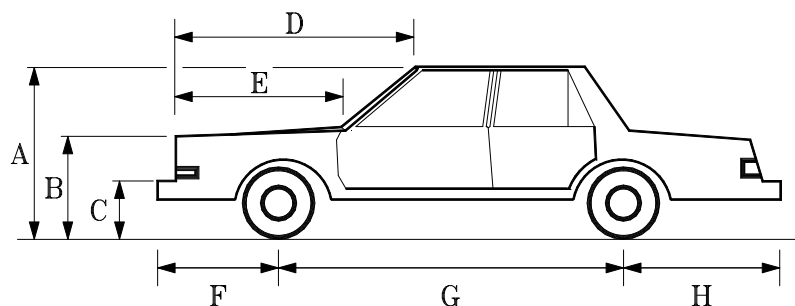


Expert AutoStats^(R)



Over 41,000 cars, pickups, vans, and utility vehicles
1940's to present are represented

4N6XPRT Systems^(R)

Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942

Web Site: www.4n6xpert.com
E-mail: AutoStats@4n6xpert.com

(800) 266-9778

Expert AutoStats®

Weight and dimensional data on more than 41,000 cars,
pick-up trucks, vans, and utility vehicles.

Copy right 1991-2011 by
4N6XPRT Systems
La Mesa, CA
91941
ALL RIGHTS RESERVED

TABLE OF CONTENTS

Topic	Page
Copyrights	iii
Limited Warranty	iv
Technical Support	v
Upgrades	v
License Agreement	vi
Remedies	vii
INTRODUCTION	1
INTENDED USERS	3
PROGRAM OVERVIEW	4
Start the Program	4
The Options Menu	4
EXAMINE VEHICLE SPECS	5
Unable to Find Vehicle	5
Vehicle Data Displayed	6
Print Data	7
Search for Another Vehicle	7
End Search and Exit	8
PRINT BLANK VEHICLE SPEC FORM	8
MANUFACTURERS / YEARS AVAILABLE	8
AASHTO DESIGN VEHICLE SPECS	8
A CAUTION -	9

CAR PROFILE WITH DIMENSION LINES	10
MEASUREMENT PROCEDURE AND PRACTICE	11
Interior Dimensions	12
Center of Gravity (or Mass)	13
Moments of Inertia	14
Acceleration and Braking Data	15
Steering Factor	15
POTENTIAL APPLICATIONS OF THE DATA	16
Steering Factor	17
N.S.D.C. Range	18
DATA SOURCES	18
SYSTEM REQUIREMENTS	20
INSTALLATION	22
4N6.BAT	24
VEHICLES IN EXPERT AUTOSTATS	26
DEFINITIONS	Definitions-1
PRINT TO FILE OPTION	Definitions-15
EXCHANGE FILE OUTPUT OPTION	Definitions-15
SELECTED CODE OF FEDERAL REGULATIONS SECTIONS	
49CFR571 - Table of Contents	
49CFR571.1	
49CFR571.3	
49CFR571.4	
49CFR581	

COPYRIGHTS

This manual and the software described herein are COPYRIGHT 1990-2011 by 4N6XPRT SYSTEMS® and Expert Witness Services® Inc. All rights are reserved.

This manual may not, in whole or in part, be copied, photocopied, reproduced, translated, reduced to any electronic medium or machine readable form without prior consent in writing from 4N6XPRT SYSTEMS® or its parent company.

4N6XPRT SYSTEMS®, Qwic Calcs®, and Autostats®, are registered trademarks. Other hardware, software, and products named in this manual are registered trademarks of their respective producing companies.

In accordance with the COMPUTER SOFTWARE RENTAL ACT OF 1990, this software may not be rented, lent or leased.

This software and its documentation may not be provided by a "Backup Service" or any other vendor which does not provide an original package as composed by 4N6XPRT SYSTEMS®, including but not limited to all original documentation, insertions, registration cards, and software.

Use, duplication, or disclosure by the U.S. Government of the computer software and documentation in this package shall be subject to the restricted rights applicable to commercial computer software (under DFARS

52.2277013).

All rights not specifically granted are reserved by 4N6XPRT SYSTEMS®.

LIMITED WARRANTY

The program is provided "As Is" without warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The user is fully and solely responsible for any and all uses of the program or the interpretation of any results.

For a period of thirty (30) days from the date of delivery, 4N6XPRT SYSTEMS® warrants to the original purchaser that the program disc media is free from defects in materials and workmanship under normal conditions of use and service.

Should the program fail to load or to display data on a vehicle known to be contained in the database within this 30 day period, the program disk(s) may be replaced upon authorization from 4N6XPRT SYSTEMS® for return of the original program disks.

Should the program or data prove defective in any way, the Buyer shall assume the entire cost of all necessary servicing, repair, replacement, or correction, AND NOT 4N6XPRT SYSTEMS®, Expert Witness Services® Inc., the program authors, their distributors or retailers of this product.

In no event shall 4N6XPRT SYSTEMS®, Expert Witness Services®, Inc., the program authors, their distributors or retailers of this product be liable for direct, indirect, incidental, or consequential damages, or damages resulting from loss of use or loss of anticipated profits resulting from any defect in the program.

TECHNICAL SUPPORT AGREEMENT

The User has 30 calendar days from the date of shipment or receipt to install and use this program. During that 30 day period, the publisher will provide technical information relevant only to the installation and running of the program.

AT NO TIME will said Technical Support include the interpretation of results nor the "correct" ways in which to use this program. For that type of assistance you must retain an accident reconstructionist. These may often be found in the Yellow Pages of the phone book, or through various sources such as your local Bar Association, or advertisements in legal journals.

UPGRADES

It is anticipated that from time to time upgrades reflecting additions and improvements to the program will be made. Registered Buyers having a current address on our files will have the opportunity to obtain the Upgrade at a saving of at least 25% over the list price of the program.

LICENSE AGREEMENT

Limited Non-Exclusive License Agreement:
This program, disc media, and manual are provided to the registered purchaser on a non-exclusive basis subject to the limitations set forth below.

The Registered Buyer:

- (i) May use the program on only a single INTEL 80XXX based computer at a time;
- (2) May concurrently have this program loaded on one "non-portable" computer at the "office", one "non-portable" computer at the residence, and one "portable" computer, at a time, provided that only one copy of the program is being used at any time;
- (3) May back up the program disc(s) on to another compatible media for archival purposes only.
- (4) Shall acknowledge the copyright and copyright owner on all publications of the results of this program, whether such publication is done in some printed form or whether it is done verbally or pictorially.

The Registered Buyer:

- (i) May Not electronically transfer the program from one computer to another over a Network system;
 - (2) May Not distribute copies of the program, or the accompanying documentation to others either for a fee, or without charge;
- [EXCEPTION limited portions of the Documentation may be photocopied ONLY FOR attachment as an Exhibit to a Deposition, or as an Exhibit in a Court of Law.]

- (3) May Not modify or translate the program or documentation;
- (4) May Not disassemble the program or allow its disassembly into its constituent source codes.

4N6XPRT SYSTEMS®, Expert Witness Services, Inc., and the program authors SPECIFICALLY DISCLAIM ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IF ANY PROVISION OF THIS AGREEMENT IS FOUND VOID OR UNENFORCEABLE, IT WILL NOT AFFECT THE VALIDITY OF THE BALANCE OF THIS AGREEMENT, WHICH SHALL REMAIN ENFORCEABLE ACCORDING TO ITS TERMS.

USE OF THE PROGRAM INDICATES THE BUYER'S ACCEPTANCE OF THE TERMS AND CONDITIONS OF THE Copyright, THE Computer Software Rental Act of 1990, THE Limited Warranty, AND THE License Agreement.

If the Buyer does not accept the terms and conditions in their entirety, the original program disks and all documentation shall be returned to the point of purchase AT THE BUYER'S EXPENSE.

REMEDIES

All claims, including litigation, shall be tried in San Diego, California, under the relevant laws of the State of California.
DWV - 12/91

EXPERT AUTOSTATS

Weight and dimensional data on more than 41,000 cars,
pick-up trucks, vans, and utility vehicles.

Copyright 1991-2008 by
4N6XPRT SYSTEMS
La Mesa, CA
91942
ALL RIGHTS RESERVED

INTRODUCTION

This program provides dimensional information on over 41,000 four-wheeled motor vehicles (curb weight less than 6500 pounds) manufactured after about 1946. The farther back in time, the fewer dimensions are available, however. The curb weights have been gleaned from various published sources of manufacturer's specifications, as well as from data obtained directly from the manufacturer. This weight represents the most common engine/transmission combination for that model year.

When published data were utilized, three or more sources were checked. When there were differences in the published values the average value is reported.

The various component length/width/height/track values were obtained by directly measuring the specific makes and models.

This program is an "EXPERT" program in the Legal definition of an "Expert". It provides answers to certain questions of physical evidence using knowledge, training and

experience not immediately possessed by the ordinary layperson.

Because both its history and its most probable applications will be in the sphere of potential litigation, this program provides some of the information that a "forensic expert" would provide. The authors of this program have over 31 years of combined experience in using the data contained in this program to provide the kinds of answers to attorneys and insurance adjusters that are required in a full collision analysis and accident reconstruction.

INTENDED USERS of the EXPERT AUTOSTATS Program

The information contained within this program was gathered primarily for use in the evaluation and reconstruction of vehicle accidents. As such, it is of considerable use and value to professional accident reconstructionists and accident investigators. However, it will also be of value to the regular patrol officer, governmental traffic engineers, fleet safety managers, insurance adjusters, judges, and attorneys.

PROGRAM OVERVIEW:

START THE PROGRAM: It is presumed that the user has sufficient knowledge of the operating system (DOS) of the computer to which this program was installed to find the correct directory (**\4N6XPRT**). To start the program type **AUTOSTAT**.

The first screen displays the program title, copyright notice, and credits. The second screen briefly explains the program.

The **OPTIONS MENU:** The third screen to be displayed is the **Options Menu**. At the present time, the options available are:

Examine Vehicle Specs
**Print Blank Vehicle Spec Form Manufacturers &
Years Available**
AASHTO Design Vehicle Specs
<<<Exit AUTOSTATS>

To select one of the options, move the cursor bar over the option desired and hit <ENTER>.

The contents of these various Options will be discussed individually on the following pages.

EXAMINE VEHICLE SPECS Option: When the **Examine Vehicle Specs** option is selected, the next screen will ask for the MAKE OF VEHICLE. Type in the manufacturer, e.g. Ford, and hit <ENTER>.

Next you are asked for the YEAR OF VEHICLE. Type in the year, e.g. 1989, and hit <ENTER>.

Next you are asked for a **BODYSTYLE**. Enter **C**, **V**, **P**, or **U** depending upon whether the vehicle you want is a **Car**, **Van**, **Pickup**, or **Utility vehicle**

You are then asked for the MODEL OF VEHICLE.

A window will appear listing the available models for that model year. If the model you want is not on the first screen, either begin typing the name of the model, use the up and down arrows on the keyboard, or use the Page Up and Page Down keys to scroll up and down the list. Continue until you find the model desired. Highlight the model and hit <ENTER>.

If the desired model is not shown, it is most probable that your model designation is simply a trim option on the basic vehicle. In that case, choose a vehicle similar in number of doors, basic model name, (and wheelbase and length, if known) to the vehicle desired.

UNABLE TO FIND VEHICLE: If the vehicle you are looking for was not found by the program, you will get a window on the screen containing instructions as to how to proceed.

If either the desired year is not in the database, or the manufacturer is not listed, try to find a similar type vehicle for use in first approximation estimates. THEN, as time permits, Fax us the Make, Model and Year and we will attempt to include it in a subsequent upgrade.

Vehicle Data Displayed: When you have the Make, Year, and Model that you want, hit y or Y. The computer will locate your vehicle and display the first screen. {The search time is dependent on the speed of your computer, and the number of models in the database for that make.}

The first data screen to be displayed contains information on the Length, Width, Height, and Weight for the chosen vehicle. At a minimum, you will see values for the Length, the Wheelbase, the Width, the Height, the curb Weight, and the curb weight distribution. For many vehicles there will also be displayed additional dimensional information. {As additional measurements are taken by our staff, the "holes" will be filled, and the information will be issued in future upgrades.}

You may print the contents of this first data screen, or continue directly to the second screen of information.

The second data screen displays information pertaining to acceleration, braking, drive wheels and tires, interior dimensions, and steering. The minimum data displayed will be

the information on whether the drive wheels are Front, Rear, 4x4, 4x2/4x4 or All.

The N.S.D.C. range at the bottom of Screen #2 is the range of years for which most body dimensions parts are interchangeable on that model.

Again, data screen #2 may be printed at this time, or postponed until the end.

The third data screen displays calculated values related to front profile, Center of Gravity position for the unloaded car, Tip-over stability index, and calculated Moments of Inertia. You may print this screen, or you may proceed.

Print Data: The data may be printed out in one of two forms.

(1) If you want only the information contained on one data screen, hit P before going on to the next screen.

(2) If you want all of the data printed out in a traditional tabular format, wait until after the third screen is reviewed. Hit any key to bring up the fourth screen. THE ONLY DIFFERENCE BETWEEN data screen #3 and screen #4 is the bottom line. If you hit P at this time, {and your printer is on} you will get three pages of Output. Be sure that Your Printer Paper is set at TOP Of Page before You choose this option.

Search for another vehicle: To search for

another vehicle, hit **N** when you get screen #4.

End Search and Exit: To end the search process and return to the Option Menu, hit **Q**.

PRINT BLANK VEHICLE SPEC Form: This option will print out a two page version of the tabular form with no data. This form may be used to obtain required information from either an accident vehicle, or an exemplar vehicle. The information would be in the same order and format as contained on the first two pages of the three-page print-out described previously.

MANUFACTURERS & YEARS AVAILABLE: Selecting this option will display several successive screens showing the names of the manufacturers contained in this database, and the years covered for each manufacturer.

AASHTO DESIGN VEHICLE SPECS: The American Association of State Highway and Transportation Officials promulgates various standards and recommended practices pertaining to road design, and to vehicle and pedestrian movement and control. A standard set of measurements is recommended for use in evaluating the movement of various types of vehicles on roads and parking facilities. There are a total of 15 different vehicle types or combinations for which AASHTO has recommended standards. The dimensional data for these 15 Design Vehicles are contained in this option. A discussion of these vehicles begins on page 19 of A POLICY on GEOMETRIC

A CAUTION -

There is a danger in accident reconstruction of attempting to "fine tune" the calculations beyond the level of certainty or reliability of the data and measurements.

There is also a danger in believing that if one sees information in either printed form or as a computer-generated copy it is correct and beyond dispute. This is not the case in general, nor as it applies to this program! While we have tried to be as accurate as possible, the data and measurements provided herein are subject to the "eye of the beholder". One person measures the length of the vehicle from bumper to bumper along the mid-line of the vehicle. Another includes the bumper guards, while yet another measures from corner of bumper to corner of bumper. The variation in vehicle shape also contributes to the variance in the data from different sources. There is a saying attributed to a philosopher: "Measure a piece of yarn once and you know how long it is. Measure it more than once and you have confusion." This applies to a vehicle even more than yarn.

The data is presented to aid you in your evaluation of a particular situation. It is reasonably reliable, but should be checked against an exemplar vehicle whenever possible!

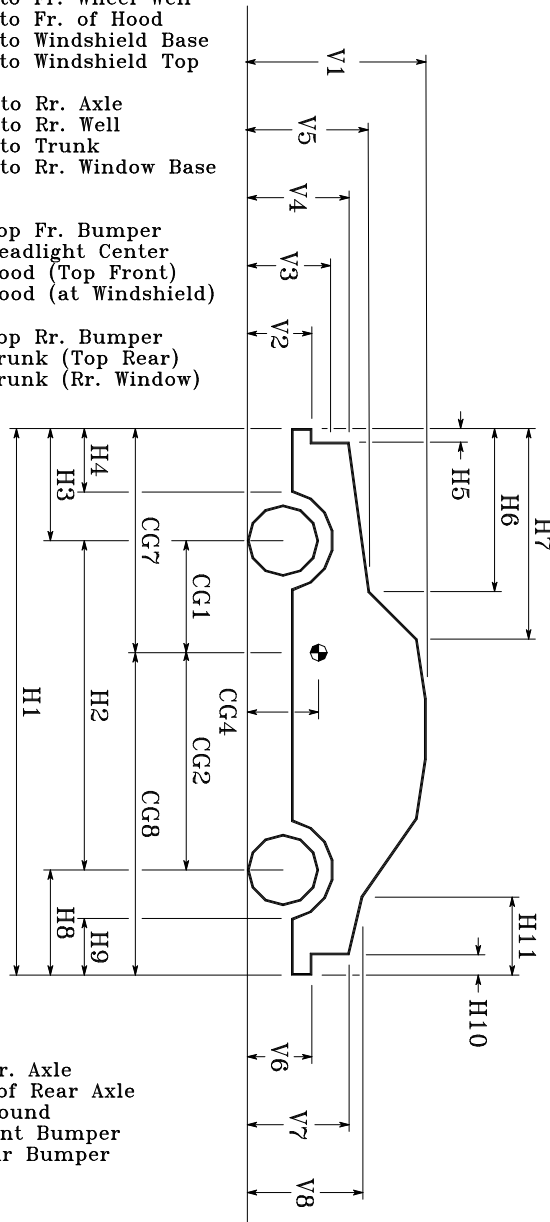
H1 - Length
H2 - Wheelbase

H3 - Front Max. Overhang
H4 - Fr. Bumper to Fr. Wheel Well
H5 - Fr. Bumper to Fr. of Hood
H6 - Fr. Bumper to Windshield Base
H7 - Fr. Bumper to Windshield Top

H8 - Rr. Bumper to Rr. Axle
H9 - Rr. Bumper to Rr. Well
H10 - Rr. Bumper to Trunk
H11 - Rr. Bumper to Rr. Window Base

V1 - Height
V2 - Ground to Top Fr. Bumper
V3 - Ground to Headlight Center
V4 - Ground to Hood (Top Front)
V5 - Ground to Hood (at Windshield)

V6 - Ground to Top Rr. Bumper
V7 - Ground to Trunk (Top Rear)
V8 - Ground to Trunk (Rr. Window)



CG1 - CG behind Fr. Axle
CG2 - CG if front of Rear Axle
CG4 - CG above Ground
CG7 - CG from Front Bumper
CG8 - CG from Rear Bumper

MEASUREMENT PROCEDURE AND PRACTICE:

EXTERIOR DIMENSIONS:

The major measurements of length, width, height, and wheel track, as well as many of the interior dimensions, were obtained from manufacturers specifications as published by the manufacturers and by various automotive publications. When ever possible, these measurements were checked and confirmed by our staff.

The Turning Circle and steering factor values, as well as the acceleration and braking information were taken from the automotive literature.

The more specific exterior component measurements, wheel/tire radius, and many of the interior dimensions were made by our staff.

The front overhang measurements were taken from the center of the front axle to the forward most point of the bumper. In the case of a distinctly curved bumper, or of a bumper with a center projection (1979 Cadillacs for example), or with fenders projecting over the headlights, the overhang distance will differ from the corner of the bumper to axle distance.

The front overhang can be checked by subtracting the rear bumper to front axle distance from the overall, or total, length. That difference is the front overhang

measured along the center of the vehicle.

The wheel track is measured from the center of the tires on one side to the center of the tires on the other side. The track is influenced by the tire size and profile on the measured vehicle. Normally, this will not be more than a 2-inch variation from one vehicle to another of the same make and model.

All height measurements are based to an extent on the tire size and profile, as well as the air pressure of the tires. Other tires may have a 2 to 3 inch effect on these values.

The bumper heights are measured from the ground to the top of the bumper.

The height of the front of the hood is obvious in some cases, and is a "best estimate" for both those newer vehicles with very sloped hoods and very short grills. In those cases it is considered as the intersection of two rulers placed upon the respective surfaces of hood and grill.

INTERIOR DIMENSIONS:

The interior dimensions were taken as follows:

Headroom is the distance from the seat pan to the head liner. A heavy person may change this measure slightly.

Front leg room is measured from the seat back at the seat pan to the base of the accelerator when the front seat is at the end of its backward travel. Thus, the front leg room is the maximum value.

The rear leg room is the distance from the back of the hips to the back of the front seat when the front seat is either at the end of its travel, or 40 inches as measured for the front leg room. That distance is highly dependent on the angle of the front seat back. In the case of an adjustable seat back, this distance could be decreased by 2 to 3 inches with some drivers.

Measured data was obtained from both published sources and staff measurements.

CENTER OF GRAVITY Or MASS)

The C.G., or center of mass or center of gravity, of the unloaded vehicle is determined as follows:

Fore/aft position is determined by weight distribution on the front axle,

Thus, if 56% of the weight is on the front axle, the C.G. is $(0.44 * \text{wheelbase})$ inches behind the front axle.

Side-to-side position is taken as being on the vehicle mid-line.

The height above ground is calculated using the heuristic of 38-40% of the vehicle

height.

The distance to the front or rear bumper refers to the distance along the vehicle mid-line. This is the axle to bumper distance + the C.G. to axle distance.

The distance to a corner of the vehicle is the hypotenuse of the triangle formed by the C.G. to mid-line of bumper : mid-line of bumper to bumper corner : bumper corner to C.G.. Although the program does not currently do the C.G. to wheel calculation, that distance is simply the hypotenuse of the C.G. : axle : wheel triangle.

MOMENTS OF INERTIA

The Yaw, pitch and Roll Moments of Inertia are determined based upon the data reported by Garrott, et al., in Accident Reconstruction Journal vol 1(3), 24-31, (1989).

Some authors and formulas use terms such as "moment of inertia", "mass moment of inertia", or "polar moment of inertia". These all refer to what is called the "Yaw moment of inertia" in Garrott's paper and in this print-out. This value refers to the Moment of inertia of a rectangular mass rotating in the X-y plane about a vertical, or Z-axis passing through the center of mass, or center of gravity.

The values reported in the program print-out are "best approximations". As such they can be used for a "first approximation" evaluation, BUT the end result of the

evaluation should be tempered with caution! The values are based upon the empty, no occupant vehicle. In any accident, it is extremely unlikely that the vehicles are in that condition. Therefore, the final calculations involving values of this type should be adjusted for the effects of load on both weight and location of the center of gravity (or center of mass).

ACCELERATION and BRAKING DATA:

The acceleration times and hard non-skid braking distance information upon which the acceleration/deceleration values are based were taken from published test results.

This data should be considered as a guide to the optimum driver performance.

The results are highly dependent on the skill of the driver. It is not unusual to find test results on the same model vehicle which differ by 3-5 seconds for the 0-60 mph acceleration test, or by more than 25 feet on the 60-0 mph braking test.

STEERING FACTOR:

The Steering Factor is the ratio of the amount of rotation of the steering wheel to the amount of movement of the steering tires. The basic values were obtained from various published sources. Calculations were made within the program to provide a consistent form. The value assumes a constant ratio from lock-to-lock. It may not be exact for some

vehicles.

If the value is high, e.g. 24:1, the driver is likely to under steer, and take a turn too wide. If it is low, e.g. 10:1, the driver is likely to oversteer, and turn too sharply.

POTENTIAL APPLICATIONS OF THE DATA:

The curb weight information is essential in the evaluation of both conservation of momentum and kinetic energy calculations.

The weight distribution is based upon an empty vehicle. It will usually move towards the rear axle when occupants are present when the engine is in front, and will move forward with occupants for a rear-engine vehicle.

The wheelbase, width, height, and total length are important for consideration of a variety of spatial problems which can be of significance in many vehicle accidents.

The additional information related to front bumper, hood, and windshield height, and the distance from the front bumper to the hood, windshield, or axles is often quite useful in estimating both crush damage depth and pedestrian impact dynamics.

The rear bumper height is useful in evaluating some aspects of rear-end collisions relative to braking issues, as well as questions related to sources of primary vs. secondary vs. unrelated damage.

The interior dimensional data, as well as the seatbelt and airbag information, is useful in the evaluation of occupant injury dynamics.

The Original Equipment Manufacture (OEM) tire size is sometimes useful in evaluating tire effects or changes in tires. Both the OEM tire size and the wheel radius are of use in evaluating the effects of larger or smaller tires on steering, speedometer readings, and handling.

Turning circle information and steering factors can be of use in issues of turning and situation avoidance.

The information on Front/Rear drive can be used to evaluate such things as the ability to drive out of an impact vs. spinning out of control, as well as general handling and roll-over potential for smaller cars.

The acceleration and hard, but nonskid, braking information also is of value in the evaluation of expected and/or feasible driver performance in both causation and avoidance issues.

STEERING FACTOR:

For a fixed frame, or single unit vehicle the amount of turn of the steering wheels for a particular turn may be found by dividing the wheelbase (in feet) by the turn radius (in feet). The direct result is the tire angle in radians. Multiply this result by 57.29578 to convert the value to degrees of angle.

Multiplying the tire angle in degrees by the steering factor tells you about how far the steering wheel must be rotated in order to make the required turn.

For example, to negotiate a 30-foot radius turn, a 99-inch wheelbase vehicle must turn the steering tires about 15.8 degrees. If the steering factor is 20:1, the steering wheel must be rotated about 316 degrees, or almost a full revolution.

N.S.D.C. Range:

The **N.S.D.C.** (**N**o **S**ignificant **D**imensional **C**hanges) dates indicate the range of years for which all of the dimensional information is the same for a particular model. Given this data, you can find an exemplar model of a different year than the damaged car and have confidence that the measurements are applicable to your case.

DATA SOURCES

The data contained in this program have been obtained from the following sources:

Manufacturers literature
Measurements by our staff (all of the vertical and horizontal component measurements, tire radius, etc.).
Comparison of values as given in many automotive publications, including (but Not limited to):
Consumer Reports magazine
Consumers Guide New/Used cars*

Edmunds Car and Truck prices@
American Cars, vol. 2 and 3#
American Light Trucks#
Motor Trend Magazine
Road & Track Magazine
Accident Reconstruction Journal
NHTSA Crash Test data as published in
the Accident Reconstruction Journal

* - Signet paperback books
@ - Edmund Publication Group, West Hempstead, N.Y.
- Krause Publications, Iola, WI.

The AASHTO Design Vehicle data is based upon information found in A POLICY on GEOMETRIC DESIGN of HIGHWAYS and STREETS, 1990, by the American Association of State Highway and Transportation officials, Wash. D.C.

SYSTEM REQUIREMENTS

Computer Compatibility:

This program has been tested on several varieties of "IBM clones" using one of the series of INTEL/AMD CPU chips. We have experienced no problems with the 8088, 80286, 80386, 80386SX, 80486, or Pentium series versions. A Math Co processor chip is NOT required.

Operating Systems:

This program has been tested under the various version of MS DOS from 3.0 through 7.0. It has also been tested with DrDOS. It has also been tested on Windows 95/98/NT/Me/2000/XP and has worked as a single station. Finally, it has been tested with Linux and worked. Other operating systems have not been tested but would be expected to work as long as the system has a DOS emulation mode.

Printer Compatibility:

A variety of dot matrix, ink jet, and Laser printers. Printers which are hooked in to one of the Parallel ports on a single station computer should have no problems in printing data from our program.

Monitors:

The program works with both monochrome and color monitors. Color monitors should be EGA

or better. Monochrome systems should have a Hercules compatible graphics card.

Networks:

This program is not designed as a network program. While it is being used on a network in many customer locations, we have not tested it with any Networking system.

Mouse:

This version of the EXPERT AUTOSTATS does not use a mouse.

WINDOWS (tm) :

You do not have to spend a lot of money and time on this product. It runs without either WINDOWS or megabytes of memory.

INSTALLATION

The program must FIRST be installed from the original floppy disks before it will run correctly.

At the prompt:

- (a) Insert this disk into the floppy drive,
- (b) Type {floppy drive}:INSTALL, then hit <ENTER>, e.g. A:INSTALL <ENTER>
- © Follow the directions on the monitor

Unless you have defined a different directory on your hard drive, a directory \4N6XPRT will be created on your C: drive, and the program will be installed into that directory.

At this point, you will be given the option of having a Batch file written to the root directory of the C: drive. If you choose this option, 4N6.BAT will be added to the C:\ directory. If the drive on which you have installed the \4N6XPRT directory and programs is in your system path, typing 4N6 will start the AutoStats program.

This installation procedure DOES NOT CHANGE either the Config.sys or the Autoexec.Bat files.

It is presumed that the user has sufficient knowledge of the Disk Operating System (DOS) employed on his/her computer to access the program and its directory once the

program has been installed. It is recommended that one establish a menu in the root directory which will call and run this program.

To **Exit the program** move the cursor bar to the bottom of the MENU screen, and hit <ENTER>.

4N6.BAT :

The 4N6.BAT file is as follows -

```
echo off
{Drive to which \4N6XPRT was installed}
Cd\4N6XPRT
AUTOSTAT
echo.
echo.
echo.
echo.
echo.
echo.
echo.
```

YOU may edit the lines after AUTOSTAT using any text editor, such as:

```
edlin (with MSDOS),
editor (with DrDOS),
a non-document text editor (as in
    Wordstar), etc.
```

For example, if you have Menu.bat file in the C:\ root directory, you could edit the 4N6.BAT file to read -

```
echo off
{Drive with \4N6XPRT } cd\4N6XPRT
    AUTOSTAT
C:
MENU
```

This should take you back to your basic menu whenever you exit this program.

For further insight on working with batch files, consult your operating system

manual, or any of the supplemental texts on the market which pertain to your operating system.

Expert AutoStats® Manufacturer List

(March 1, 2008)

ABARTH	1950-1969
AC	1947-1992
ACURA	1986-2008
ALFA ROMEO	1946-1995
ALLARD	1946-1954
ALPINE	1963-1970
ALVIS	1947-1967
AM GENERAL	1976-2006
AMC	1958-1988
AMPHICAR	1961-1968
ARMSTRONG	1945-1960
ARNOLT BRIST	1954-1961
ASTON MARTIN	1948-2008
AUDI	1967-2008
AUSTIN	1947-1975
AUSTIN HEALE	1953-1970
AVANTI	1965-1985
BAT INC	1998-2003
BENTLEY	1946-2008
BERKELEY	1956-1960
BERTONE	1984-1990
BIZZARRINI	1965-1969
BMW	1952-2008
BOND	1953-1958
BORGWARD	1949-1961
BRISTOL	1947-1976
BUGATTI	1949-1996
BUICK	1946-2008
CADILLAC	1946-2008
CHECKER	1960-1972
CHEVROLET	1931-2008

Expert AutoStats® Manufacturer List

(March 1, 2008)

CHRYSLER	1946-2008
CISITALIA	1947-1952
CITROEN	1945-1993
CONNAUGHT	1948-1954
CORBIN	1999-2003
DAEWOO	1999-2002
DAF	1959-1973
DAIHATSU	1988-1992
DAIMLER	1946-1967
DATSUN	1958-1984
DE TOMASO	1967-1989
DELAGE	1946-1953
DELAHAYE	1947-1954
DELLOW	1949-1959
DELOREAN	1981-1982
DENZEL	1957-1960
DESOTO	1942-1961
DETAMASO	2000-2000
DEUTSCH BONN	1955-1961
DKW	1954-1963
DODGE	1940-2008
DORETTI	1954-1955
DUAL GHIA	1960-1963
EAGLE	1986-1998
EDSEL	1958-1960
ELVA	1958-1966
EXCALIBUR	1972-1972
FACEL VEGA	1954-1964
FAIRTHORPE	1955-1962
FERRARI	1947-2008
FIAT	1947-1983

Expert AutoStats® Manufacturer List

(March 1, 2008)

FORD	1930-2008
FRAZER	1947-1951
FRAZER NASH	1948-1957
GENERIC	1979-1989
GEO	1987-1998
GLAS	1963-1966
GMC	1947-2008
GOGGOMOBIL	1955-1961
GOLIATH	1950-1960
GORDON KEEBL	1964-1967
GRUMMAN	1988-1999
HANSA	1961-1961
HEALEY	1946-1954
HILLMAN	1946-1965
HONDA	1969-2008
HOTCHKISS	1949-1954
HRG	1946-1956
HUDSON	1946-1957
HUMBER	1946-1967
HUMMER	1990-2008
HUMV	1980-2008
HYUNDAI	1984-2008
INFINITI	1990-2008
INTERNATIONA	1948-1981
ISO	1965-1974
ISOTTA FRASC	1947-1949
ISUZU	1961-2008
JAGUAR	1946-2008
JEEP	1955-2008

Expert AutoStats® Manufacturer List

(March 1, 2008)

JENSEN	1949-1977
JOWETT	1947-1954
JUSTICIALI	1954-1955
KAISER	1947-1969
KIA	1994-2008
LA FORZA	1990-1990
LADA	1987-1989
LAGONDA	1948-1964
LAMBORGHINI	1964-2008
LANCHESTER	1946-1954
LANCIA	1946-1982
LAND ROVER	1948-2008
LEA FRANCIS	1946-1954
LEXUS	1990-2008
LINCOLN	1946-2008
LLOYD	1956-1961
LOTUS	1957-2008
MAICO	1955-1960
MARATHON	1953-1956
MARAUDER	1950-1952
MARCOS	1962-1970
MASERATI	1946-1992
MATRA	1965-1969
MAZDA	1967-2008
MCLAREN	1995-1995
MERCEDES BENZ	1946-2008
MERCURY	1946-2008
MERKUR	1985-1990
MESSERSCHMIT	1955-1964
METROPOLITAN	1954-1962
MG	1945-1980

Expert AutoStats® Manufacturer List

(March 1, 2008)

MITSUBISHI	1979-2008
MONTEVERDI	1967-1977
MORETTI	1950-1960
MORGAN	1945-2008
MORRIS	1949-1971
MOSKVICH	1956-1964
MOSLER	2001-2001
NASH	1946-1957
NASH HEALEY	1951-1954
NISSAN	1980-2008
NSU	1959-1977
OLDSMOBILE	1946-2004
OPEL	1947-2001
OSCA	1961-1967
PACKARD	1946-1956
PAGANI	2001-2001
PANHARD	1954-1962
PANOZ	2000-2008
PANTHER	1972-1985
PEERLESS	1958-1960
PEGASO	1951-1958
PEUGEOT	1949-1991
PININFARIN	1984-1985
PLYMOUTH	1936-2001
POBEDA	1949-1958
PONTIAC	1946-2008
PORSCHE	1948-2008
QVALE	2000-2002
RELIANT	1952-1985

Expert AutoStats® Manufacturer List

(March 1, 2008)

RENAULT	1949-1993
RILEY	1948-1963
ROLLS ROYCE	1946-2008
ROVER	1950-1980
SAAB	1950-2008
SABRA	1962-1964
SALEEN	2001-2008
SALMSON	1951-1957
SATURN	1991-2008
SHELBY	1998-2008
SIATA	1952-1970
SIMCA	1946-1971
SINGER	1948-1958
SKODA	1946-1967
STANDARD	1949-1963
STERLING	1987-1991
STUDEBAKER	1946-1966
STUTZ	1971-1971
SUBARU	1971-2008
SUNBEAM TALB	1949-1967
SUZUKI	1981-2008
TALBOT LAGO	1946-1960
TATRA	1948-1968
TOYOPET	1958-1966
TOYOTA	1967-2008
TRIUMPH	1946-1982
TURNER	1958-1966
TVR	1957-1989
U. S. POSTAL - See Jeep, Ford, Grumman, and Utilimaster	

Expert AutoStats® Manufacturer List

(March 1, 2008)

UTILIMASTER	2000-2001
VAUXHALL	1957-1962
VESPA	1958-1961
VOLKSWAGEN	1946-2008
VOLVO	1944-2008
WARTBURG	1956-1966
WILLYS	1946-1964
WOLSELEY	1949-1965
YUGO	1986-1992
ZUNDAPP	1956-1958

Expert AutoStats® Data Definitions and Sources

(March 1, 2008)

Published Data - PD - Data Sources include, but are not limited to: Manufacturer brochures, Manufacturers Web Sites, Manufacturers Press Kits, Vehicle labels, Vehicle window price stickers, and publications such as: Car & Driver, Road & Track, Motor Trend, Popular Science, Consumer Reports, Truck Index, Consumer Guide, Edmunds Guide, Kelley Blue Book, and NADA Official Used Car Guide.

Personal Measurements - PM - Measurements obtained by staff of 4N6XPRT Systems®

Calculated Data - Calc - Calculated by the program from the dimensional data contained within the program.

Vehicle Model - (PD) - The model of vehicle. Trim lines are not identified unless they result in a change of safety information (such as ABS optional or not available in one line, but standard on a higher line).

Curb Weight - (PD) - Average published curb weight across the published data and the N.S.D.C. range. The standard curb weight measurement is for the vehicle with full fluids, as it would sit as a new car at the curb of a new car dealer with a full tank of gas, but no junk in the trunk, passengers, etc.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Curb Weight Distribution - (PD) - The published average curb weight distribution, either in percentage or in actual pounds.

Gross Vehicle Weight Rating (GVWR) - (PD) - The published maximum GVWR with standard equipment.

Number of tires on Vehicle - (PM) - The physical count of tires on the vehicle in contact with the roadway.

Drive Wheels - (PD) - The drive axle which provides the motive power for the vehicle:

- Front - front axle;
- Rear - rear axle;
- 4x2 - 2 axles, 1 powered (working from rear to front);
- 4x4/4 Wheel Drive - 2 axles, 2 powered, usually the front axle is only part time switchable powered;
- All Wheel Drive - Similar to 4 Wheel Drive but the front axle is full time powered or powered on demand;
- 6x4 - 3 axles, 2 powered.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Total Length - (PD) - Centerline measurement, may or may not include rear bumper and/or bumper guards, depending upon the vehicle and the data source.

Wheelbase - (PD) - Measurement from the center of front axle to:

- A) the center of the rear axle on two-axle vehicles,
- B) a point midway between the two rear axles on three-axle vehicles,
- C) the middle of the middle axle of the rear three axles on four-axle vehicles.

Front Bumper to Front Axle - (PM, PD) - Centerline measurement from the front of the front bumper to the center of the front axle. Sometimes published, often times requires personal measurement.

Front Bumper to Front of Front Well - (PM) - Centerline measurement from the front of the front bumper to the bottom front corner of the front wheel well.

Front Bumper to Front of Hood - (PM) - Centerline measurement from the front of the front bumper to:

- A) the 'breakpoint' where the slope transitions from primarily vertical to primarily horizontal;

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

- B) hood line on vehicles which have no breakpoint or differentiation between front bumper and hood such as the Dodge Viper or Mitsubishi 3000;
- C) hood line on vehicles which are rounded such as the VW Beetle.

Front Bumper to Base of Windshield - (PM) - Centerline measurement from the front of the front bumper to point where the windshield line intersects the hoodline.

Front Bumper to Top of Windshield - (PM) - Centerline measurement from front of the front bumper to point where the windshield line meets the gasket at the top of the windshield.

Rear Bumper to Rear Axle - (PM) - Centerline measurement from the rear of the rear bumper to the rear of the rear axle. When published overall length or wheelbase differs from the actual measured values, the Rear Bumper to Rear Axle measurement is calculated as Total Length - (Wheelbase + Front Bumper to Front Axle).

Rear Bumper to Rear of Rear Well - (PM) - Centerline measurement from the rear of the rear bumper to the bottom rear corner of the rear wheel well.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Rear Bumper to Rear of Trunk - (PM) - Cars: Centerline measurement from the rear of the rear bumper to the 'breakpoint' where the slope transitions from primarily vertical to primarily horizontal.

Pickups: Centerline measurement from the rear of the rear bumper to the top of the tailgate.

Vans & Utility Vehicles: Centerline measurement from the rear of the rear bumper to the transition point where the rear begins to slope towards front of vehicle.

Rear Bumper to Base of Rear Window - (PM) - Cars: Centerline measurement from rear of the rear bumper to the point the trunk line meets the rear window line.

Pickups, Vans, and Utility Vehicles: Centerline measurement from the rear of the rear bumper to the gasket at the bottom of the rear window.

Maximum Width - (PD) - Published overall width of the vehicle measured at the widest point. Normally the width measurement excludes the side mirrors.

Front Track - (PD, PM) - Measured from the centerline of one front tire to the centerline of the other front tire.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Rear Track - (PD, PM) -
Single Rear Wheels: Measured from the centerline of one rear tire to the centerline of the other rear tire.
Dual Rear Wheels: Measured from the point between one pair of rear tires to the point between the other pair of rear tires.

Height - (PD) - The overall height of the vehicle.

Ground to Front Bumper (Top) - (PM) - Measured from the ground to the 'breakpoint' of the bumper or the nose of the vehicle if there is no visible bumper, such as the Dodge Viper.

Ground to Headlight - center - (PM) - Measured from the ground to the center of the headlight in the 'ON' position.

Ground to Hood - top front - (PM) - Measured from the ground to:

- A) the 'breakpoint' where the slope transitions from primarily vertical to primarily horizontal,
- B) hood line on vehicles which have no breakpoint or differentiation between front bumper and hood such as the Dodge Viper or Mitsubishi 3000,
- C) hood line on vehicles which are all rounded such as the VW Beetle.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Ground to Base of Windshield - (PM) - Measured from the ground to the point where the windshield line intersects the hoodline.

Ground to Rear Bumper - top - (PM) - Measured from the ground to the 'breakpoint' of the bumper or the breakpoint of the rear of the vehicle if there is no visible bumper, such as the Chevrolet Corvette.

Ground to Trunk - top rear - (PM) -
Cars: Measured from the ground to the 'breakpoint' where the slope transitions from primarily vertical to primarily horizontal.
Pickups: Measured from the ground to the top of the tailgate.
Vans & Utility Vehicles: Measured from the ground to the transition point where the rear begins to slope towards front of vehicle.

Ground to Base of rear window - (PM) -
Cars: Measured from the ground to the point the trunk line meets the rear window line.
Pickups, Vans, and Utility Vehicles: Measured from the ground to the gasket at the bottom of the rear window.

Front Seat Shoulder Width - (PD) - The interior measurement from one side of the vehicle

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

to the other at 'shoulder height' of a seated occupant in the front seat.

Front Seat to Headliner - (PD) - The distance from the point where the seatpan meets the seat back, up to the inside of the roof.

Front Leg - seat back to floor (max) - (PD) - The distance from the seat back, forward to the front of the seat, then down at an angle to the firewall, with the front seat in the farthest rearward position.

Rear Seat Shoulder Width - (PD) - The interior measurement from one side of the seating area to the other at 'shoulder height' of a seated occupant in the rear seat.

Rear Seat to Headliner - (PD) - The distance from the point where the seatpan meets the seat back, up to the inside of the roof.

Seatbelts - (PD, PM) - The minimum observed seatbelt setup for the model and N.S.D.C. range listed.

Airbags - (PD) - The minimum number of airbag(s) standard for the model and N.S.D.C. range listed.

Turning Circle (Diameter) - (PD) - The minimum published turning circle for the vehicle for the N.S.D.C. range listed. May be

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

either curb-to-curb or wall-to-wall. The curb-to-curb measurement is for the outside of the outside front tire path. The wall-to-wall measurement is for the path of the outside front corner of the vehicle. Wall-to-wall is only used when it is the minimum published value.

Steering Ratio - (PD) - The published steering ratio. The number of degrees through which the steering wheel must be turned to turn the wheels one degree of deflection.

Wheel Radius - (PM) - The radius of the tire measured from the ground to the center of the axle.

Tire Size (OEM) - (PD, PM) - The published base equipment tire size, when available; when no published size is available the tire size observed on the vehicle at the time of measurement. When the vehicle is equipped with two different sizes of tires, one on the front and a different size on the rear, (such as the Plymouth Prowler) the front, usually smaller of the two, tire size is listed.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Brake Type - (PD) - The minimum standard brake setup for the model and N.S.D.C. range listed.

Braking, 60 mph -> 0 (Hard pedal, no skid, dry pavement) - (PD) - the minimum published braking distance. Time (t), deceleration (a), and G-force are calculated using standard formula.

Acceleration, 0->30 mph, 0->60 mph, and 45->65 mph - (PD) - The minimum published acceleration times. Acceleration (a), and G-force are calculated using standard formula.

Transmission Type - (PD) - Standard equipment or most commonly sold transmission for the model and N.S.D.C. range listed.

Rated Bumper Strength - (PD, PM) - Published bumper strength or compliance with bumper strength standards at the time of the vehicle production. Bumper strength compliance is based primarily on the Consumer Reports 'bumper basher' tests. If the bumper strength is published as 2.5 mph or no value is published, the displayed value is ____ mph.

N.S.D.C. - (PD, PM) - 'No Significant Dimensional Change', as identified by Mitchell Manual interchangeable major body

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

parts, and/or commentary as to lack of changes to the vehicle together with no change in overall length, wheelbase, width, height, and minimal change in Curb Weight. In the 1990's it is not uncommon for the N.S.D.C. range to be less than the actual interchangeable body part range due to constantly changing safety (Seatbelt/Airbag/Brake) information.

Tip-Over Stability Ratio - CALC - The stability ratio is an indication of how likely a vehicle is to tip over or slide if sliding sideways. One way of looking at the stability ratio is what would the coefficient of friction of the tires on the roadway have to be to cause the vehicle to roll instead of slide. The ratio is also the tangent of the Lean Angle, which if exceeded, will result in a rollover.

The labels UNSTABLE, RELATIVELY STABLE, or STABLE relate to tip over potential as follows:

- Less than 1.00 is UNSTABLE.
- A value greater than or equal to 1.00 and less than 1.25 is RELATIVELY STABLE.
- A value greater than 1.25 is STABLE.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

NHTSA Star Rating - CALC - The Federal Government has finalized their STAR RATING system for what they term the STATIC STABILITY FACTOR (SSF). This was published in the Federal Register Vol 66 No. 9 pg 3395 on January 12, 2001. The information is also located at 49 CFR 575.

We have provided, beginning in version 4.1, a calculated estimation of the star rating as part of our output.

The Tip-Over Stability Ratio is calculated as follows:

$$(\text{wheel track} / 2) / (\text{CG Height})$$

CENTER OF GRAVITY (No Load) positions - CALC - Calculated values based upon Weight Distribution, wheelbase, width and height of vehicle, and knowledge of Front Bumper to Front Axle measurement in combination with Total Length. CG position from side was calculated from the track through version 3.7. Beginning with version 3.8 it is referenced to the side of the vehicle, which is calculated as 1/2 of the overall width. Inches from ground was calculated as 40% of overall height through version 4.0.

Starting with version 4.1, the inches

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

from the ground is calculated based upon Body Style, in combination with the number of Doors in the case of the cars. The inches from ground value will be calculated at 38%-40% of the Overall Height. The data for refining the calculation came from work done by Dr. W. Riley Garrott, et. al.

Moments of Inertia Approximations (No Load) - CALC - Calculated values based upon published equations and rules of thumb. A single source reference for the rules of thumb, formulas, and test data is the MAY/JUNE 1989 Accident Reconstruction Journal, Volume 1, Number 3, available from Accident Reconstruction Journal, PO Box 234, Waldorf, MD 20604.

Prior to version 4.1, one set of calculations was used for the YAW, PITCH, and ROLL Moments of Inertia. Beginning with version 4.1, the Moments of Inertia are calculated as follows:

Cars

YAW	1.03*Weight - 1206
PITCH	0.99*Weight - 1149
ROLL	0.18*Weight - 1500

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Trucks

YAW 1.03*Weight - 1343
PITCH 1.12*Weight - 1657
ROLL 0.22*Weight - 235

Front Profile Information - CALC - Calculated values dependant upon having 'detail dimensions' referencing the front bumper and height above ground for each point.

Angle of Steering tires at Max Turn - CALC - Calculated value based upon wheelbase and turning circle.

First Approximation Crush Factors - exactly as stated in the discussion at the end of page 3 of the printout. The CF values are determined in the same way a coefficient of friction or drag factor is determined from a set of test skids -

$CF = MPH^2 / (30 * \text{stopping distance in feet})$

.

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

PRINT TO FILE OPTION

The third screen of data for the Expert AutoStats® program contains an option to Print to File, which is selected by entering the character "F". This option will allow you to send the output to a file name which you designate. This name must be at least 1 character in length and no more than 8 characters in length. All "Print to File" filenames will have an extension of **.VEH** and will be contained in the same directory as the Expert AutoStats® program.

If this is selected by mistake, a file name of **JUNK** is suggested.

EXCHANGE FILE OUTPUT

Selection of the Exchange File Output option is intended to allow the Expert AutoStats® data be imported into other calculation programs (such as REC-TEC, ED-CRASH, ARW, WinCRASH, etc.). The data can also be imported into other programs which allow you to import ASCII comma delimited data. (Including programs you write yourself) The data is stored in the **ASVEH#.4N6** files, where # = 1, 2, 3, 4, 5, and 6. The units of measurement are inches, unless otherwise noted. The data fields and data type begin on the next

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

page.

<u>FIELD</u>	<u>DATA TYPE</u>
AutoStats version Number	String
Vehicle identification	String
Model Year	Real
Manufacturer	String
Model	String
Number of Doors	Integer
Body Style	String
Curb weight (pounds)	Real
Percent Weight on Front Axle	Real
Percent Weight on Rear Axle	Real
Drive Axle	String
Length	Real
Height	Real
Width	Real
Wheelbase	Real
Front Bumper to Front Axle	Real
Rear Bumper to Rear Axle	Real
Front Track	Real
Rear Track	Real
Transmission	String
0-30 (feet/second/second)	Real
0-60 mph (feet/second/second)	Real
45-65 mph (feet/second/second)	Real
60-0 mph (feet/second/second)	Real
Steering Factor (dimensionless)	Real
Turning Circle Diameter (feet)	Real
Front Bumper to Front Hood	Real
Front Bumper to Window Bottom	Real
Front Bumper to Window Top	Real
Ground to Front Bumper (top)	Real

Expert AutoStats®
Data Definitions and Sources
(March 1, 2008)

Ground to Center of Headlights	Real
Ground to Front of Hood	Real
Ground to Ft. Window Bottom	Real
Ground to Ft. Window Top	Real
Rear Bumper to Trunk	Real
Rear Bumper to Rear Window Bottom	Real
Ground to Rear Bumper (top)	Real
Ground to Rear Window Bottom	Real
Yaw Moment of Inertia (ft*lb*sec^2)	Real
Pitch Moment of Inertia (ft*lb*sec^2)	Real
Roll Moment of Inertia (ft*lb*sec^2)	Real
Ground to Rear of Trunk	Real
Ground to CG Height (calculated)	Real

Select the file position using the up and down arrow keys. The vehicle will be saved in the position highlighted. If another vehicle is in the highlighted position, that vehicle information will be replaced by the current vehicle information.

Select the "Clear all OUTPUT FILES" to clear all of the Exchange File Output files of information.

If you decide that you do not want to save the vehicle in any of the Exchange Output File positions, you may select the "Exit Output to file" selection to return to screen three.



National Archives and Records Administration



§ 570.61

§ 570.61 Suspension system.

(a) *Suspension condition.* Ball joint seals shall not be cut or cracked, other than superficial surface cracks. Ball joints and kingpins shall not be bent or damaged. Stabilizer bars shall be connected. Springs shall not be broken and coil springs shall not be extended by spacers. Shock absorber mountings, shackles, and U-bolts shall be securely attached. Rubber bushings shall not be cracked, extruded out from or missing from suspension joints. Radius rods shall not be missing or damaged.

(1) *Inspection procedure.* Examine front and rear end suspension parts for the conditions indicated.

(b) *Shock absorber condition.* There shall be no oil on the shock absorber housings attributable to leakage by the seal.

(1) *Inspection procedure.* Examine shock absorbers for oil leakage from within.

§ 570.62 Tires.

(a) *Tread depth.* The tread shall be not less than four thirty-seconds of an inch deep on each front tire of any vehicle other than a trailer and not less than two thirty-seconds of an inch on all other tires.

(1) *Inspection procedure.* For tires with treadwear indicators, check for indicators in any two adjacent major grooves at three locations spaced approximately 120° apart around the circumference of the tire. For tires without treadwear indicators, measure the tread depth with a suitable gauge or scale in two adjacent major grooves at 3 locations spaced approximately 120° apart around the circumference of the tire at the area of greatest wear.

(b) *Type.* Vehicles should be equipped with tires on the same axle that are matched in construction and tire size designation, and dual tires shall be matched for overall diameter within one-half inch.

(1) *Inspection procedure.* Examine visually. A mismatch in size and construction between tires on the same axle, or a major deviation from the size recommended by the vehicle or tire manufacturer, is a cause for rejection. On a dual-tire arrangement the diameter of one of the duals must be within one-half inch of the other as measured

49 CFR Ch. V (10–1–02 Edition)

by a gauge block inserted between the tire and a caliper.

(c) *General condition.* Tires shall be free from chunking, bumps, knots, or bulges evidencing cord, ply or tread separation from the casing.

(1) *Inspection procedure.* Examine visually for the conditions indicated.

(d) *Damage.* Tire cords or belting materials shall not be exposed, either to the naked eye or when cuts on the tire are probed. Reinforcement repairs to the cord body are allowable on tires other than front-mounted tires.

(1) *Inspection procedure.* Examine visually for the conditions indicated, using a blunt instrument if necessary to probe cuts and abrasions.

(e) *Special purpose tires.* Tires marked “Not For Highway Use” or “Farm Use Only” or other such restrictions shall not be used on any motor vehicles operating on public highways.

(1) *Inspection procedure.* Examine visually for tires labeled with specific restrictions.

§ 570.63 Wheel assemblies.

(a) *Wheel integrity.* A tire rim, wheel disc or spider shall have no visible cracks, elongated bolt holes, or indications of in-service repair by welding.

(1) *Inspection procedure.* Examine visually for the conditions indicated.

(b) *Cast wheels.* Cast wheels shall not be cracked or show evidence of excessive wear in the clamp area.

(1) *Inspection procedure.* Examine visually for the conditions indicated.

(c) *Mounting.* All wheel nuts shall be in place and tight.

(1) *Inspection procedure.* Check wheel retention for the conditions indicated.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

Subpart A—General

Sec.	
571.1	Scope.
571.3	Definitions.
571.4	Explanation of usage.
571.5	Matter incorporated by reference.
571.7	Applicability.
571.8	Effective date.
571.9	Separability.

Subpart B—Federal Motor Vehicle Safety Standards

- 571.101 Standard No. 101; Controls and displays.
- 571.102 Standard No. 102; Transmission shift lever sequence, starter interlock, and transmission braking effect.
- 571.103 Standard No. 103; Windshield defrosting and defogging systems.
- 571.104 Standard No. 104; Windshield wiping and washing systems.
- 571.105 Standard No. 105; Hydraulic and electric brake systems.
- 571.106 Standard No. 106; Brake hoses.
- 571.107 [Reserved]
- 571.108 Standard No. 108; Lamps, reflective devices, and associated equipment.
- 571.109 Standard No. 109; New pneumatic tires.
- 571.110 Standard No. 110; Tire selection and rims.
- 571.111 Standard No. 111; Rearview mirrors.
- 571.112 [Reserved]
- 571.113 Standard No. 113; Hood latch system.
- 571.114 Standard No. 114; Theft protection.
- 571.115 [Reserved]
- 571.116 Standard No. 116; Motor vehicle brake fluids.
- 571.117 Standard No. 117; Retreaded pneumatic tires.
- 571.118 Standard No. 118; Power-operated window, partition, and roof panel systems.
- 571.119 Standard No. 119; New pneumatic tires for vehicles other than passenger cars.
- 571.120 Standard No. 120; Tire selection and rims for motor vehicles other than passenger cars.
- 571.121 Standard No. 121; Air brake systems.
- 571.122 Standard No. 122; Motorcycle brake systems.
- 571.123 Standard No. 123; Motorcycle controls and displays.
- 571.124 Standard No. 124; Accelerator control systems.
- 571.125 Standard No. 125; Warning devices.
- 571.126–571.128 [Reserved]
- 571.129 Standard No. 129; New non-pneumatic tires for passenger cars.
- 571.131 Standard No. 131; School bus pedestrian safety devices.
- 571.135 Standard No. 135; Passenger car brake systems.
- 571.138 Standard No. 138; Tire pressure monitoring systems.
- 571.201 Standard No. 201; Occupant protection in interior impact.
- 571.202 Standard No. 202; Head restraints.
- 571.203 Standard No. 203; Impact protection for the driver from the steering control system.
- 571.204 Standard No. 204; Steering control rearward displacement.
- 571.205 Standard No. 205; Glazing materials.
- 571.206 Standard No. 206; Door locks and door retention components.
- 571.207 Standard No. 207; Seating systems.
- 571.208 Standard No. 208; Occupant crash protection.
- 571.209 Standard No. 209; Seat belt assemblies.
- 571.210 Standard No. 210; Seat belt assembly anchorages.
- 571.211 [Reserved]
- 571.212 Standard No. 212; Windshield mounting.
- 571.213 Standard No. 213; Child restraint systems.
- 571.214 Standard No. 214; Side impact protection.
- 571.215 [Reserved]
- 571.216 Standard No. 216; Roof crush resistance.
- 571.217 Standard No. 217; Bus emergency exits and window retention and release.
- 571.218 Standard No. 218; Motorcycle helmets.
- 571.219 Standard No. 219; Windshield zone intrusion.
- 571.220 Standard No. 220; School bus rollover protection.
- 571.221 Standard No. 221; School bus body joint strength.
- 571.222 Standard No. 222; School bus passenger seating and crash protection.
- 571.223 Standard No. 223; Rear impact guards.
- 571.224 Standard No. 224; Rear impact protection.
- 571.225 Standard No. 225; Child restraint anchorage systems.
- 571.301 Standard No. 301; Fuel system integrity.
- 571.302 Standard No. 302; Flammability of interior materials.
- 571.303 Standard No. 303; Fuel system integrity of compressed natural gas vehicles.
- 571.304 Standard No. 304; Compressed natural gas fuel container integrity.
- 571.305 Standard No. 305; Electric-powered vehicles: electrolyte spillage and electrical shock protection.
- 571.401 Standard No. 401; Internal trunk release.
- 571.500 Standard No. 500; Low-speed vehicles.

AUTHORITY: 49 U.S.C. 322, 30111, 30115, 30166 and 30177; delegation of authority at 49 CFR 1.50.

Subpart A—General**§ 571.1 Scope.**

This part contains the Federal Motor Vehicle Safety Standards for motor vehicles and motor vehicle equipment established under section 103 of the National Traffic and Motor Vehicle Safety Act of 1966 (80 Stat. 718).

[33 FR 19703, Dec. 25, 1968. Redesignated at 35 FR 5118, Mar. 26, 1970]

§ 571.3 Definitions.

(a) *Statutory definitions.* All terms defined in section 102 of the Act are used in their statutory meaning.

(b) *Other definitions.* As used in this chapter—

Act means the National Traffic and Motor Vehicle Safety Act of 1966 (80 Stat. 718).

Approved, unless used with reference to another person, means approved by the Secretary.

Boat trailer means a trailer designed with cradle-type mountings to transport a boat and configured to permit launching of the boat from the rear of the trailer.

Bus means a motor vehicle with motive power, except a trailer, designed for carrying more than 10 persons.

Curb weight means the weight of a motor vehicle with standard equipment; maximum capacity of engine fuel, oil, and coolant; and, if so equipped, air conditioning and additional weight optional engine.

Designated seating capacity means the number of designated seating positions provided.

Designated seating position means any plan view location capable of accommodating a person at least as large as a 5th percentile adult female, if the overall seat configuration and design and vehicle design is such that the position is likely to be used as a seating position while the vehicle is in motion, except for auxiliary seating accommodations such as temporary or folding jump seats. Any bench or split-bench seat in a passenger car, truck or multipurpose passenger vehicle with a GVWR less than 4,536 kilograms (10,000 pounds), having greater than 127 centimeters (50 inches) of hip room (measured in accordance with SAE

Standard J1100(a)) shall have not less than three designated seating positions, unless the seat design or vehicle design is such that the center position cannot be used for seating. For the sole purpose of determining the classification of any vehicle sold or introduced into interstate commerce for purposes that include carrying students to and from school or related events, any location in such vehicle intended for securement of an occupied wheelchair during vehicle operation shall be regarded as four designated seating positions.

Driver means the occupant of a motor vehicle seated immediately behind the steering control system.

Emergency brake means a mechanism designed to stop a motor vehicle after a failure of the service brake system.

5th percentile adult female means a person possessing the dimensions and weight of the 5th percentile adult female specified for the total age group in Public Health Service Publication No. 1000, Series 11, No. 8, "Weight, Height, and Selected Body Dimensions of Adults."

Firefighting vehicle means a vehicle designed exclusively for the purpose of fighting fires.

Fixed collision barrier means a flat, vertical, unyielding surface with the following characteristics:

(1) The surface is sufficiently large that when struck by a tested vehicle, no portion of the vehicle projects or passes beyond the surface.

(2) The approach is a horizontal surface that is large enough for the vehicle to attain a stable attitude during its approach to the barrier, and that does not restrict vehicle motion during impact.

(3) When struck by a vehicle, the surface and its supporting structure absorb no significant portion of the vehicle's kinetic energy, so that a performance requirement described in terms of impact with a fixed collision barrier must be met no matter how small an amount of energy is absorbed by the barrier.

Forward control means a configuration in which more than half of the engine length is rearward of the foremost point of the windshield base and the

steering wheel hub is in the forward quarter of the vehicle length.

Full trailer means a trailer, except a pole trailer, that is equipped with two or more axles that support the entire weight of the trailer.

Gross axle weight rating or *GAWR* means the value specified by the vehicle manufacturer as the load-carrying capacity of a single axle system, as measured at the tire-ground interfaces.

Gross combination weight rating or *GCWR* means the value specified by the manufacturer as the loaded weight of a combination vehicle.

Gross vehicle weight rating or *GVWR* means the value specified by the manufacturer as the loaded weight of a single vehicle.

H point means the mechanically hinged hip point of a manikin which simulates the actual pivot center of the human torso and thigh, described in SAE Recommended Practice J826, "Manikins for Use in Defining Vehicle Seating Accommodations," November 1962.

Head impact area means all nonglazed surfaces of the interior of a vehicle that are statically contactable by a 6.5-inch diameter spherical head form of a measuring device having a pivot point to "top-of-head" dimension infinitely adjustable from 29 to 33 inches in accordance with the following procedure, or its graphic equivalent:

(a) At each designated seating position, place the pivot point of the measuring device—

(1) For seats that are adjustable fore and aft, at—

(i) The seating reference point; and

(ii) A point 5 inches horizontally forward of the seating reference point and vertically above the seating reference point an amount equal to the rise which results from a 5-inch forward adjustment of the seat or 0.75 inch; and

(2) For seats that are not adjustable fore and aft, at the seating reference point.

(b) With the pivot point to "top-of-head" dimension at each value allowed by the device and the interior dimensions of the vehicle, determine all contact points above the lower windshield glass line and forward of the seating reference point.

(c) With the head form at each contact point, and with the device in a vertical position if no contact points exist for a particular adjusted length, pivot the measuring device forward and downward through all arcs in vertical planes to 90° each side of the vertical longitudinal plane through the seating reference point, until the head form contacts an interior surface or until it is tangent to a horizontal plane 1 inch above the seating reference point, whichever occurs first.

Interior compartment door means any door in the interior of the vehicle installed by the manufacturer as a cover for storage space normally used for personal effects.

Longitudinal or longitudinally means parallel to the longitudinal centerline of the vehicle.

Low-speed vehicle means a 4-wheeled motor vehicle, other than a truck, whose speed attainable in 1.6 km (1 mile) is more than 32 kilometers per hour (20 miles per hour) and not more than 40 kilometers per hour (25 miles per hour) on a paved level surface.

Motorcycle means a motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground.

Motor-driven cycle means a motorcycle with a motor that produces 5-brake horsepower or less.

Multipurpose passenger vehicle means a motor vehicle with motive power, except a low-speed vehicle or trailer, designed to carry 10 persons or less which is constructed either on a truck chassis or with special features for occasional off-road operation.

Open-body type vehicle means a vehicle having no occupant compartment top or an occupant compartment top that can be installed or removed by the user at his convenience.

Outboard designated seating position means a designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the

front and rear edges of the seat cushion.

Overall vehicle width means the nominal design dimension of the widest part of the vehicle, exclusive of signal lamps, marker lamps, outside rearview mirrors, flexible fender extensions, and mud flaps, determined with doors and windows closed and the wheels in the straight-ahead position.

Parking brake means a mechanism designed to prevent the movement of a stationary motor vehicle.

Passenger car means a motor vehicle with motive power, except a low-speed vehicle, multipurpose passenger vehicle, motorcycle, or trailer, designed for carrying 10 persons or less.

Pelvic impact area means that area of the door or body side panel adjacent to any outboard designated seating position which is bounded by horizontal planes 7 inches above and 4 inches below the seating reference point and vertical transverse planes 8 inches forward and 2 inches rearward of the seating reference point.

Pole trailer means a motor vehicle without motive power designed to be drawn by another motor vehicle and attached to the towing vehicle by means of a reach or pole, or by being boomed or otherwise secured to the towing vehicle, for transporting long or irregularly shaped loads such as poles, pipes, or structural members capable generally of sustaining themselves as beams between the supporting connections.

School bus means a bus that is sold, or introduced in interstate commerce, for purposes that include carrying students to and from school or related events, but does not include a bus designed and sold for operation as a common carrier in urban transportation.

Seating reference point (SgRP) means the unique design H-point, as defined in SAE J1100 (June 1984), which:

(a) Establishes the rearmost normal design driving or riding position of each designated seating position, which includes consideration of all modes of adjustment, horizontal, vertical, and tilt, in a vehicle;

(b) Has X, Y, and Z coordinates, as defined in SAE J1100 (June 1984), established relative to the designed vehicle structure;

(c) Simulates the position of the pivot center of the human torso and thigh; and

(d) Is the reference point employed to position the two-dimensional drafting template with the 95th percentile leg described in SAE J826 (May 1987), or, if the drafting template with the 95th percentile leg cannot be positioned in the seating position, is located with the seat in its most rearward adjustment position.

Semitrailer means a trailer, except a pole trailer, so constructed that a substantial part of its weight rests upon or is carried by another motor vehicle.

Service brake means the primary mechanism designed to stop a motor vehicle.

Speed attainable in 1 mile means the speed attainable by accelerating at maximum rate from a standing start for 1 mile, on a level surface.

Speed attainable in 2 miles means the speed attainable by accelerating at maximum rate from a standing start for 2 miles, on a level surface.

Torso line means the line connecting the "H" point and the shoulder reference point as defined in SAE Recommended Practice J787g, "Motor Vehicle Seat Belt Anchorage," September 1966.

Trailer means a motor vehicle with or without motive power, designed for carrying persons or property and for being drawn by another motor vehicle.

Trailer converter dolly means a trailer chassis equipped with one or more axles, a lower half of a fifth wheel and a drawbar.

Truck means a motor vehicle with motive power, except a trailer, designed primarily for the transportation of property or special purpose equipment.

Truck tractor means a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn.

Unloaded vehicle weight means the weight of a vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants, or accessories that are ordinarily removed from the vehicle when they are not in use.

95th percentile adult male means a person possessing the dimensions and weight of the 95th percentile adult male specified in Public Health Service Publication No. 1000, Series 11, No. 8, "Weight, Height, and Selected Body Dimensions of Adults."

Vehicle fuel tank capacity means the tank's unusable capacity (i.e., the volume of fuel left at the bottom of the tank when the vehicle's fuel pump can no longer draw fuel from the tank) plus its usable capacity (i.e., the volume of fuel that can be pumped into the tank through the filler pipe with the vehicle on a level surface and with the unusable capacity already in the tank). The term does not include the vapor volume of the tank (i.e., the space above the fuel tank filler neck) nor the volume of the fuel tank filler neck.

[33 FR 19703, Dec. 25, 1968. Redesignated at 35 FR 5118, Mar. 26, 1970]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §571.3, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

§571.4 Explanation of usage.

The word *any*, used in connection with a range of values or set of items in the requirements, conditions, and procedures of the standards or regulations in this chapter, means generally the totality of the items or values, any one of which may be selected by the Administration for testing, except where clearly specified otherwise.

Examples: "The vehicle shall meet the requirements of S4.1 when tested at any point between 18 and 22 inches above the ground." This means that the vehicle must be capable of meeting the specified requirements at every point between 18 and 22 inches above the ground. The test in question for a given vehicle may call for a single test (a single impact, for example), but the vehicle must meet the requirement at whatever point the Administration selects, within the specified range.

"Each tire shall be capable of meeting the requirements of this standard when mounted on any rim specified by the manufacturer as suitable for use with that tire." This means that, where the manufacturer specifies more than one rim as suitable for use with a tire, the tire must meet the requirements with whatever rim the Administration selects from the specified group.

"Any one of the items listed below may, at the option of the manufacturer, be substituted for the hardware specified in S4.1." Here the wording clearly indicates that the selection of items is at the manufacturer's option.

[36 FR 2511, Feb. 5, 1971]

§571.5 Matter incorporated by reference.

(a) *Incorporation.* There are hereby incorporated, by reference, into this part, all materials referred to in any standard in subpart B of this part that are not set forth in full in the standard. These materials are thereby made part of this regulation. The Director of the Federal Register has approved the materials incorporated by reference. For materials subject to change, only the specific version approved by the Director of the Federal Register and specified in the standard are incorporated. A notice of any change in these materials will be published in the FEDERAL REGISTER. As a convenience to the reader, the materials incorporated by reference are listed in the Finding Aid Table found at the end of this volume of the Code of Federal Regulations.

(b) *Availability.* The materials incorporated by reference, other than acts of Congress and matter published elsewhere in the FEDERAL REGISTER, are available as follows:

(1) *Standards of the Society of Automotive Engineers (SAE).* They are published by the Society of Automotive Engineers, Inc. Information and copies may be obtained by writing to: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

(2) *Standards of the American Society for Testing and Materials.* They are published by the American Society for Testing and Materials. Information on copies may be obtained by writing to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

(3) *Standards of the American National Standards Institute.* They are published by the American National Standards Institute. Information and copies may be obtained by writing to: American National Standards Institute, 1430 Broadway, New York, New York 10018.

(4) *Data from the National Health Survey, Public Health Publication No. 1000,*

attorney is greater than that previously stated on the title and reassignment documents. This certification is not intended to create, nor does it create any new or additional liability under Federal or State law.

(Signature) _____

(Printed Name) _____

Address (Street) _____

(City) _____ (State) _____ (ZIP Code) _____

Date _____

[54 FR 9816, Mar. 8, 1989, as amended at 54 FR 35889, Aug. 30, 1989]

PART 581—BUMPER STANDARD

Sec.

581.1 Scope.

581.2 Purpose.

581.3 Application.

581.4 Definitions.

581.5 Requirements.

581.6 Conditions.

581.7 Test procedures.

581.8 Exemptions.

AUTHORITY: 49 U.S.C. 32502; 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.50.

SOURCE: 42 FR 24059, May 12, 1977, unless otherwise noted.

§581.1 Scope.

This standard establishes requirements for the impact resistance of vehicles in low speed front and rear collisions.

§581.2 Purpose.

The purpose of this standard is to reduce physical damage to the front and rear ends of a passenger motor vehicle from low speed collisions.

§581.3 Application.

This standard applies to passenger motor vehicles other than multipurpose passenger vehicles and low-speed vehicles as defined in 49 CFR part 571.3(b).

[63 FR 33217, June 17, 1998]

§581.4 Definitions.

All terms defined in 49 U.S.C. 32101 are used as defined therein.

Bumper face bar means any component of the bumper system that con-

tacts the impact ridge of the pendulum test device.

[42 FR 24059, May 12, 1977, as amended at 64 FR 2862, Jan. 19, 1999]

§581.5 Requirements.

(a) Each vehicle shall meet the damage criteria of §§581.5(c)(1) through 581.5(c)(9) when impacted by a pendulum-type test device in accordance with the procedures of §581.7(b), under the conditions of §581.6, at an impact speed of 1.5 m.p.h., and when impacted by a pendulum-type test device in accordance with the procedures of §581.7(a) at 2.5 m.p.h., followed by an impact into a fixed collision barrier that is perpendicular to the line of travel of the vehicle, while traveling longitudinally forward, then longitudinally rearward, under the conditions of §581.6, at 2.5 m.p.h.

(b) [Reserved]

(c) *Protective criteria.* (1) Each lamp or reflective device except license plate lamps shall be free of cracks and shall comply with applicable visibility requirements of S5.3.1.1 of Standard No. 108 (§571.108 of this chapter). The aim of each headlamp installed on the vehicle shall be adjustable to within the beam aim inspection limits specified in Table 1 of SAE Recommended Practice J599 AUG97, measured with the aiming method appropriate for that headlamp.

(2) The vehicle's hood, trunk, and doors shall operate in the normal manner.

(3) The vehicle's fuel and cooling systems shall have no leaks or constricted fluid passages and all sealing devices and caps shall operate in the normal manner.

(4) The vehicle's exhaust system shall have no leaks or constrictions.

(5) The vehicle's propulsion, suspension, steering, and braking systems shall remain in adjustment and shall operate in the normal manner.

(6) A pressure vessel used to absorb impact energy in an exterior protection system by the accumulation of gas pressure or hydraulic pressure shall not suffer loss of gas or fluid accompanied by separation of fragments from the vessel.

(7) The vehicle shall not touch the test device, except on the impact ridge shown in Figures 1 and 2, with a force

that exceeds 2000 pounds on the combined surfaces of Planes A and B of the test device.

(8) The exterior surfaces shall have no separations of surface materials, paint, polymeric coatings, or other covering materials from the surface to which they are bonded, and no permanent deviations from their original contours 30 minutes after completion of each pendulum and barrier impact, except where such damage occurs to the bumper face bar and the components and associated fasteners that directly attach the bumper face bar to the chassis frame.

(9) Except as provided in § 581.5(c)(8), there shall be no breakage or release of fasteners or joints.

[42 FR 24059, May 12, 1977, as amended at 42 FR 38909, Aug. 1, 1977; 43 FR 40231, Sept. 11, 1978; 47 FR 21837, May 20, 1982; 64 FR 16360, Apr. 5, 1999; 64 FR 49092, Sept. 10, 1999]

§ 581.6 Conditions.

The vehicle shall meet the requirements of § 581.5 under the following conditions.

(a) *General.* (1) The vehicle is at unloaded vehicle weight.

(2) The front wheels are in the straight ahead position.

(3) Tires are inflated to the vehicle manufacturer's recommended pressure for the specified loading condition.

(4) Brakes are disengaged and the transmission is in neutral.

(5) Trailer hitches, license plate brackets, and headlamp washers are removed from the vehicle. Running lights, fog lamps, and equipment mounted on the bumper face bar are removed from the vehicle if they are optional equipment.

(b) *Pendulum test conditions.* The following conditions apply to the pendulum test procedures of § 581.7 (a) and (b).

(1) The test device consists of a block with one side contoured as specified in Figure 1 and Figure 2 with the impact ridge made of AISI 4130 steel hardened to 34 Rockwell "C." The impact ridge and the surfaces in Planes A and B of the test device are finished with a surface roughness of 32 as specified by SAE Recommended Practice J449A, June 1963. From the point of release of the device until the onset of rebound,

the pendulum suspension system holds Plane A vertical, with the arc described by any point on the impact line lying in a vertical plane (for § 581.7(a), longitudinal; for § 581.7(b), at an angle of 30° to a vertical longitudinal plane) and having a constant radius of not less than 11 feet.

(2) With Plane A vertical, the impact line shown in Figures 1 and 2 is horizontal at the same height as the test device's center of percussion.

(3) The effective impacting mass of the test device is equal to the mass of the tested vehicle.

(4) When impacted by the test device, the vehicle is at rest on a level rigid concrete surface.

(c) *Barrier test condition.* At the onset of a barrier impact, the vehicle's engine is operating at idling speed in accordance with the manufacturer's specifications. Vehicle systems that are not necessary to the movement of the vehicle are not operating during impact.

(Authority: Sec. 102, Pub. L. 92-513, 86 Stat. 947 (15 U.S.C. 1912); secs. 103, 119, Pub. L. 89-563, 80 Stat. 718 (15 U.S.C. 1392, 1407); delegation of authority at 49 CFR 1.50 and 501.7)

[42 FR 24059, May 12, 1977, as amended at 42 FR 38909, Aug. 1, 1977; 48 FR 43331, Sept. 23, 1983]

§ 581.7 Test procedures.

(a) *Longitudinal impact test procedures.*

(1) Impact the vehicle's front surface and its rear surface two times each with the impact line at any height from 16 to 20 inches, inclusive, in accordance with the following procedure.

(2) For impacts at a height of 20 inches, place the test device shown in Figure 1 so that Plane A is vertical and the impact line is horizontal at the specified height.

(3) For impacts at a height between 20 inches and 16 inches, place the test device shown in Figure 2 so that Plane A is vertical and the impact line is horizontal at a height within the range.

(4) For each impact, position the test device so that the impact line is at least 2 inches apart in vertical direction from its position in any prior impact, unless the midpoint of the impact line with respect to the vehicle is to be more than 12 inches apart laterally from its position in any prior impact.

(5) For each impact, align the vehicle so that it touches, but does not move, the test device, with the vehicle's longitudinal centerline perpendicular to the plane that includes Plane A of the test device and with the test device in-board of the vehicle corner test positions specified in § 581.7(b).

(6) Move the test device away from the vehicle, then release it to impact the vehicle.

(7) Perform the impacts at intervals of not less than 30 minutes.

(b) *Corner impact test procedure.* (1) Impact a front corner and a rear corner of the vehicle once each with the impact line at a height of 20 inches and impact the other front corner and the other rear corner once each with the impact line at any height from 16 to 20 inches, inclusive, in accordance with the following procedure.

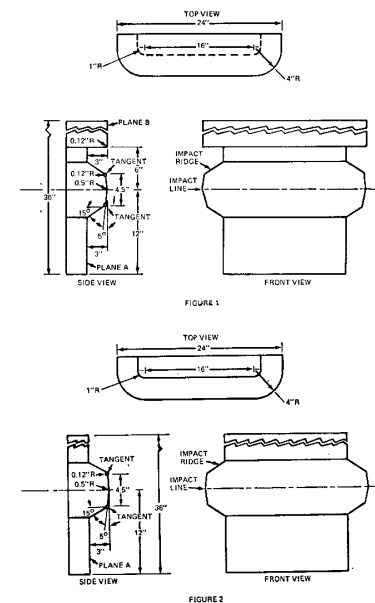
(2) For an impact at a height of 20 inches, place the test device shown in Figure 1 so that Plane A is vertical and the impact line is horizontal at the specified height.

(3) For an impact at a height between 16 inches and 20 inches, place the test device shown in Figure 2 so that Plane A is vertical and the impact line is horizontal at a height within the range.

(4) Align the vehicle so that a vehicle corner touches, but does not move, the lateral center of the test device with Plane A of the test device forming an angle of 60 degrees with a vertical longitudinal plane.

(5) Move the test device away from the vehicle, then release it to impact the vehicle.

(6) Perform the impact at intervals of not less than 30 minutes.



[42 FR 24059, May 12, 1977, as amended at 42 FR 38909, Aug. 1, 1977]

§ 581.8 Exemptions.

A manufacturer of a passenger motor vehicle to which a bumper standard issued under this part applies may apply to the Administrator:

(a) For rulemaking as provided in part 552 of this chapter to exempt a class of passenger motor vehicles from all or any part of a bumper standard issued under this part on the basis that the class of vehicles has been manufactured for a special use and that compliance with the standard would unreasonably interfere with the special use of the class of vehicle; or

(b) To exempt a make or model of passenger motor vehicle on the basis set forth in paragraph (a) of this section or part 555 of this chapter.

(c) An application filed for exemption on the basis of paragraph (a) of this section shall contain the information specified in §555.5 of this chapter, and set forth data, views, and arguments in support that the vehicle has been manufactured for a special use and that compliance with the bumper standard would interfere unreasonably with the special use of the vehicle.

(d) An application filed for exemption under part 555 of this chapter shall be filed in accordance with the requirements of that part.

(e) The NHTSA shall process exemption applications in accordance with §555.7 of this chapter. An exemption granted a manufacturer on the basis of paragraph (a) of this section is indefinite in length but expires when the manufacturer ceases production of the exempted vehicle, or when the exempted vehicle as produced has been so modified from its original design that the Administrator decides that it is no longer manufactured for the special use upon which the application for its exemption was based. The Administrator may terminate an exemption in the manner set forth in §§555.8(c) and 555.8(f) of this chapter, and for the reasons set forth in §555.8(d) of this chapter. An exempted vehicle shall be labeled in accordance with §555.9 of this chapter. Information relating to an application shall be available to the public in the manner specified in §555.10 of this chapter.

[64 FR 2862, Jan. 19, 1999]

PART 582—INSURANCE COST INFORMATION REGULATION

Sec.

582.1 Scope.

582.2 Purpose.

582.3 Definitions.

582.4 Requirements.

582.5 Information form.

AUTHORITY: 49 U.S.C. 32303; delegation of authority at 49 CFR 1.50(f).

SOURCE: 40 FR 4918, Feb. 3, 1975, unless otherwise noted.

§ 582.1 Scope.

This part requires automobile dealers to make available to prospective purchasers information reflecting dif-

ferences in insurance costs for different makes and models of passenger motor vehicles based upon differences in damage susceptibility and crashworthiness, pursuant to section 201(e) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1941(e)), herein “the Cost Savings Act.”

§ 582.2 Purpose.

The purpose of this part is to enable prospective purchasers to compare differences in auto insurance costs for the various makes and models of passenger motor vehicles, based upon differences in damage susceptibility and crashworthiness, and to realize any savings in collision insurance resulting from differences in damageability, and any savings in medical payment insurance resulting from differences in crashworthiness.

§ 582.3 Definitions.

(a) *Statutory definitions.* All terms used in this part which are defined in section 2 of the Cost Savings Act are used as so defined.

(b) *Definitions used in this part.* (1) *Automobile dealer* means any person who engages in the retail sale of new automobiles as a trade or business.

(2) *Collision insurance* means insurance that reimburses the insured party for physical damage to his property resulting from automobile accidents.

(3) *Insurance cost* means the insurance premium rate, as expressed in appropriate indices, for collision and medical payment, including personal injury protection in no-fault states.

(4) *Medical payment insurance* means insurance that reimburses the insured party for medical expenses sustained by himself, his family, and his passengers in automobile accidents.

[40 FR 4918, Feb. 3, 1975, as amended at 58 FR 12550, Mar. 5, 1993]

§ 582.4 Requirements.

(a) Each automobile dealer shall make available to prospective purchasers, without charge, the information specified in §582.5, at each location where he or she offers new vehicles for sale.