SONAT	A - M60	506				
Vehicle Len	gth	4801	mm	189.0	inches	CG behind Front Axle	1157	mm	45.6	inches
Vehicle V	Vidth	1832	mm	72.1	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Whee	lbase	2727	mm	107.4	inches	Total Length of Indentation	1452	mm	57.2	inches
Vehicle Test W	/eight	1710	] KG	3769	pounds	Maximum Static Crush Depth	431	mm	17.0	inches
						Pre-Impact Speed	57	kph	35.2	mph
Vehicle Damage Index 12FDEW2 Principal Direction of Force 0										
			P	re & Po	ost Tes	st Damage Measurements				

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

	Left	Side			Cente	erline			Right Side				
Pre	e-Test	Pos	t-Test	Pre	-Test	Post	-Test	Pre	-Test	Post	Test		
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches		
				Leng	gth of Vehi	cle at Cer	Iterline						
				4801	189.0	4407	173.5						
					Engin	e Block							
				434	17.1	434	17.1						
4724	186.0	4293	169.0		Front Bur	mper Corr	ner	4722	185.9	4383	172.6		
					Front of	of Engine							
				4326	170.3	4081	160.7						
3687	145.2	3676	144.7		Fire	ewall		3682	145.0	3641	143.3		
				3706	145.9	3684	145.0						
3272	128.8	3274	128.9	Upp	per Leading	g Edge of	Door	3270	128.7	3271	128.8		
3300	129.9	3300	129.9	Low	er Leading	g Edge of	Door	3298	129.8	3299	129.9		
3300	129.9	3300	129.9		Bottom of	f 'A' Post		3297	129.8	3298	129.8		
2225	87.6	2226	87.6	Up	per Trailin	g Edge of	Door	2223	87.5	2225	87.6		
2253	88.7	2253	88.7	Lo	wer Trailin	g Edge of	Door	2250	88.6	2251	88.6		
					Steerin	g Column							
				2843	111.9	2872	113.1						
				Center of See	ering Colur	nn to 'A' F	ost (Horizo	ntal)					
				367	14.4	386	15.2						
				Center of Stee	ering Colur	mn to Hea	dliner (Vert	ical)					
				418	16.5	409	16.1						

NHTSA Crash Test - #5453 - Front Impact

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

Test Vehicle Weight =	3769 pounds
Vehicle Closing Speed =	35.2 mph
Test Crush Length =	72.1 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Deee Side)
(Driver Side)	17.0	15.5	13.3	(Pass. Side)

		CRASH	CRASH 3 Stiffness Coefficents			
		<u> </u>	<u> </u>	G	<u>    Kv    </u>	
Minimum Crush = 13.3 inches					293.5	
Using a Rated No Damage Speed of	2.5mph	257.5	253.2	130.9		
Using a Rated No Damage Speed of	5.0mph	475.6	216.0	523.7		
Using a Rated No Damage Speed of	7.5mph	654.4	181.7	1178.2		
Using a Rated No Damage Speed of	10.0mph	793.8	150.4	2094.6		
Average Crush = 15.3 inches					221.7	
Using a Rated No Damage Speed of	2.5mph	223.8	191.4	130.9		
Using a Rated No Damage Speed of	5.0mph	413.5	163.2	523.7		
Using a Rated No Damage Speed of	7.5mph	568.8	137.3	1178.2		
Using a Rated No Damage Speed of	10.0mph	690.0	113.7	2094.6		
Maximum Crush = 17.0 inches					179.6	
Using a Rated No Damage Speed of	2.5mph	201.5	155.0	130.9		
Using a Rated No Damage Speed of	5.0mph	372.1	132.2	523.7		
Using a Rated No Damage Speed of	7.5mph	512.0	111.2	1178.2		
Using a Rated No Damage Speed of	10.0mph	621.0	92.1	2094.6		

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, Ib/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	17.0	29.9	-5.3	-17.8

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 29.2

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #5453 - Front Impact

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

Test Vehicle Weight =	3769 pounds
Vehicle Closing Speed =	35.2 mph
Test Crush Length =	57.2 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Dece Side)
(Driver Side)	17.0	15.5	13.3	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	<u> </u>	G	<u>    Kv</u>
Minimum Crush = 13.3 inches					370.2
Using a Rated No Damage Speed of	2.5mph	324.9	319.5	165.2	
Using a Rated No Damage Speed of	5.0mph	600.1	272.5	660.7	
Using a Rated No Damage Speed of	7.5mph	825.6	229.3	1486.6	
Using a Rated No Damage Speed of	10.0mph	1001.5	189.8	2642.8	
Average Crush = 15.3 inches					279.8
Using a Rated No Damage Speed of	2.5mph	282.4	241.4	165.2	
Using a Rated No Damage Speed of	5.0mph	521.7	205.9	660.7	
Using a Rated No Damage Speed of	7.5mph	717.7	173.3	1486.6	
Using a Rated No Damage Speed of	10.0mph	870.6	143.4	2642.8	
Maximum Crush = 17.0 inches					226.6
Using a Rated No Damage Speed of	2.5mph	254.2	195.6	165.2	
Using a Rated No Damage Speed of	5.0mph	469.5	166.8	660.7	
Using a Rated No Damage Speed of	7.5mph	645.9	140.3	1486.6	
Using a Rated No Damage Speed of	10.0mph	783.5	116.2	2642.8	

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, Ib/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	17.0	29.9	-5.3	-17.8

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 29.2

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #5453 - Front Impact

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

Test Vehicle Weight =	3769 pounds
Vehicle Closing Speed =	35.2 MPH
Test Crush Length =	72.1 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Dece Cide)
(Driver Side)	11.5	16.7	15.4	14.6	13.5	13.0	(Pass Side)

		CRASH 3 Stiffness Coefficients SN			SMAC Stiffness
		<u> </u>	<u> </u>	G	Kv
Minimum Crush = 11.5 inches					392.5
Using a Rated No Damage Speed of	2.5mph	297.8	338.7	130.9	
Using a Rated No Damage Speed of	5.0mph	550.1	288.9	523.7	
Using a Rated No Damage Speed of	7.5mph	756.8	243.1	1178.2	
Using a Rated No Damage Speed of	10.0mph	918.0	201.2	2094.6	
Average Crush = 14.5 inches					246.9
Using a Rated No Damage Speed of	2.5mph	236.2	213.1	130.9	
Using a Rated No Damage Speed of	5.0mph	436.3	181.7	523.7	
Using a Rated No Damage Speed of	7.5mph	600.2	152.9	1178.2	
Using a Rated No Damage Speed of	10.0mph	728.1	126.5	1458.5	
Maximum Crush = 16.7 inches					186.1
Using a Rated No Damage Speed of	2.5mph	205.1	160.6	130.9	
Using a Rated No Damage Speed of	5.0mph	378.8	137.0	523.7	
Using a Rated No Damage Speed of	7.5mph	521.2	115.3	1178.2	
Using a Rated No Damage Speed of	10.0mph	632.2	95.4	2094.6	

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

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	16.7	29.6	-5.6	-18.9

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 29.7

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #5453 - Front Impact

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

Test Vehicle Weight =	3769 pounds
Vehicle Closing Speed =	35.2 MPH
Test Crush Length =	57.2 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	11.5	16.7	15.4	14.6	13.5	13.0	(Pass Side)

		CRASH 3 Stiffness Coefficients Si			SMAC Stimness
		<u> </u>	<u> </u>	G	<u> </u>
Minimum Crush = 11.5 inches					495.2
Using a Rated No Damage Speed of	2.5mph	375.7	427.4	165.2	
Using a Rated No Damage Speed of	5.0mph	694.0	364.5	660.7	
Using a Rated No Damage Speed of	7.5mph	954.9	306.7	1486.6	
Using a Rated No Damage Speed of	10.0mph	1158.3	253.8	2642.8	
Average Crush = 14.5 inches					311.5
Using a Rated No Damage Speed of	2.5mph	298.0	268.8	165.2	
Using a Rated No Damage Speed of	5.0mph	550.4	229.3	660.7	
Using a Rated No Damage Speed of	7.5mph	757.3	192.9	1486.6	
Using a Rated No Damage Speed of	10.0mph	918.6	159.7	1840.2	
Maximum Crush = 16.7 inches					234.8
Using a Rated No Damage Speed of	2.5mph	258.7	202.7	165.2	
Using a Rated No Damage Speed of	5.0mph	477.9	172.9	660.7	
Using a Rated No Damage Speed of	7.5mph	657.6	145.4	1486.6	
Using a Rated No Damage Speed of	10.0mph	797.6	120.4	2642.8	

Rated No Damage Speed = Impact speed with a barrier

resulting in no permanant vehicle deformation

Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in

B = Crush resistance per inch of damage width (Crash), lb/in^2

G = Energy dissipated without permanent damage, lb

Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

\*

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

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats KE Speed (mph) = SQRT(30 \* CF \* max crush in feet)

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	16.7	29.6	-5.6	-18.9

# 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 29.7

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2013 Make: HYUNDAI Model: SONATA

Test	Vehicle	No							
Numbe	r Info	Damage	Average	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	e s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
5730	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	13.6	24.7	296.9	86.2	511.4	135.4	18.0
6940	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	17.5	35.0	353.3	121.4	514.2	165.3	28.0
7203	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	17.1	35.1	363.4	128.3	514.5	174.5	28.9
6362	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	17.1	35.0	374.6	131.7	532.7	179.3	28.7
5798	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	16.6	35.4	404.8	148.5	551.8	201.4	30.2
5453	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	14.5	35.2	436.4	181.8	523.7	247.0	34.2
5799	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	14.4	35.1	460.6	192.1	552.1	261.3	34.1
6338	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	13.3	34.8	476.9	214.8	529.6	292.8	36.6
7002	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	12.5	35.0	496.4	237.9	517.9	323.9	39.1
6511	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	12.1	35.0	524.0	259.3	529.4	352.9	40.4
5797	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	8.1	25.0	546.9	271.2	551.5	423.5	31.0
7792	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	7.7	24.7	577.0	296.7	561.0	466.2	31.9
		Average	(AVG)		442.6	189.2	532.5	268.6	31.8

Average (AVG)		442.6	189.2	532.5	268.6	31.8
Minimum (MIN)		296.9	86.2	511.4	135.4	18.0
Maximum (MAX)		577.0	296.7	561.0	466.2	40.4
Standard Deviation (STDev-sample)		86.1	67.5	17.4	106.2	5.9
Number of Tests (n)	12					

#### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2013 Make: HYUNDAI Model: SONATA

Test	Vehicle	No							
Numbe	r Info	Damage	Max	Closing	V	ehicle	Width-		
		Speed	Crush	Speed	S t	iffness	Value	e s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
5730	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	15.7	24.7	257.6	64.9	511.4	101.9	15.6
7203	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	21.3	35.1	290.4	81.9	514.5	111.4	23.1
6940	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	20.4	35.0	302.4	88.9	514.2	121.0	24.0
6362	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	20.7	35.0	309.6	89.9	532.7	122.4	23.7
5798	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	18.8	35.4	357.0	115.5	551.8	156.6	26.7
5453	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	17.0	35.2	372.8	132.7	523.7	180.3	29.2
5797	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	11.6	25.0	381.7	132.1	551.5	206.3	21.6
5799	2006 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	17.2	35.1	387.1	135.7	552.1	184.5	28.7
7002	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	15.2	35.0	409.8	162.1	517.9	220.7	32.3
6338	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	14.8	34.8	428.2	173.1	529.6	236.0	32.9
6511	2009 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	14.0	35.0	454.9	195.4	529.4	265.9	35.1
7792	2011 HYUNDAI SONATA FOUR DOOR SEDAN	5.0	9.4	24.7	470.6	197.3	561.0	310.0	26.0
		Average (	(AVG)		368.5	130.8	532.5	184.8	26.6

Average (AVG)		368.5	130.8	532.5	184.8	26.6
Minimum (MIN)		257.6	64.9	511.4	101.9	15.6
Maximum (MAX)		470.6	197.3	561.0	310.0	35.1
Standard Deviation (STDev-sample)		67.5	44.5	17.4	65.8	5.5
Number of Tests (n)	12					

#### Expert VIN DeCoder®

Copyright© 1991-2014 Expert Witness Services, Inc. All Rights Reserved

Version Number 3.4.0.2



The First through Third characters (JTD) indicate a Toyota Car made in Japan The Fourth character (B) indicates a 4-Door Sedan The Fifth character (T) indicates the OEM engine: 1.5L / 91cu.in., L4,DOHC The Sixth and Eighth characters (93) indicate a Yaris The Seventh character (2) indicates Dual Front Air Bags The Ninth character (the check digit) is entered as 3. The VIN appears Valid, the calculated value is 3. The Tenth character (7) indicates the model year 2007

- The Eleventh character (1) indicates the vehicle was made in the assembly plant in Toyota, Japan
- The Twelfth through Seventeenth characters (164780) indicate the Serial Number and are unique to this vehicle.

#### Expert AutoStats®

Version 5.5.1.0 Copyright 2015 - All Rights Reserved

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

> > 9/4/2015

#### 2007 TOYOTA YARIS 4 DOOR SEDAN

2309 1047 Curb Weight: lbs. kg. % Curb Weight Distribution -61 % Front: Rear: 39 Gross Vehicle Weight Rating: 3300 lbs. 1497 kg. Number of Tires on Vehicle: 4 Drive Wheels: FRONT Horizontal Dimensions Inches Feet Meters Total Length 169 14.08 4.29 wheelbase: 100 2.54 8.33 Front Bumper to Front Axle: 31 2.58 0.79 Front Bumper to Front of Front Well: 17 1.42 0.43 Front Bumper to Front of Hood: 7 0.58 0.18 Front Bumper to Base of Windshield: 36 3.00 0.91 Front Bumper to Top of Windshield: 66 5.50 1.68 0.97 Rear Bumper to Rear Axle: 38 3.17 Rear Bumper to Rear of Rear Well: 1.92 23 0.58 0.50 Rear Bumper to Rear of Trunk: 6 0.15 18 Rear Bumper to Base of Rear Window: 1.50 0.46 Width Dimensions 67 5.58 1.70 Maximum Width: 58 4.83 1.47 Front Track: 58 4.83 1.47 Rear Track: Vertical Dimensions Height: 57 4.75 1.45 Ground to -22 1.83 0.56 Front Bumper (Top) Headlight - center 29 2.42 0.74 2.75 Hood - top front: 33 0.84 39 3.25 Base of Windshield 0.99 Rear Bumper - top: 24 2.00 0.61 Trunk - top rear: 42 3.50 1.07 Base of Rear Window: 44 3.67 1.12

# Expert AutoStats®

#### 2007 TOYOTA YARIS 4 DOOR SEDAN

Interior Dimensions Front Seat Shoulder Front Seat to Headl Front Leg Room - sea	width iner atback to floor (max)	Inches 52 39 42	Feet 4.33 3.25 3.50	Meters 1.32 0.99 1.07
Rear Seat Shoulder W Rear Seat to Headlir Front Leg Room - sea	vidth ner atback to floor (min)	50 37 36	4.17 3.08 3.00	1.27 0.94 0.91
Seatbelts: <b>3pt -</b>	front and rear			
Airbags: <b>FRONT</b>	SEAT AIRBAGS			
Steering Data				
Turning Circle (Dian	neter)	396	33.00	10.06
Steering Ratio:	19.70:1			
Wheel Radius:				
Tire Size (OEM):	P175/65R14			
Acceleration & Braking	Information			
Brake Type: FRONT	DISC - REAR DRUM			
ABS System: ALL W	HEEL ABS - OPTIONAL			
Braking, 60 mph to ( d = <b>125.0</b> ft	) (Hard pedal, no skid, t = <b>2.8</b> sec	dry pavement): a = -30.9 ft/s	sec² G-fo	rce = -0.96
Acceleration:				
0 to 30mph	t = 3.3 sec	a = 13.3 ft/s	sec² G-fo	rce = 0.41
0 to 60mph	t = 10.4 sec	a = 8.5 ft/s	sec² G-fo	rce = 0.26
45 to 65mph	t = <b>5.6</b> sec	a = 5.2 ft/s	sec² G-fo	rce = 0.16
Transmission Type:	5spd MANUAL			
Notes: Federal Bumper St This vehicles Rat	andard Requirements: ed Bumper Strength:	2.5	mph mph	

N.S.D.C = 2007 - 2012

### Expert AutoStats®

#### 2007 TOYOTA YARIS 4 DOOR SEDAN

Other Information			
Tip-Over Stability Ratio =	1.30	Stable	
NHTSA Star Rating (calculated)		****	
Center of Gravity (No Load):			
Inches behind front axle	=	39.00	
Inches in front of rear axle	=	61.00	
Inches from side of vehicle	=	33.50	
Inches from ground	=	22.37	
Inches from front corner	=	77.60	
Inches from rear corner	=	104.51	
Inches from front bumper	=	70.00	
Inches from rear bumper	=	99.00	
Moments of Inertia Approximations (No Load):			
Yaw Moment of Inertia	=	1172.27	lb*ft*sec <sup>2</sup>
Pitch Moment of Inertia	=	1136.91	lb*ft*sec <sup>2</sup>
Roll Moment of Inertia	=	265.62	lb*ft*sec <sup>2</sup>
Front Profile Information			
Angle Front Bumper to Hood Front	=	57.5	deg
Angle Front of Hood to Windshield Base	=	11.7	deg
Angle Front of Hood to Windshield Top	=	20.4	deg
Angle of Windshield	=	28.1	deg
Angle of Steering Tires at Max Turn	=	28.9	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 #6221

# 2008 TOYOTA YARIS

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS 8387 UNIVERSITY AVENUE LA MESA CA 91941-3842 15R-030201SC02301

Copyright 2015 - All Rights Reserved 4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA (800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

# Similar Vehicle database reader

# You entered: 2007 TOYOTA YARIS 4D

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

Year Range	Make	Model	<b>Body Styles</b>	Wheelbase
2006 - 2010	ΤΟΥΟΤΑ	YARIS 4D	4D	100.4
Remarks:				

The Similar Vehicle List contained in 4N6XPRT StifCalcs is an extension of the free Vehicle Interchange List provided by Gregory C. Anderson of Scalia Safety Engineering through the 2012 model year. 4N6XPRT Systems® has taken over the maintenance of the Similar Vehicle List beginning with the 2013 version of the 4N6XPRT StifCalcs program. 4N6XPRT Systems® makes no warranties, either expressed or implied, with respect to this data, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the user. In no event will 4N6XPRT Systems® be liable for direct, indirect, incidental, or consequential damages resulting from any data presented here, even if 4N6XPRT Systems® has been advised of the possibility of such damages. The user must agree to assume full responsibility for any decisions which are based, in whole or in part, upon information obtained by using this data. Some of the listed similarities are based on estimates or memory. Most of the data are pulled from specification tables which may contain inaccuracies of their own. Use common sense - if something seems wrong, check it (and if it is wrong, let us know!). corrections, etc., we request and urge you to contact us - 4n6@4n6xprt.com. If you have suggestions,

#### **Test Information**

	_				Г				
lest # <b>6221</b>		NHTSA Test	Reference	e Guide Version	n #[	<u>V5</u>			
Test Date 2007-10-1	.0			Contract	t # [	DTNH22-06-	D-00028		
Contract/Study Title	NCAP - 200	8 TOYOTA YAR	IS 3-DOC	OR LIFTBACK	κ				
Test Objective(s)	VEHICLE CR	RASHWORTHIN	ESS AND	OCCUPANT	RES	STRAINT PER	RFORMAN	CE DATA	
Test Type	NEW CAR A	SSESSMENT TE	ST			Configuration	VEHICL	E INTO BARR	IER
Impact Angle	0		S	ide Impact Po	oint [	0	mm	0.0	inches
				Offset Dista	ance	0	mm	0.0	inches
				Closing Spe	eed[	56.2	Km/Hr	34.92	MPH
Test Performer	MGA RESEA	RCH							
Test Reference #	BT0710100	1							
Test Track Surface	CONCRETE			Conditio	on [	DRY			
Ambient Temperature	<b>21</b> C	<b>69.8</b> F	Total N	umber of Curv	ves [	132			
Data Recorder Type	OTHER					Data Link	OTHER		
Test Commentary	DTS TDAS P	RO ON BOARD	DAS						

### **Fixed Barrier Information**

Barrier Type <b>R</b>	IGID	Pole Barrier Diameter <b>0</b>	mm	0	inches
Barrier Shape	OAD CELL BARRIER				
Barrier Commentary					

# 2008 TOYOTA YARIS LEFT FRONT SEAT OCCUPANT

Test #	6221		
Vehicle #	1	Sex MALE	
Location	LEFT FRONT SE	Age 0	
Position	FORWARD OF C	ENTER POSITION Height 0 mm 0.0 inches	
Туре	HYBRID III DUMM	MY Weight 0.0 kg 0 pounds	
Size	<b>50 PERCENTILE</b>		
Cali	ibration Method	HYBRID III	
Occupar	nt Manufacturer	FIRST TECHNOLOGY S/N 065	
Occupa	ant Modification		
Occu	pant Description		
Occupa	ant Commentary	HEAD TO HEADREST	
Head to -		Head	
Windshie	der Header 355	5 mm <b>14.0</b> inches Head Injury Criteria (HIC) <b>390</b>	
Windonie	WindShield 641	mm 25.2 inches HICLower Time Interval (ms) 60.4	
	Seatback 0	mm 0.0 inches HIC Lower Time Interval (ms) 96.4	
	Side Header 214	1 mm 84 inches	
ç	Side Window 321	$\frac{1}{1} mm = \frac{12.6}{12.6} inches$	
Neck to Se	atback 0 n	mm 0 0 inches	
	First Contact Re	egion (Head) AIR BAG	
ç	Second Contact Red	egion (Head)	
		Chest	
Chest to -			
	Dash 644 m	mm <b>25.4</b> inches Arm to Door <b>96</b> mm <b>3.8</b> inches	
Steering V	Vheel 317 m	mm 12.5 inches Hip to Door 138 mm 5.4 inches	
Seat	tback <b>0</b> m	mm <b>0.0</b> inches	
Chest S	everity Index 0	Pelvic Peak Lateral Acceleration (g's) 0	
Thoracic Tr	auma Index 0	Thorax Peak Acceleration (g's) 43	
	Lap B	Belt Peak Load 6545 Newtons 1471.4 pound Force	
	Shoulder B	Belt Peak Load 4588 Newtons 1031.4 pound Force	
First Co	ontact Region (Che	est/Abdomen) AIR BAG	
Second Co	ontact Region (Ches	est/Abdomen) NONE	
		lans	
Knees to	Dash 151 m	mm <b>5.9</b> inches Knees to Seatback <b>0</b> mm <b>0.0</b> inches	
Left Femi	ur Peak Load	13035 Newtons -1356.7 pounds Force	
Right Femu	Ir Peak Load	327 Newtons -1197.6 pounds Force	
	First Contact R	Region (Legs) DASHPANEL	
	Second Contact Re	egion (Legs)	

# 2008 TOYOTA YARIS LEFT FRONT SEAT OCCUPANT

<b>T</b> + - #						
lest#	6221		-			
Vehicle #	1		Sex	MALE		
Location	LEFT FRONT SE	EAT	Age 🕻	0		
Position	FORWARD OF	CENTER POSITION	Height	<b>0</b> mm	0.0 inches	
Туре	HYBRID III DUM	MY	Weight	<b>0.0</b> kg	0 pounds	
Size	<b>50 PERCENTILE</b>					
Cal	ibration Method	HYBRID III				
Occupar	nt Manufacturer	FIRST TECHNOLOGY S/N	65			
Occupa	ant Modification					
Occu	pant Description					
Occupant Commentary HEAD TO HEADREST						
	-					
		Postrainta				
_		Restraints				
Restrai	nt # 1 3 POINT	BELT				
Mounte	ed BELT - C	ONVENTIONAL MOUNT				
Deploy	ment <b>DEPLOY</b>	ED PROPERLY				
Restrai	nt Commentary	PRIMARY				
Postrai						
Resula						
Mounte	d STEERIN	IG WHEEL				
Deploy	ment <b>DEPLOY</b>	ED PROPERLY				

**Restraint Commentary** 

SECONDARY

# 2008 TOYOTA YARIS RIGHT FRONT SEAT OCCUPANT

Test #	6221				
Vehicle #	1		Sex	MALE	
Location	<b>RIGHT FRONT S</b>	EAT	Age [	0	
Position	FORWARD OF C	ENTER POSITION	Height	0 mm 0.0 inch	es
Туре	HYBRID III DUMM	/IY	Weight	0.0 kg 0 pour	nds
Size	50 PERCENTILE				
Cal	ibration Method	HYBRID III			
Occupar	nt Manufacturer	FIRST TECHNOL	OGY S/N 066		
Occupa	ant Modification				
Occu	pant Description				
Occupa	ant Commentary	HEAD TO HEADF	EST; KNEES TO GLOVEBO	XC	
Head to - Windshie	elder Header 377 WindShield 651 Seatback 0	H mm 14.8 mm 25.6 mm 0.0	ead inches Head Injury Cr inches HIC Low inches HIC Upp	riteria (HIC) <b>559</b> ver Time Interval (ms) <b>61.6</b> ver Time Interval (ms) <b>86.3</b>	
(	Side Mindow 222	(1)     <u>8.3</u>			
Neck to Se	athack 0 r	$\frac{12.7}{100}$			
NECK ID DE	First Contact Re		BAG		Г
c	Second Contact Re		DAG		J T
Chest to -	Dash <b>527</b> n	<u>Cr</u> nm <u>20.7</u> incr	est es Arm to Door 13	6 mm <b>5.4</b> inches	
Steering v	theoly	im <u>U.U</u> incr	es Hip to Door [ <u>13</u>	<u>9</u> mm <u>5.5</u> incres	
Sea Choot S			Bolvio Dook Latoral Acc	coloration (g/a)	7
Thoracic Tr			Thoray Deak A	cceleration $(q's)$ <b>42</b>	1
			III Newtone 1823.4 r	nound Force	
	Shoulder B	elt Peak Load	25 Newtons 1017.3 r	pound Force	
First C	ontact Region (Che	st/Abdomen)			7
Second Co	ontact Region (Che	st/Abdomen)	IF		 ]
					<b>_</b>
Knees to Left Femu Right Femu	Dash <b>151</b> n ur Peak Load <b>-52</b> ur Peak Load <b>-59</b> First Contact R	1m <b>5.9</b> inch 222 Newto 39 Newto tegion (Legs) <b>OTI</b>	<u>egs</u> es Knees to Seatback 0 ns -1174.0 pounds ns -134.7 pounds ER	mm <b>0.0</b> inches Force Force	]
	Second Contact Re	gion (Legs)			]

#### 2008 TOYOTA YARIS RIGHT FRONT SEAT OCCUPANT

Test #	6221							
Vehicle #	1		Sex	MALE				
Location	<b>RIGHT FRONT</b>	SEAT	Age	0				
Position	FORWARD OF	CENTER POSITION	Height	<b>0</b> mm	0.0 inches			
Туре	HYBRID III DUN	IMY	Weight	<b>0.0</b> kg	0 pounds			
Size	<b>50 PERCENTIL</b>	E						
Cali	ibration Method	HYBRID III						
Occupar	nt Manufacturer	FIRST TECHNOLOGY S/	N 066					
Occupa	ant Modification							
Occu	pant Description							
Occupa	ant Commentary	HEAD TO HEADREST; K	NEES TO GLOVEB	OX				
		Restraints	<u>5</u>					
Restrai	nt # 1 3 POINT	BELT						
Mounte	Mounted BELT - CONVENTIONAL MOUNT							
Deploy	bloyment DEPLOYED PROPERLY							
Restrai	nt Commentary	PRIMARY						
Restrai	nt # 2 FRONT	AL AIRBAG						
Mounte	d DASH P	ANEL - TOP						

 Deployment
 DEPLOYED PROPERLY

 Restraint Commentary
 SECONDARY

# 2008 TOYOTA YARIS RIGHT REAR SEAT OCCUPANT

Test #	6221			
Vehicle #	1		Sex NOT APPLICABLE	
Location	<b>RIGHT REAR SE</b>	лт	Age <b>0</b>	
Position	NON-ADJUSTAB	E SEAT	Height 0 mm 0.0 inch	es
Туре	CRABI		Weight <b>0.0</b> kg <b>0</b> pour	nds
Size	12 MONTH OLD	HILD		
Cali	ibration Method	PART 572		
Occupar	nt Manufacturer	FIRST TECHNOLOGY S/N 093		
Occupa	ant Modification			
Occu	pant Description			
Occupa	ant Commentary	HEAD TO HEADREST		
Head to -		<u>Head</u>		
Windshie	elder Header	mm inches	Head Injury Criteria (HIC) [1391	
	WindShield 0	mm inches	HIC Lower Time Interval (ms) 54.3	3
	Seatback 507	mm <b></b> inches	HIC Upper Time Interval (ms) 90.3	3
	Side Header	mm inches		
5	Side Window 357	mm <b>14.1</b> inches		
Neck to Sea	atback [ <b>0</b> r	im <b>[0.0</b> ] inches		-
	First Contact Re	gion (Head) OTHER		4
S	Second Contact Reg	ion (Head)		
<b>e</b>		<u>Chest</u>		
Chest to -	[]			
<i>.</i>	Dash <b>0</b> n	m 0.0 inches Arm	to Door <b>242</b> mm <b>9.5</b> inches	6
Steering v	vneel <b>0</b> n	m 0.0 inches Hip	to Door [281] mm [11.1] inches	6
Seat	tback [ <b>402</b> ] n	m [15.8] inches		-
Chest S	everity index 0		ak Lateral Acceleration (g's)	-
Inoracic Ir	auma index [U		norax Peak Acceleration (g's) 61	
	Lap E Chauldan D	Sit Peak Load U Newton	s [0.0] pound Force	
Einst Q	Shoulder B		s [0.0 ] pound Force	-
First Co	untact Region (Che			
Second Co	Intact Region (Ches			
		Legs		
Knees to	Dash <b>0</b> n	m 0.0 inches Knees to	Seatback 172 mm 6.8 inches	6
Left Femu	ur Peak Load 0	Newtons 0.0	pounds Force	
Right Femu	Ir Peak Load 0	Newtons 0.0	pounds Force	_
	First Contact R	egion (Legs) SEAT BACK		_
	Second Contact Re	gion (Legs)		

# 2008 TOYOTA YARIS RIGHT REAR SEAT OCCUPANT

Test #	6221									
Vehicle #	1			Sex	NOT APPLIC	ABLE				
Location	RIGHT	REAR SE	AT	Age	0					
Position	NON-A	JUSTAB	SLE SEAT	] Height	<b>0</b> mm	0.0 inches				
Туре	CRABI			] Weight	<b>0.0</b> kg	0 pounds				
Size	12 MON	ITH OLD	CHILD	]						
Cali	ibration M	lethod	PART 572							
Occupar	nt Manufa	cturer	FIRST TECHNOLOGY S	N 093						
Occupa	ant Modifi	cation								
Occu	pant Des	cription								
Occupant Commentary HEAD TO HEADREST										
	<u>Restraints</u>									
Restrai	int # 1	INFANT S	SAFETY SEAT							
Mounte	ed [	LATCH -	LOWER ANCHORAGES N	O TOP TETHER						
Deploy	ment [	NOT APP	LICABLE							
Restrai	int Comm	entary	PRIMARY - GRACO SNL	JGRIDE						
Restrai	int # 2	5 POINT I	BELT							
Mounte	ed [	CHILD SE	EAT							
Deploy	ment	NOT APP	LICABLE							

SECONDARY - GRACO SNUGRIDE

Restraint Commentary

# 2008 TOYOTA YARIS LEFT REAR SEAT OCCUPANT

Test # 6221	
Vehicle # 1 Sex NOT APPLICABLE	
Location LEFT REAR SEAT Age 0	
Position       NON-ADJUSTABLE SEAT       Height       0       mm       0.0       inches	
Type CRABI Weight 0.0 kg 0 pounds	
Size 12 MONTH OLD CHILD	
Calibration Method PART 572	
Occupant Manufacturer FIRST TECHNOLOGY S/N 090	
Occupant Modification	
Occupant Description	
Occupant Commentary	
Head to -         Windshielder Header       0       mm       0.0       inches       Head Injury Criteria (HIC)       1487         WindShield       0       mm       0.0       inches       HIC Lower Time Interval (ms)       49.9         Seatback       451       mm       17.8       inches       HIC Upper Time Interval (ms)       85.9         Side Header       0       mm       0.0       inches       HIC Upper Time Interval (ms)       85.9         Neck to Seatback       0       mm       0.0       inches       HIC Upper Time Interval (ms)       85.9         Neck to Seatback       0       mm       0.0       inches       HIC Upper Time Interval (ms)       85.9         First Contact Region (Head)       inches       HIC Upper Time Interval (ms)       85.9       HIC Upper Time Interval (ms)       85.9         Second Contact Region (Head)       inches       HIC Upper Time Interval (ms)       85.9       HIC Upper Time Interval (ms)       10	
Chest	
Chest to -Dash0mm0.0inchesArm to Door233mm9.2inchesSteering Wheel0mm0.0inchesHip to Door287mm11.3inchesSeatback352mm13.9inchesHip to Door287mm11.3inches	
Chest Severity Index 0 Pelvic Peak Lateral Acceleration (g's) 0	
Thoracic Trauma Index     0     Thorax Peak Acceleration (g's)     59	
Lap Belt Peak Load <b>0</b> Newtons <b>0.0</b> pound Force	
Shoulder Belt Peak Load <b>0</b> Newtons <b>0.0</b> pound Force	
First Contact Region (Chest/Abdomen)	
Second Contact Region (Chest/Abdomen) NONE	
Legs         Knees to Dash       0       mm       0.0       inches       Knees to Seatback       163       mm       6.4       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)       SEAT BACK       Seat Back       Seat Back	
Second Contact Region (Legs)	

# 2008 TOYOTA YARIS LEFT REAR SEAT OCCUPANT

Test #	6221							
Vehicle #	1		Sex	NOT AP	PLIC	ABLE		
Location	LEFT REAR SEA	NT	Age	0	]			
Position	NON-ADJUSTAE	BLE SEAT	Height	0	mm	0.0	inches	
Туре	CRABI		Weight	0.0	kg	0	pounds	
Size	12 MONTH OLD	CHILD						
Cali	bration Method	PART 572						
Occupant Manufacturer FIRST TECHNOLOGY S/		N 090						
Occupa	ant Modification							
Occupant Description								
Occupa	ant Commentary							

	<u>Restraints</u>						
Restraint # 1	INFANT SAFETY SEAT						
Mounted	LATCH - LOWER ANCHORAGES NO TOP TETHER						
Deployment	eployment NOT APPLICABLE						
Restraint Comr	Restraint Commentary PRIMARY - EVENFLO EMBRACE						
Destraint # 2							
Mounted	CHILD SEAT						
Deployment	Deployment NOT APPLICABLE						
Restraint Comr	nentary SECONDARY - EVENFLO EMBRACE						

## Vehicle 1 2008 TOYOTA YARIS

Test #	6221	]									
VIN	JTDJT9232	85140508			NHTSA T	est Vehicl	e Number	1			
Year	2008				Vehicle Mo	dification	Indicator	PRODU	JCTION	VEHICI	E
Make	ΤΟΥΟΤΑ		Post-test	Steering Col	umn Shear C	apsule Se	eperation	UNKNO	OWN		
Model	YARIS			Steerin	ig Column Co	llapse Me	echanism	UNKNO	OWN		
Body	THREE DO	OR HATC	HBACK								
Engine	4 CYLINDE	R TRANS	VERSE FF	RONT							
Displacement	<b>1.5</b> L	iter Tr	ansmissio	n MANUA	L - FRONT V	VHEEL D	RIVE				
Vehicle Modific	ation(s) Des	cription									
Vehicle Comme	entary VE	IICLE MO	DEL: YAR	IS							
Vehicle Leng	gth <b>364</b>	<b>1</b> mm	143.3	inches	CO	6 behind F	Front Axle	1009	mm	39.7	inches
Vehicle V	Vidth 169	<b>0</b> mm	66.5	inches	Center of D	amage to	o CG Axis	0	mm	0.0	inches
Vehicle Wheel	lbase 246	<b>3</b> mm	97.0	inches	Total Leng	gth of Inde	entation	1164	mm	45.8	inches
Vehicle Test W	eight 124	5 KG	2744	pounds	Maximum S	Static Cru	sh Depth	517	mm	20.4	inches
						Pre-Impa	ict Speed	56	kph	34.9	mph
Vel	hicle Damag	e Index 🧜	2FDEW6		Princ	ipal Direc	tion of For	ce <b>0</b>			
	ofilo Diotor		uromont	•	Cruch from			at Dama			aanta
Damage Pro				<u>s</u>	Clushillor		POSLIE		ige me	asuren	
(Measu	Ired Left-to-H	Right, Rear	-to-⊢ront)			Pre-Tes	<u>it</u> I	Post-les	<u>st</u>	Crush	<u>Depth</u>
	<b>131</b> mm	17.0		Left Bui	mper Corner	139.3	inches	122.3	inches	17.0	] inches
	<b>191</b> mm	19.3				3538	mm	3107	mm	431	] mm
	517 mm	20.4			Centerline	143.3	inches	123.1	inches	20.2	] inches
	507 mm	20.0				3641	mm	3128	mm	513	] mm
	197 mm	19.6		Right Bur	nper Corner	138.9	inches	122.3	inches	16.6	linches
DPD 6 🛛	<b>121</b> mm	16.6	inches	r tight bui		3528	mm	3106	mm	422	] mm
						3020				722	7
Bumper E	ngagement			Sill En	gagement			A	-pillar E	ngageme	ent
(Inline Im	pact Only)			(Side	Impact Only)			(	Side In	npact Onl	V)
	).0			NOT A	PPLICABLE			Γ		0.0	Ϋ́
								L			
Moving	Test Cart			Moving T	est Cart/Vehi	cle		Vehi	cle Orie	entation c	n Cart
A	ngle			Crab	bed Angle				Moving	Test Car	t
DIRECT	ENGAGEME	NT			0.0			N	OT API	PLICABL	.E
Magnitude	of the Tilt Angl	е		Magniture o	f the Crabbed Ai	ngle		I	Magnitud	e of the An	gle
Measured b	etween surface	of a		Measure	e Clockwise from	ו		Measured	between	the Vehicle	• Orientation
Rollover Test	Cart and the G	round	Lon	gitudinal Vector	r to Velocity Vec	tor of Vehicl	le	and D	)irection o	of Test Carl	Motion

### Vehicle 1 2008 TOYOTA YARIS

Test #	6221			_	
VIN	JTDJT92328514050	8	NHTSA Test Vehicle Num	ber 1	
Year	2008	V	ehicle Modification Indicat	or <b>PRODUCTIC</b>	N VEHICLE
Make	ΤΟΥΟΤΑ	Post-test Steering Colum	n Shear Capsule Seperati	on <b>UNKNOWN</b>	
Model	YARIS	Steering C	Column Collapse Mechanis	m UNKNOWN	
Body	THREE DOOR HATC	НВАСК			
Engine	4 CYLINDER TRANS	SVERSE FRONT			
Displacement	1.5 Liter T	ransmission MANUAL -	FRONT WHEEL DRIVE		]
Vehicle Modifie	cation(s) Description				
Vehicle Comm	entary VEHICLE MC	DEL: YARIS			
Vehicle Ler	igth <b>3641</b> mm	143.3 inches	CG behind Front A	xle <b>1009</b> mm	39.7 inches
Vehicle	Nidth <b>1690</b> mm	66.5 inches C	enter of Damage to CG A	xis <b>0</b> mm	0.0 inches
Vehicle Whee	lbase 2463 mm	97.0 inches	Total Length of Indentation	n <b>1164</b> mm	45.8 inches
Vehicle Test V	/eight <b>1245</b> KG	2744 pounds N	laximum Static Crush Dep	oth <b>517</b> mm	20.4 inches
	_		Pre-Impact Spe	ed 56 kph	<b>34.9</b> mph
Ve	hicle Damage Index	12FDEW6	Principal Direction of	Force 0	
	<u>F</u>	<u>'re &amp; Post Test Dar</u>	<u>mage Measuremer</u>	<u>nts</u>	
(Measurem	ents are taken in a longitudi	naldirection. Except for Engine B	ock, all measurements are take	from the Rear Vehicle S	Surface forward.)
1	.eft Side	Ce	nterline	Righ	t Side
Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
mm inche	es mm inches	mm inche	s mm inches	mm inches	mm inches
		Length of Ve	ehicle at Centerline		
		3641 143.3	3128 123.1		
		En:	gine Block		
		458 18.0	459 18.1		
3538 139.3	3107 122.3	Front F	Bumper Corner	3528 138.9	3106 122.3
		Fro	nt of Engine		
		3252 128.0	2980 117.3		
2926 115.2	2827 111.3	]	Firewall	2923 115.1	2854 112.4
		2847 112.1	0 0.0		
2488 98.0	2495 98.2	Upper Lead	ling Edge of Door	2485 97.8	2474 97.4
2450 96.5	2443 96.2	Lower Lead	ling Edge of Door	2453 96.6	2443 96.2
2449 96.4	2434 95.8	Bottom	n of 'A' Post	2446 96.3	2432 95.7
1252 49.3	1276 50.2	Upper Tra	iling Edge of Door	1249 49.2	1259 49.6
1314 51.7	1312 51.7	Lower Tra	iling Edge of Door	1304 51.3	1294 50.9
		Stee	ring Column		
		2068 81.4	2161 85.1		
		Center of Seering Co	lumn to 'A' Post (Horizonta	al)	
		400 15.7	380 15.0		

Center of Steering Column to Headliner (Vertical)

17.7

450

462

18.2

NHTSA Crash Test - #6221 - Front Impact

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

Test Vehicle Weight =	2744 pounds
Vehicle Closing Speed =	34.9 mph
Test Crush Length =	66.5 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Deee Side)
(Driver Side)	17.0	20.2	16.6	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		<u> </u>	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 16.6 inches					146.3
Using a Rated No Damage Speed of	2.5mph	161.4	126.1	103.3	
Using a Rated No Damage Speed of	5.0mph	298.0	107.4	413.3	
Using a Rated No Damage Speed of	7.5mph	409.6	90.2	929.9	
Using a Rated No Damage Speed of	10.0mph	496.4	74.5	1653.2	
Average Crush = 18.5 inches					117.8
Using a Rated No Damage Speed of	2.5mph	144.9	101.5	103.3	
Using a Rated No Damage Speed of	5.0mph	267.4	86.5	413.3	
Using a Rated No Damage Speed of	7.5mph	367.6	72.6	929.9	
Using a Rated No Damage Speed of	10.0mph	445.4	60.0	1653.2	
Maximum Crush = 20.2 inches					98.8
Using a Rated No Damage Speed of	2.5mph	132.7	85.2	103.3	
Using a Rated No Damage Speed of	5.0mph	244.9	72.5	413.3	
Using a Rated No Damage Speed of	7.5mph	336.6	60.9	929.9	
Using a Rated No Damage Speed of	10.0mph	407.9	50.3	1653.2	

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

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	20.2	32.6	-2.4	-7.2

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.1

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #6221 - Front Impact

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

Test Vehicle Weight =	2744 pounds
Vehicle Closing Speed =	34.9 mph
Test Crush Length =	45.8 inches

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

	Left Side Crush	Centerline Crush	Right Side Crush	(Dece Side)
(Driver Side)	17.0	20.2	16.6	(Pass. Side)

		<b>CRASH 3 Stiffness Coefficents</b>			SMAC Stiffness
		<u> </u>	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 16.6 inches					212.4
Using a Rated No Damage Speed of	2.5mph	234.4	183.1	150.0	
Using a Rated No Damage Speed of	5.0mph	432.6	156.0	600.1	
Using a Rated No Damage Speed of	7.5mph	594.7	131.0	1350.1	
Using a Rated No Damage Speed of	10.0mph	720.7	108.2	2400.2	
Average Crush = 18.5 inches					171.0
Using a Rated No Damage Speed of	2.5mph	210.3	147.4	150.0	
Using a Rated No Damage Speed of	5.0mph	388.2	125.6	600.1	
Using a Rated No Damage Speed of	7.5mph	533.6	105.5	1350.1	
Using a Rated No Damage Speed of	10.0mph	646.7	87.1	2400.2	
Maximum Crush = 20.2 inches					143.5
Using a Rated No Damage Speed of	2.5mph	192.6	123.7	150.0	
Using a Rated No Damage Speed of	5.0mph	355.5	105.3	600.1	
Using a Rated No Damage Speed of	7.5mph	488.7	88.5	1350.1	
Using a Rated No Damage Speed of	10.0mph	592.2	73.1	2400.2	

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

Crush	Maximum Crush	Calculated KE Speed	Calculated Error	Calculated Error
Factor	(inches)	(mph)	(mph)	(%)
21	20.2	32.6	-2.4	-7.2

#### 4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 24.1

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

NHTSA Crash Test - #6221 - Front Impact

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

Test Vehicle Weight =	2744 pounds
Vehicle Closing Speed =	34.9 MPH
Test Crush Length =	66.5 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Deee Cide)
(Driver Side)	17.0	19.3	20.4	20.0	19.6	16.6	(Pass Side)

		CRASH 3 Stiffness Coefficients SN			SMAC Stiffness
		<u> </u>	B	G	<u>Kv</u>
Minimum Crush = 16.6 inches					146.3
Using a Rated No Damage Speed of	2.5mph	161.4	126.1	103.3	
Using a Rated No Damage Speed of	5.0mph	298.0	107.4	413.3	
Using a Rated No Damage Speed of	7.5mph	409.6	90.2	929.9	
Using a Rated No Damage Speed of	10.0mph	496.4	74.5	1653.2	
Average Crush = 19.2 inches					109.4
Using a Rated No Damage Speed of	2.5mph	139.6	94.3	103.3	
Using a Rated No Damage Speed of	5.0mph	257.6	80.3	413.3	
Using a Rated No Damage Speed of	7.5mph	354.2	67.4	929.9	
Using a Rated No Damage Speed of	10.0mph	429.2	55.7	1146.8	
Maximum Crush = 20.4 inches					96.9
Using a Rated No Damage Speed of	2.5mph	131.4	83.5	103.3	
Using a Rated No Damage Speed of	5.0mph	242.5	71.1	413.3	
Using a Rated No Damage Speed of	7.5mph	333.3	59.7	929.9	
Using a Rated No Damage Speed of	10.0mph	403.9	49.3	1653.2	

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

Registered Owner: 4N6XPRT SYSTEMS

NHTSA Crash Test - #6221 - Front Impact

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

Test Vehicle Weight =	2744 pounds
Vehicle Closing Speed =	34.9 MPH
Test Crush Length =	45.8 inches

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

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	(Daga Cida)
(Driver Side)	17.0	19.3	20.4	20.0	19.6	16.6	(Pass Side)

		CRASH	SMAC Stiffness		
		A	<u> </u>	G	<u>    Kv    </u>
Minimum Crush = 16.6 inches					212.4
Using a Rated No Damage Speed of	2.5mph	234.4	183.1	150.0	
Using a Rated No Damage Speed of	5.0mph	432.6	156.0	600.1	
Using a Rated No Damage Speed of	7.5mph	594.7	131.0	1350.1	
Using a Rated No Damage Speed of	10.0mph	720.7	108.2	2400.2	
Average Crush = 19.2 inches					158.8
Using a Rated No Damage Speed of	2.5mph	202.7	136.9	150.0	
Using a Rated No Damage Speed of	5.0mph	374.0	116.6	600.1	
Using a Rated No Damage Speed of	7.5mph	514.2	97.9	1350.1	
Using a Rated No Damage Speed of	10.0mph	623.1	80.9	1665.1	
Maximum Crush = 20.4 inches					140.7
Using a Rated No Damage Speed of	2.5mph	190.7	121.2	150.0	
Using a Rated No Damage Speed of	5.0mph	352.0	103.3	600.1	
Using a Rated No Damage Speed of	7.5mph	483.9	86.7	1350.1	
Using a Rated No Damage Speed of	10.0mph	586.4	71.6	2400.2	

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

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

4N6XPRT StifCalcs® licensed by 4N6XPRT Systems (www.4N6XPRT.com) to:

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2010 Make: TOYOTA Model: YARIS 4D

Test	Vehicle	No							
Number	Info Damage Av				V				
			Speed Crush		Stiffness Values			: s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
6069	2007 TOYOTA YARIS FOUR DOOR SEDAN	5.0	11.7	24.7	255.4	86.4	377.3	135.8	21.0
6221	2008 TOYOTA YARIS THREE DOOR HATCHBACK	5.0	19.2	34.9	257.7	80.3	413.3	109.4	25.4
5677	2007 TOYOTA YARIS FOUR DOOR SEDAN	5.0	15.3	35.0	330.3	129.7	420.7	176.5	32.0
7433	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	15.4	43.7	443.4	222.9	441.2	284.1	49.6
	Average (AVG)			321.7	129.8	413.1	176.5	32.0	
		Minimum (MIN)			255.4	80.3	377.3	109.4	21.0
	Maximum (MAX)			443.4	222.9	441.2	284.1	49.6	
	Standard Deviation	(STDev-sa	mple)		88.3	65.8	26.6	76.9	12.6
	Nu	mber of Tes	sts (n)	4					

### Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2010 Make: TOYOTA Model: YARIS 4D

Test	Vehicle	No							
Numbe	r Info	Damage	mage Max  Vehicle Width						
		Speed	Crush	KEES	S t	iffness	Value	e s	Crush
		(mph)	(inch)	(mph)	А	В	G	Kv	Factor
7444	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	34.5	45.1	204.8	47.6	440.4	60.2	23.6
6069	2007 TOYOTA YARIS FOUR DOOR SEDAN	5.0	13.4	24.7	221.8	65.2	377.3	102.4	18.2
5677	2007 TOYOTA YARIS FOUR DOOR SEDAN	5.0	21.5	35.0	234.7	65.5	420.7	89.1	22.8
6221	2008 TOYOTA YARIS THREE DOOR HATCHBACK	5.0	20.4	34.9	243.0	71.4	413.3	97.3	24.0
7433	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	24.9	43.7	274.6	85.4	441.2	108.9	30.7
7434	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	17.0	43.7	405.3	184.7	444.6	235.5	44.9
	Average (AVG)		AVG)		264.0	86.6	422.9	115.6	27.4
		Minimum	(MIN)		204.8	47.6	377.3	60.2	18.2
Maximum (MAX)			MAX)		405.3	184.7	444.6	235.5	44.9
	Standard Deviation	(STDev-sa	mple)		73.0	49.5	25.6	61.2	9.5
	Nur	nber of Tes	sts (n)	6					
Expert System Software for Litigation

8387 University Avenue La Mesa, CA 91941-3842 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

NHTSA conducted three (3) "Oblique Impact" tests on the Yaris.

The Stiffness Test Summary for the AVERAGE and MAXIMUM Crush depths in those tests follow.

## 4N6XPRT StifCalcs®

## Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2010 Make: TOYOTA Model: YARIS 4D

Test	r Info Damage Average								
Number			Average	e  Vehicle Width					
		Speed	Crush	KEES	S	tiffness	Valu	e s	Crush
		(mph)	(inch)	(mph)	Α	В	G	Kv	Factor
7433	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	15.4	43.7	443.4	222.9	441.2	284.1	49.6
7434	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	7.5	43.7	916.9	945.3	444.6	1205.6	101.7
7444	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	6.4	45.1	1099.9	1373.6	440.4	1737.1	126.8
		Average	(AVG)		820.1	847.3	442.1	1075	92.7
		Minimum	(MIN)		443.4	222.9	440.4	284.1	49.6
		Maximum	(MAX)		1099.9	1373.6	444.6	1737	126.8
	Standard Deviation	on (STDev-sa	mple)		338.8	581.6	2.3	735.1	39.4
	Ν	lumber of Tes	sts (n)	3					

## 4N6XPRT StifCalcs®

## Available Test Results Front Impact Test Summary

**Report Filter Settings** 

Year Range: 2006 - 2010 Make: TOYOTA Model: YARIS 4D

Test	Vehicle	No							
Number	Info	Damage	Max		V	ehicle	Width-		
		Speed	Crush	KEES	S t	iffness	Value	s	Crush
		(mph)	(inch)	(mph)	Α	В	G	Kv	Factor
7444	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	34.5	45.1	204.8	47.6	440.4	60.2	23.6
7433	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	24.9	43.7	274.6	85.4	441.2	108.9	30.7
7434	2010 TOYOTA YARIS FOUR DOOR SEDAN	5.0	17.0	43.7	405.3	184.7	444.6	235.5	44.9
		Average	(AVG)		294.9	105.9	442.1	134.9	33.1
		Minimum	(MIN)		204.8	47.6	440.4	60.2	23.6
		Maximum (	MAX)		405.3	184.7	444.6	235.5	44.9
	Standard Deviation	n (STDev-sa	mple)		101.8	70.8	2.3	90.5	10.9
	Nu	mber of Tes	sts (n)	3					

Expert System Software for Litigation

8387 University Avenue La Mesa, CA 91941-3842 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.



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

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

Model	Data Page 1	Data Page 2	Data Pag	e3	Printer	File Ou	utput	D>	(F Outp	ut	
	2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN										
Horizontal Dimensions				Vertical Dimensions							
Length			212	in.	н	Height		58	in.		
Wheelbas	e		115	in.	Grou	und to:					
Front Burr	nper to Front	Axle	43	in.	F	ront Bu	mper (	(Toj	p)	23	in.
Front Bur	nper to Front	of Hood	8	in.	H	leadligh	nt - Ce	ntei	r	27	in.
Front Burr	nper to Base o	of Windshield	65	in.	H	Hood - Top Front		31	in.		
Front Burr	nper to Top o	f Windshield	91	in.	В	Base of Windshield		39	in.		
Front Burr	nper to Front	Wheel Well	26	in.	R	Rear Bumper (Top)		25	in.		
Rear Bump	per to Rear of	f Trunk	8	in.	Т	Trunk - Top Rear		39	in.		
Rear Bump	per to Base of	f Rear Window	38	in.	В	Base of Rear Window		40	in.		
Rear Bump	per to Rear W	/ell	38	in.		W	/eiaht	Dir	mensior	ns	
Rear Bump	per to Rear A:	xle	54	in.					inchisio.	4104	.
	Depth	Dimensions			Curb Weight 4184 Curb Weight Distribution:		lbs.				
Width			78	in.	F	Front =		56	%		
Front Trac	ck		63	in.		Rear =		44	%		
Rear Track	k		66	in.	Gros	s Vehicl	le Wei	ght	Rating	5500	lbs.

N6XPRT BIOMEKN Vers. 2.0 MAIN MENU BRAIN & ORGANS MUSCLE & TENDON NERVES SKIN & HAIR reference CALCULATION CRASH KINEMATICS & DATA

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<sup>™</sup> 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<sup>™</sup>, 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.



**4N6XPRT** Ped & Bike Calcs®

The 4N6XPRT

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



>>>Calculate Time given D & V<<<

45

Enter Distance (in feet) :

Enter Velocity (in mph) :

Expert Qwic Calcs<sup>®</sup> 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**<sup>®</sup>

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<sup>®</sup>. Is a program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet in order to obtain Stiffness Values!

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

### WITHOUT THE INTERNET the user can:

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

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

#### FRONTAL STATISTICAL MEASURES EXAMPLE:

		\  S	/ehicle tiffnes	Width s Valu	 e s
		1	4	В	G Kv
Average (AVG)		305.7	93.5	523.6	143.1
Minimum (MIN)		115.0	13.2	465.2	23.5
Maximum (MAX)		461.6	200.0	614.1	387.3
Standard Deviation (STDev-sample)		73.4	38.4	36.2	72.8
Number of Tests (n)	53				

WITH THE INTERNET the user can: **★ RESEARCH** and easily download the PICTURES, VIDEOS, and REPORTS available for individual tests



## 4N6XPRT BioMeknx®



location

Ford Mercury/Lincoln Chrysler/AMC/Jeep European Import

3FAPP1280MR117253

and Utility vehicles manufactured from 1981 to the present. Cars/Vans/Utility/Lt. Trucks Modules: 1981 to Present Chevrolet/Geo Pontiac / Buick / Oldsmobile

Expert VIN DeCoder® is a program that "DeCodes" the 17 character VIN number for Cars, Vans, Pickups,

Cadillac/Saturn

Asian Import

Expert

VIN

**DeCoder**<sup>®</sup>

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/MasterCar	d card or <b>front of</b> American Express Card:
t224 5676 5012 344 (13) with the one of th	MasterCard Security	American Express →

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

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

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

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

PROGRAM (Pricing effective as of 8/30/12 -	1 ORDER FORM: prices subject to change without	notice)	Individual Veh
Expert AutoStats <sup>®</sup> : 4N6XPRT BioMeknx <sup>®</sup> :	\$ 625.00 * \$ 495.00 *	\$ \$	□ Expert VIN □ NH7
4N6XPRT Ped & Bike Calcs <sup>®</sup> :	\$ 375.00 *	\$	Please circl
Expert Qwic Calcs <sup>®</sup> :	\$ 275.00 *	\$	
Expert TireStuf <sup>®</sup> :	\$ 85.00 *	\$	YEAR & MAKE:
4N6XPRT StifCalcs <sup>®</sup> :	\$ 650.00 *	\$	MODEL
Expert VIN DeCoder <sup>®</sup> :	\$ 550.00 *	\$	MODEL
		======	If you are requesting VIN D
	SUB-TOTAL	\$	
Handling **:		\$	Vehicle Ty
( Cash or Check with order	= \$5.00, Credit Card =	\$10.00,	Car Body S
Govt. Purchas	e Order = \$15.00 )		DRIV
Notarized Affidavit Filing Require	ment	\$	PICKUPS:Dual Rear Wheel - St VANS:Cargo / J
( \$25.00 per require	ed Notarized Signature )		VAIV5.Cargo /
Normal delivery is	via electronic download		
<ul> <li>Deliver via electronic download linl</li> </ul>	k (e-mail address required)	\$ 0.00	
Deliver on USB - <u>additional cost</u> of	of \$35.00 / disk / program	\$	1 2 3
		======	
	SUB-TOTAL	\$	10 11
California shinning addresses add	8 50% sales tax	\$	<u>NHTS</u>
(California orders delivered electronica	ally <b>DO NOT</b> owe sales tax)	Ψ	Impact I Impac
(		¢	mpac
	IUIAL	J	Case Reference/I

icle Data FAX/Order Form

N Decoder & Expert AutoStats TSA Crash Test Results BOTH le ALL OPTIONS that apply

DeCoder & AutoStats please also provide:

ype:Car - Pickup - Utility - Van No. of Doors:2/3/4/5 Style:Coupe/Conv./Sedan/Wagon VE WHEELS: 4x2/4x4 d. / Extra / Super / Crew Cab - Short Bed / Long Bed Passenger - Short / Long Wheelbase

VIN Information

9 4 5 6 7 8 12 13 14 15 16 17 A Crash Test Information

location - Front / Side / Rear ct Speed - Lower / Higher

Number:

## **Individual Vehicle Data** Search Service<sup>®</sup>

**Charges & Services** 

**Individual Vehicle Specifications** \$40.00-First vehicle\*, \$35.00/Additional Vehicles\*, \$20 00/Additional Similar Model\*

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

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

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

### **Individual Vehicle Specifications**

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

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

#### Minimum Vehicle specifications include:

Overall Length	Curb Weight
Overall Width	Weight Distribution
Overall Height	Front/Rear Track
Wheelbase	CG Location
Model years with No Signif	icant Dimensional Changes
VIN DeCoding when VIN	N is provided Information
avail	able
Mid-60's to present <b>also</b> is	ncludes ( <i>when available</i> )
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**<sup>®</sup>

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**<sup>®</sup> 4N6XPRT StifCalcs<sup>®</sup> 4N6XPRT BioMeknx<sup>®</sup> 4N6XPRT Ped & Bike Calcs<sup>®</sup> **Expert Qwic Calcs**<sup>®</sup> Expert TireStuf<sup>®</sup> Expert VIN DeCoder<sup>®</sup>

Vehicle Data Service **Individual Vehicle Data** Search Service<sup>®</sup>

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.

> <u>Modules: 1981 to Present</u> 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 coprocessor chip is NOT required. Expert VIN DeCoder® has also been tested under the various versions of MS-DOS 3.0 thru 7.0, DrDOS 6.0, and PC DOS 7.0. It also works as a DOS program under Windows 3.x, Windows, 95, Windows 98, Windows NT, OS/2 2.x, OS/2 Warp, and various versions of LINUX.

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

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

## PLEASE PRINT

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

Expert VIN DeCoder®

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

#### Normal delivery is via electronic download

□ - Deliver via electronic download link (e-mail address required) \$ 0.00 □ Please deliver on USB at an

additional cost of \$35.00 per disk \$
SUB-TOTAL = \$

CA Addresses add 8.75% sales tax .... = \$\_\_\_\_\_(California orders delivered by e-mail attachment **DO NOT** over sales tax)

TOTAL =

Enclosed is:

Check*/Money Order:	<pre> Credit Card:</pre>	P.O.:
Please make check*/M.	O./P.O. payable	e to:

### 4N6XPRT Systems®

#### **Credit Card Orders:**

MasterCard: Visa: Am.Ex.:
Card #:
Expires:
Name on Card:
Signature:
Billing Add. #:
Billing Zip:
• • •

Mail to: 4N6XPRT Systems® 8387 University Avenue La Mesa, CA 91942-9342

Telephone Orders:

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

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

# Expert VIN DeCoder<sup>®</sup>



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: <u>VIN@4n6xprt.com</u>

## 1-800-266-9778

# 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  $\{ \text{ the Check Digit } \}$  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. S/N:930114VD01201 01-01-2001 Reg. User: 4N6XPRT SYSTEMS

## **Expert AutoStats®**

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

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

### SYSTEM REQUIREMENTS

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

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

### **PLEASE PRINT**

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

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

Normal delivery is via electronic downlo	ad	
□ - Deliver via electronic download link (e-mail address required)	\$	0.00
Please deliver on USB at an		
additional cost of \$35.00 per disk	S	

SUB-TOTAL = \$

CA Addresses add 8.50% sales tax .... = \$ (California orders delivered by e-mail attachment **DO NOT** owe sales tax)

### TOTAL =

Enclosed is:

Check\*/Money Order: Credit Card: P.O.: Please make check\*/M.O./P.O. payable to:

4N6XPRT Systems®

#### **Credit Card Orders:**

MasterCard:	Visa: Am.Ex.:
Card #:	
Expires:	Sec.Code:
Name on Card:	
Signature:	
Billing Add. :	
Billing Zip:	

Mail to: 4N6XPRT Systems® 8387 University Avenue La Mesa, CA 91942-9342

Telephone Orders:

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

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

# Expert AutoStats<sup>®</sup>



vehicles 1940's to the present are represented.

### 4N6XPRT Systems®

Forensic Expert Software 8387 University Avenue La Mesa, CA 91942-9342

## Web: http://www.4n6xprt.com E-Mail: <u>autostats@4n6xprt.com</u>

## 1-800-266-9778

## **Select Your Vehicle**

Expert AutoStats®	Model	Data Page 1	Data Page 2	Data Page 3	Printer	File Output	DXF Output		
Version 5.2.0.2	Version 5.2.0.2 Make of Vehicle: FORD			Select the Manufacturer from			th		
12R-930512AQ03201	Y	ar of Vehicle:	2011			list below.			
Copyright© 1991-2012	Mo	lel of Vehicle:				Once a Mai	nufacturer ha	s beer	n
All Rights Reserved	Nun	ber of Doors:				Selected th Models will	e list of availa be below.	able	
-	Bodyst	de of Vehicle:							
Introduction )	Car	Pickup				to narrow t	mpty boxes t he search.	o the l	et
mine Vehicle Specs	🔄 Van	Utility	C Other		Clear				-
Blank Vehicle Spec Form	Manuf	act		S	tart Year	En	d Year		
acturers & Years Available )	FORD			1	930	20	12		4
O Design Vehicle Specs	FRAZE	K R NIASH		1	947	19	51 57		
ate Definitions	FUNKE	& WILL		2	002	20	04		
Definitions	GENER	IC		1	979	19	89		
Expert Autostats®	GEO			1	987	19	98		
	GLAS			1	963	19	66		
Exit AutoStats®>>>	GMC			1	947	20:	11		1
PROVIDED BY:	Model				Body St	yle	WB (in)	OAL	(ir
4N6XPRT Systems	FUSIO	N HYBRID			4 DOOF	R SEDAN	108	191	
87 University Avenue	MUST	ANG			2 DOOF	RCOUPE	107	188	
La Mesa CA 91941	MUST	ANG			2 DOOF	CONVERTIBLE	E 107	188	
-930512AQ03201	MUST	ANG GT			2 DOOF	COUPE	107	188	
	MUST	ANG GT			2 DOOF	CONVERTIBLE	E 107	188	
I6XPRT Systems®	MUST	AING SHELBY (	51500		2 0001	CONVERTING	107	100	
nsic Expert Software	POLIC	AINO SHELBY (	1 JUO	OLICE PKG	2000	SEDAN	115	199	1
Mesa, CA 91942-9342	POLIC	INTERCEPTO	R (3 55) MSP 8	OLICE PKG	4 000	SEDAN	115	212	٩
464-3478 / (800) 266-9778	RANG	R 112WB	(J.J.J.) (1.J.)	OLICETRO	2 000	AX2 PICKUP	112	188	
Fax: (619) 464-2206	RANG	R 112WB			2 0006	AX4 PICKUP	112	188	
www.4N6XPRT.com	RANG	R 118WB			2 DOOF	AX2 PICKUP	118	200	

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

### Screen 1

Model Data Page 1 Data Page 2	Data Pag	e 3	Printer	File Out	tput	DX	(F Outp	out	
2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN									
Horizontal Dimension	5			Ve	rtical	Di	mensio	ons -	
Length	212	in.	H	leight				58	in.
Wheelbase	115	in.	Grou	und to:					
Front Bumper to Front Axle	43	in.	F	ront Bun	nper (	То	p)	2	in.
Front Bumper to Front of Hood	8	in.	F	leadlight	t - Cer	nter	r	27	in.
Front Bumper to Base of Windshield	65	in.	F	lood - To	op Fro	ont		31	in.
Front Bumper to Top of Windshield	91	in.	В	ase of W	indsh	nielo	ł	39	) in.
Front Bumper to Front Wheel Well	26	in.	Rear Bumper (Top)		2	i in.			
Rear Bumper to Rear of Trunk	8	in.	Т	runk - Te	op Re	ar		39	) in.
Rear Bumper to Base of Rear Window	38	in.	B	ase of Re	ear W	ind	ow	40	) in.
Rear Bumper to Rear Well	38	in.		w	eiaht	Dir	nensio	ins	
Rear Bumper to Rear Axle	54	in.				0.0	Tenoro	410	
Depth Dimensions			Curl	urb weig Weight	nt Distri	ibut	tion:	4184	ibs.
Width	78	in.		Front =		56	%		
Front Track	63	in.		Rear =		44	%		
Rear Track	66	in.	Gros	s Vehicle	e Weig	ght	Rating	5500	) Ibs.

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

Model Data Page 1	Data Page 2	Data	Page 3	Printer	File Output	DXF Out	put	
2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN								
Acceleration/								
Acceleration 0-30 mph	13.8	ft/sec	2		Bumper Stre	ngth	2.5	mph
Acceleration 0-60 mph	9.8	ft/sec	2		Steering Rati	io	:1	
Acceleration 45-65 mp	h 6.5	ft/sec	2		Interior	Dimensio	ns	
Braking 60-0 mph	138	feet			Front Should	ler Room	61	in.
Drive Wheels		REAR			Front Head F	Room	40	in.
Turn Circle (Diameter)		40	feet		Front Leg Ro	om	42	in.
Number of Wheels		4			Rear Shoulder Ro	er Room	60	in.
Wheel Radius		12	in.		Rear Head R	oom	38	in.
Tire Size	P235/	/55R17			Rear Leg Roo	om	38	in.
ALL DISC - ALL WHEEL ABS								
3pt - front and rear -	FRONT SEAT	AIRBAG	GS					
4spd AUTOMATIC								
N.S.D.C. = 2011 - 2011								
= Not in Database								
								-

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 odel | Data Page 1 | Data Page 2 | Data Page 3 | Printer | File Output | DXF Output 2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN Angle Measurements Angle Front Bumper to Hood Front 45.0 degrees Angle Front of Hood to Windshield Base = 8.0 degrees Angle Front of Hood to Windshield Top = 16.8 degrees 33.2 degrees Angle of Windshield Angle of Steering Tires at Max Turn 27.5 degrees Center of Gravity = 22.77 39.00 Inches from side of vehicle = nches from around Inches in front of rear axle nches behind front axle = 50.60 64.40 ches from front bumper = 93.60 Inches from rear bumper 118.40 ches from front corner = 101.40 Inches from rear corner = 124.66 = 1.41 Stable ip-Over Stability Ratio NHTSA Static Stability Factor (calculated) Star Rating \*\*\*\* Moments of Inertia aw Moment of Inertia 3103.52 lb\*ft\*sec2 Pitch Moment of Inertia 2993.16 lb\*ft\*sec oll Moment of Inertia 603.12 lb\*ft\*se

The third and last screen contains a number of calculated items of information which may be of use depending upon the type of case, the

other software that you use, and the questions which need to be answered.

## **DXF Output Screen**

Model Data Page 1 Data Page 2 Data	ta Page 3 Prin	ter   File Outp	ut DXF Output				
2011 FORD POLICE INTERCEPTOR (3.27) MSP POLICE PKG 4 DOOR SEDAN							
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 manufacturing variations from vehcle to vehicle. Whenever feasible, the vehicle in question or an exemplar vehicle should be measured TO VERIFY DATA IMPORTANT TO YOUR CASE. The provision of the DXF output is provided as an aide to your evaluation. It is not meant to be the final drawing of the vehicle.							
DXF File Name 2011_FORD_POLICE_IN	ITERCEPTOR_(3	.27)_MSP_POL	ICE_PKG_4_DOOR_SEDAN_				
Length	212	Inches	Drawing Notation				
Wheelbase	115	Inches	On				
Width	78	Inches	Off				
Front Track	63	Inches	Units				
Rear Track	66	Inches	Inches				
Front Overang	43	Inches	Feet				
Bumper to Base of windshield	65	Inches	Interes (				
Bumper to Top of windshield	91	Inches					
Rear Bumper to Base of Rear window	38	Inches					
Rear Bumper to Top of Rear window	64	Inches					
Front Tire Diameter	24	Inches					
Rear Tire Diameter	24	Inches					
CG behind Front axle	50.6	Inches	DXF Output				

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

-	
9. The Crash Zone 8.1 - [51473.0XF]	
Ste File Edit. Draw Wew Snaps Text)Dimension Utilities Recon 30 Window Help	. @ ×
□ # 8 ↓ 4 € 8 ~ ~ 00000	
Line Types	~
- FRONT of 2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE 4DR SEDAN	
O Strike Free Control Data	
Oraw / Snaps / Hotch Length:	
Width: 6.50 Feet	
A Text / Dimensions Front humber to Front Ayle: 3.67 Feet	
A view Withershares 0.59 East	
30 3D Tools	
Becon Front Track:	
Symbols Rear Track: 5.33 Feet	
CG behind Front Axle: 4.31 Feet	
Forms	*
V coming center	3
Select Objects : Selection Tool A 282.06' D.9.55' X1.78' Y-4	36

## 4N6XPRT StifCalcs®

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

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

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

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

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

## SYSTEM REQUIREMENTS

4N6XPRT StifCalcs<sup>®</sup> is a MS-Windows program designed to work under a 32 <u>or</u> 64-bit ( 2000/XP/Vista/7) Windows System. ★ Obtain Similar Vehicle group summary STIFFNESS VALUES with Statistical measures.

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

## FRONTAL STATISTICAL MEASURES EXAMPLE:

		\  S	/ehicle tiffness A E	Width s Valu 3	 e s  G Kv
Average (AVG)		305.7	93.5	523.6	143.1
Minimum (MIN)		115.0	13.2	465.2	23.5
Maximum (MAX)		461.6	200.0	614.1	387.3
Standard Deviation (STDev-sample)		73.4	38.4	36.2	72.8
Number of Tests (n)	53				

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

**★ RESEARCH** and <u>easily download</u> the



that are available for the individual tests

e CHARDERT SUBCalca - Selected Vehicles 20 a Prof Reports Serring: Help Reg To Hills Pro Seate Vehicle Search NHTSA Test Selection: Advanced Available Test: Test Deformation: Occup	NO ECCOL CLANINA 1967090 - DECESSIONAL 3 1 4 Webs Steech Forcatalena et biomaten - Webs Information - Stiffman Cala	Steps to Download Media from the NHTSA Web Site
Ait	Available Tests in the NHTSA database for a 2001 - 2007 DODGE CARAVAN Similar Vehicles Searched Year Range (2001 - 2007)	1 - Select the desired Test 2 - Click the <u>NHTSA DOWNLOAD</u>
Text No.         New         New           2020         2030         CCC02           4146         2031         CCC02           4147         2032         CCC02           4130         1         CCC02           4131         1         CCC02           4132         4         CCC02           4133         4         CCC02           4134         4         CCC02	Currently Selected Test Number; 4936	3 - Check the boxes for the media you want to download
1005 OF1320 570 2005 OF1320 570 2005 OF1320 570 2005 OF1320 570 2005 OF1320 570 2005 OF1320	Nat ancie, en kinne karos er skolige i men. Nather fanns valke 10 Panningen: Consistengester 4 2 4 50 Nathergen:	4 - Click the <u>DOWNLOAD</u> CHECKED MEDIA button
	Hatter (Mock skalder + Mon Hypes) Considering when P 1 of UA Con Pik-Hypesso Hatter of Regards Analdaic 1 Report Hypers Considering and P 1 of UD Con	5 - Watch the selected media download, OR continue working on other things while the download promesses
Print         Nide           76:17.00         Vieur         Nide           3564         2001         00052         2001           3561         2001         00052         3561           3567         2001         00052         3561	Pie Integrate Constant/Optical State	6 - When the downloads are complete, find the media in the desired SAVE

### PLEASE PRINT

Contact Name:
Company/Dept:
Mailing Address:
City:State:Zip:
Phone:
Fax:
E-Mail:
(E-mail address required for electronic delivery)
StifCalcs <sup>®</sup> (copies) x $650.00 \dots = $
Handling **: \$

	*
landling **:	\$
Check with order = \$5.00, Credit Card = \$10.00, Govt. P.	0. = \$15.00)
lotarized 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 via electronic download link (e-mail address required) \$ 0.0
 Please deliver on USB at an
 additional cost of \$35.00 per disk \$

SUB-TOTAL = \$

TOTAL =

Enclosed is:

N

Check/M. O. :\_\_\_ Credit Card:\_\_\_ P.O.:\_\_

Please make check/M.O./P.O. payable to:

4N6XPRT Systems<sup>®</sup>

**Credit Card Orders:** 

MasterCard: Visa: Am.Ex.:
Card #:
Expires:
Name on Card:
Signature:
Billing Add. #:
Billing Zip:

Mail to: 4N6XPRT Systems<sup>®</sup> 8387 University Avenue La Mesa, CA 91942-9342

Telephone Orders:

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

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

# 4N6XPRT StifCalcs<sup>®</sup>



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

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

## Web: http://www.4n6xprt.com E-Mail: <u>stifcalcs@4n6xprt.com</u>

1-800-266-9778

## **BASIC VEHICLE CRASH TEST SEARCH**

PRT StifCalcs - SELECTED VEHICLE : 2001 LINCOLN TOWN CA

A - B - G Values Crush Factor (CF)

G

149.1 596.4 1341.9 2385.7

149.1 596.4 1341.9 2385.7

149.1 596.4 1341.9 2385.7

Select the desired vehicle through our SIMILAR VEHICLE READER





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

SELECTED VEHICLE + 2004 LINCOLN TOWN CA

2001 LINCOLN TOWN CAR

Pre/Post Collison Crush Depths (inches)

Centerline crush

Α

194.5 359.1 494 599

163.4 301.8 415.1 503.4

145.7 269 370 448.7

A - Maximum force per inch of damage without permenant damage, Ib/in

B = Crush resistance per inch of damage width, b/in~2

G = Energy dissipated without permenant damage, Ib

Vehicle Closing Speed

Right side crush

В

126.8 108.1 90.9 75.2

89.6 76.4 64.2 53.1

71.2 60.7

51 42.2

(Pass. Side)

ASIC VEHICLE SEARCH NHTSA TEST SELECTION ADVANCED VEHICLE SEAR lable Tests Test Information Occupant Information Vehicle Info Stiffness Calc Pre/Post Vehicle Depth Damage Profile Distance Depths Maximum Vehicle Depth

4654 pound

78.2 inche

2.5 mph 5 mph 7.5 mph 10 mph

2.5 mph 5 mph 7.5 mph 10 mph

2.5 mph 5 mph 7.5 mph 10 mph

int Reports Settings Help Reg. To: 4N6XPRT SYSTEMS

G Makida Mid

Vehicle Test Weight =

Test Crush Length -

sing a Rated No Damage Speed o Jsing a Rated No Damage Speed of Ising a Rated No Damage Speed of

ush = 23.8

sing a Rated No Damage Speed o Ising a Rated No Damage Speed of

Ising a Rated No Damage Speed of

imum Crush =26.7 inches

ig a Rated No Damage Speed of

Ising a Rated No Damage Speed of

Ising a Rated No Damage Speed of

Damage Speed o

Rated No Damage Speed = Imapct speed with a barrier

Normal "Bated No Damage Speed" is 2.5 or 5 mph. Some specific

resulting in no permenant vehicle deformation

Step 1

	BAS	IC VEHICLE	SEARCH M	NHTSA TE	ST SELECTION ADVANC	ED VEHICLE S	SEARCH					
	Ava	ilable Tests Te	est Information	Occupan	t Information Vehicle Info S	Stiffness Calos						
					Available Te	ests in t	the NI	HTSA	databa	ase	for a	
					1000	2000 1	INCO			DAF		
					1990 -	- 2008 L			JAMIN (	JAP		
		1										
	_	Print	I MO	dily Year H	ange	F	Frontal T	'est(s)				
	Ĩ	Test Number	Year	Make	Model	Impact Speed	Max Crush	Crush Factor	VDI	PDOF	Test Config	VIN
		2764	1998	FORD	CROWN VICTORIA	35.3	29.9	16.7	12FDEW3	18	0 VEHICLE INTO BARRIER	2FAFP73W7WX
	1	3077	1999	FORD	CROWN VICTORIA	24.6	28.1	8.6	9999999	0	VEHICLE INTO BARRIER	2FAFP74W7XX
		3103	1999	FORD	CROWN VICTORIA	29.3	27.9	12.3	9999999	0	VEHICLE INTO BARRIER	2FAFP74W8VX
		3219	2000	LINCOLN	TOWN CAR	35.1	27.8	17.7	12FDEW3	18	0 VEHICLE INTO BARRIER	1LNHM81W8m
		3480	2001	LINCOLN	TOWN CAR	35.1	27.6	17.9	12FDEW6	0	VEHICLE INTO BARRIER	1LNHM82W11Y
		3614	2001	FORD	CROWN VICTORIA	35	20.4	24	12FDEW6	0	VEHICLE INTO BARRIER	2FAFP73wX1X
		4476	2003	FORD	CROWN VICTORIA	35.3	25.3	19.7	12FDEW6	0	VEHICLE INTO BARRIER	2FAFP73wX3X
		4496	2003	FORD	CROWN VICTORIA	29.7	0	0		0	SLED WITH VEHICLE BODY	2FAFP73W53K*
		4894	2003	LINCOLN	TOWN CAR	0	0	0		0	STATIC AIR BAG TEST SIDE	1LNHM81W93Y
		<										>
			∏ Mo	dify Year R	ange		Rear Te	st(s)				
				NO	DEAD TESTS 1	000 2000						
				NO	REAR TESTS 1	1998-2008	\$					
		Print	Mo	dify Year R	ange		Side Te	st(s)				
		Test Number	Year	Make	Model	Impact Speed	Max Crush	Crush Factor	VDI	PDOF	Test Config	VIN
		2989	1999	LINCOLN	TOWN CAR	38.3	20	29.4	03LPAW2	270	IMPACTOR INTO VEHICLE	1LNHM81W0KY6454
		4426	2003	FORD	CROWN VICTORIA	38.4	18.4	32	10LPAW3	297	IMPACTOR INTO VEHICLE	2FAFP73W83K10915
		4427	2003	LINCOLN	TOWN CAR	38.1	17.1	34	10LPAW3	297	IMPACTOR INTO VEHICLE	1LNHM81W93Y6222
		e										5
												<u>×</u>
2												

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

## "CLASS" VEHICLE CRASH TEST SEARCH



Now Set your calculation parameters -

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:

									- 6
ile Print Report	s Settings	Help Reg. T	b: 4N6XPRT SYSTER	45					
BASIC VEHICL	E SEARCH	NHTSA TE	ST SELECTION	ADVANCED VE	HICLE SEARCH				
				Advan	ad Saarah				
		Enter as m	ak information a	Auyan	the lune of ush		aching for ther	. oliok sostak	
		Enter as int	ich moniauon a	is you nave about	the type of ver	iicie you are i	ooking tot ther	i click search	
Fest Number		_		Min	Max				
	1		Whe	el Base		-	(	Conversions	
Start Year	1965	÷		1		C MM	Value:		
F-JV	2000		Vehicle	Length		Inche	s		
chù rear	2008	T.n.s.					Answei		
Make		s Advo	inced / Vehicle	Search Printout				м ммто	IN
			Please ch	loose the pai	ameters fo	r the repo	ort		
Model			NOT	E : Default settings a	re already selected	l for you		BS LBS TU	КШ
Body Style		Rear	Tests						
	1001100	-No Da	mage Speed (mph)	Crush Depth (incl	n) Crush Lengt	h (inch) Spe	ed Type		
		0 2.5		Average	<ul> <li>Width</li> </ul>	0	Closing		
		● 5.0		~					
		0 7.5		C Max	<ul> <li>Indent</li> </ul>	•	KE .	Print	
		0.10	U						
TestNo	YEAR	M/	IEI					~	
49	1971	CH Def	ault settings	Print	Cancel				
▶ 167	1978	СН							
251	19/9	BU CA			Include	Not Calculated	Tests		
231	1979	CHECKER		OUB DOOR SED	3023	Rear	NO COMMENTS		
181	1979	CHRYSLER	NEWPORT F	OUR DOOR SED	3010 F	Rear	NO COMMENTS		
69	1979	PONTIAC	CATALINA F	OUR DOOR SED	2946 F	lear	NO COMMENTS		
1278	1988	ACURA	LEGEND F	OUR DOOR SED	2756 F	Rear	NO COMMENTS		
								~	

G CF

588

603

665 15.1

42.9 21

12.7

B

631

94.6

272.4

354.7

Std Dev

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

🗅 Displa	y Auto Ca	lculated	Tests	

Prin

	Test No	YEAR	MAKE	MODEL	Body Style	No Damage Speed	Crush Distance	Impact Velocity	Stiffness A	Stiffness B	Stiffness G	Crush Fact
·	167	1978	CHEVROLET	CAPRICE	FOUR DOOR SEDAN	5.0	16.3	20.3	216.4	40.5	577.7	10.
	54	1979	BUICK	ELECTRA	FOUR DOOR SEDAN	5.0	23	24	199.8	33.1	603.8	1
	251	1979	CADILLAC	SEVILLE	FOUR DOOR SEDAN	5.0	13.2	19.9	292.4	66.1	647.1	1
	232	1979	CHECKER	TAXICAB	FOUR DOOR SEDAN	5.0	10.8	20.2	336.3	94.6	597.9	15.
	181	1979	CHRYSLER	NEWPORT	FOUR DOOR SEDAN	5.0	16.3	24.5	270.2	64.9	562.8	14.
	69	1979	PONTIAC	CATALINA	FOUR DOOR SEDAN	5.0	18.4	24.1	237.3	49.4	570.4	12.
1	1278	1988	ACURA	LEGEND	FOUR DOOR SEDAN	5.0	11.5	20.2	354.7	93.2	674.8	14.1

To select multiple records hold the ctrl key down and click on the records you wish to selec

Print this page

Remove Selected

Cancel

Print All Pages

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

The program will

**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

### **2014 ORDER FORM**

Expert AutoStats<sup>®</sup> - Expert VIN DeCoder<sup>®</sup> - 4N6XPRT StifCalcs<sup>®</sup> - 4N6XPRT BioMeknx<sup>™</sup> Expert Qwic Calcs<sup>®</sup> - Expert TireStuf<sup>®</sup> - 4N6XPRT Ped & Bike Calcs<sup>®</sup>

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 <sup>®</sup> :	\$ 625.00 *		\$
4N6XPRT BioMeknx <sup>™</sup> :	\$ 495.00 *		\$
4N6XPRT Ped & Bike Calcs <sup>®</sup> :	\$ 375.00 *		\$
Expert Qwic Calcs <sup>®</sup> :	\$ 275.00 <sup>*</sup>		\$
Expert TireStuf <sup>®</sup> :	\$ 85.00 <sup>*</sup>		\$
4N6XPRT StifCalcs <sup>®</sup> :	\$ 650.00 *		\$
Expert VIN DeCoder <sup>®</sup> :	\$ 550.00 *		\$
		SUB-TOTA	L \$
Notarized Affidavit filing requirement - <u>\$25.0</u> Normal delivery will be via er □ - Deliver via electronic download link (e-m □ - Please deliver on USB at an <u>additional o</u>	10 per required notarized signation and the self of th	<u>ture</u> : extracting zip fil	\$ \$ \$_0.00 \$
California shipping addresses add <b>8.75%</b> sal (California orders delive	es tax ered by e-mail attachment <b>DO NOT</b> owe s	SUB-TOTA	L \$ \$
		TOTAL	 \$
Enclosed is:		- • • • • •	*
Check Money Order Purchase Order	Credit Card: Visa Ma	aster Card	American Express
Card #		Expires	SecCode
Billing Add. :		Billing	Zip:
Name on Card:	Signature:		
	*PLEASE NOTE*		

-- Orders cannot be shipped without correct Shipping & Handling included.

-- California orders cannot be shipped without sales tax included.

-- Written Purchase Orders must be received in office before shipping.

\* Prices are subject to change without notice. Call for Multi-program and package purchase discounts.

\*\* Orders will be shipped within 10 working days. Other shipping methods may cost extra. The Handling charge listed is for the first program, add \$5.00 per additional program ordered at the same time and shipped to the same address.

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

A Division of Expert Witness Services, Inc.

## **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.

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,

O'Umfaf DE

Daniel W. Vomhof III General Manager/Technical Support

A Division of Expert Witness Services, Inc.

## **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 <u>ALL OPTIONS</u> that apply

YEAR & MAKE:

MODEL:

If you are requesting VIN DeCoder & AutoStats please also provide the following information:

No. of Doors:	2/3/4/5
Body Style:	Coupe/Conv./Sedan/Wagon
SUV & P/U:	4x2 / 4x4 / Dual Rear Wheel
PICKUPS:	Std. / Extra / Super / Crew Cab
	Short Bed / Long Bed
VANS:	Cargo / Passenger
	Short / Long Wheelbase

VIN Information

1	2	3	4	5	6	7	8		9
	10	11	12	13	14	15	16	17	-

<u>NHTSA Crash Test Information</u> Impact location - Front / Side / Rear Impact Speed - Lower / Higher

PAYMENT INFORMATION Visa/MasterCard / American Express:

Expires: \_\_\_\_ / \_\_\_\_

Name & Address:

Case Reference Name/Number:

# Individual Vehicle Data Search Service<sup>®</sup>



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<sup>®</sup> 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 ( <i>when provided</i> Gross Vehicle Weight Transmission	<i>by VIN</i> ) Safety Equipment

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 Overall Width	Curb Weight Weight Distribution
Overall Height	Front/Rear Track
Wheelbase	CG Location
VIN DeCoding when VIN is pro Mid-60's to present <b>also in</b>	ovided Information available cludes (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<sup>®</sup> Charges & Services

## **Individual Vehicle Specifications**

\$40.00-First vehicle\*, \$35.00/Additional Vehicles\*, \$20.00/Additional Similar Model\*

## <u>Medium/Heavy Truck</u> <u>Specifications</u>

\$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<sup>®</sup> 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:\_\_\_\_\_

## 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

099

CID

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): MERCICAN EXPRES 1234 5678 9012 345 ←Visa/MasterCard American Express → 9500F Card ID

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,

O'Umfaf DE

Daniel W. Vomhof III General Manager/Technical Support

A Division of Expert Witness Services, Inc.