U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

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**DOT HS 809 868**
**NHTSA Technical Report**

**June 2005**

# Trends in the Static Stability Factor of Passenger Cars, Light Trucks, and Vans

**Technical Report Documentation Page**

| 1. Report No. | 2. Government Accession No. | 3. Recipient's Catalog No. |
|---|---|---|
| DOT HS 809 868 | | |

| 4. Title and Subtitle | 5. Report Date |
|---|---|
| Trends in the Static Stability Factor of Passenger Cars, Light Trucks, and Vans | June 2005 |
| | 6. Performing Organization Code |

| 7. Author(s) | 8. Performing Organization Report No. |
|---|---|
| Marie C. Walz | |

| 9. Performing Organization Name and Address | 10. Work Unit No. (TRAIS) |
|---|---|
| Office of Regulatory Analysis and Evaluation<br>Planning, Evaluation and Budget<br>National Highway Traffic Safety Administration<br>Washington, DC 20590 | 11. Contract or Grant No. |

| 12. Sponsoring Agency Name and Address | 13. Type of Report and Period Covered |
|---|---|
| Department of Transportation<br>National Highway Traffic Safety Administration<br>Washington, DC 20590 | NHTSA Technical Report |
| | 14. Sponsoring Agency Code |

**15. Supplementary Notes**

**16. Abstract**

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Data are presented for overall fleet average SSFs by vehicle type over a number of model years. Passenger cars, as a group, have the highest average SSF, and these have remained high. SUVs have substantially improved their SSF values over time, especially after model year 2000, whereas those of pickup trucks have remained consistent over the years. Minivans showed considerable improvement since they were first introduced, while full-size vans showed a small but steady improvement. In model year 2003, the sales-weighted average SSF was 1.41 for passenger cars, 1.17 for SUVs, 1.18 for pickup trucks, 1.24 for minivans, and 1.12 for full-size vans.

| 17. Key Words | 18. Distribution Statement |
|---|---|
| static stability factor; SSF; rollover; passenger vehicles; passenger cars; light trucks and vans; NCAP; New Car Assessment Program; consumer information | Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161 |

| 19. Security Classif. (Of this report) | 20. Security Classif. (Of this page) | 21. No. of Pages | 22. Price |
|---|---|---|---|
| Unclassified | Unclassified | 37 | |

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## Abstract

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Data are presented for overall fleet average SSFs by vehicle type over a number of model years. Passenger cars, as a group, have the highest average SSF, and these have remained high. SUVs have substantially improved their SSF values over time, especially after model year 2000, whereas those of pickup trucks have remained consistent over the years. Minivans showed considerable improvement since they were first introduced, while full-size vans showed a small but steady improvement. In model year 2003, the sales-weighted average SSF was 1.41 for passenger cars, 1.17 for SUVs, 1.18 for pickup trucks, 1.24 for minivans, and 1.12 for full-size vans.

## Introduction and Background

Rollovers are among the most severe traffic crashes, and are of particular concern for occupants of light trucks and vans (LTVs) - including pickup trucks, sport utility vehicles (SUVs), minivans and full-size vans up to 10,000 pounds gross vehicle weight rating (GVWR). While only about 3 percent of all passenger vehicle (passenger car and LTV) crashes involve rollover, according to the 2003 Fatality Analysis Reporting System (FARS), one-third of all passenger vehicle occupants who lost their lives were in vehicles that rolled over, a total of 10,376 rollover deaths. Of these, 4,433 were in passenger cars, 2,639 in SUVs, 2,569 in pickup trucks, 724 in vans, and the remaining 11 in other or unknown types of light trucks. Passenger cars had the lowest rollover fatality rate (23 percent of fatalities were in vehicles that rolled over), while SUVs had the highest, 59 percent. Similarly, according to the General Estimates System (GES), 6 percent of passenger car occupants who were injured were in vehicles that rolled over. LTV rates of rollover-related injured occupants were higher – 9 percent of those injured in vans, 13 percent in pickup trucks, and 20 percent in SUVs. Looking at occupant fatalities per 100,000 registered vehicles, passenger cars had the lowest rate at 3.69, with vans similarly low at a rate of 3.83. The rates for pickup trucks (7.18) and SUVs (10.22) were much higher.[1] Clearly, rollover crashes are a major safety problem for all classes of light vehicles, particularly LTVs.

On June 1, 2000, the National Highway Traffic Safety Administration proposed adding a measure of rollover resistance to the NCAP program, to begin in model year 2001.[2] It was the agency's belief that consumer information on the rollover risk of passenger cars and LTVs would influence some consumers to purchase vehicles with a lower rollover risk, and inspire manufacturers to produce vehicles with a lower rollover risk. This, in turn, would reduce the number of injuries and fatalities from rollover.

[1] 2003 Fatality Analysis Reporting System (FARS); NHTSA; USDOT.
[2] 65 FR 34988 (June 1, 2000)

Section 12 of The Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act,[3] enacted November 1, 2000, directed the Secretary of the Department of Transportation to develop a rollover test for motor vehicles, to carry out a program of rollover tests, and to develop and disseminate consumer information on rollover performance.[4] This responsibility was subsequently delegated to NHTSA. As planned, in model year 2001 NHTSA began including rollover resistance information in its NCAP.

The original rollover resistance ratings were determined solely from the vehicle's static stability factor. The SSF of a vehicle is an at-rest calculation of its rollover resistance, based on its most important geometric properties. Basically, SSF is a measure of how top-heavy a vehicle is. A vehicle's SSF is calculated using the formula:

$$\text{SSF} = \frac{T}{2\text{H}}$$

where
T=track width
H=height of the center of gravity of the vehicle

The track width is the distance between the centers of the right and left tires along the axle. The location of the center of gravity is measured in a laboratory to determine the average height above the ground of the vehicle's mass. The lower the SSF number, the more likely the vehicle is to roll over in a tripped single-vehicle crash. A higher SSF value equates to a more stable, less top-heavy vehicle. SSF values across all vehicle types typically range from around 1.00 to 1.50. Most passenger cars have values in the 1.30 to 1.50 range. Higher-riding SUVs, pick-up trucks, and vans usually have values in the 1.00 to 1.30 range.[5]

Throughout the development of testing procedures, both linear and logistic regressions were run to determine and verify the relationship between SSF and rollover.[6] [7] [8] It was found that the correlation of SSF to rollovers in single-vehicle crashes is exceptionally robust in an area as complex as rollover.

Commenters on the Federal Register announcement had suggested that the rating system did not go far enough, and suggested that a dynamic test be added.[9] NHTSA sought to expand the information provided in its rollover resistance ratings, and requested comments on the subject of dynamic rollover testing.[10] After evaluating numerous driving maneuver tests for the dynamic

[3] Public Law 106-414, 114 Stat. 1800 (2000).
[4] See 49 U.S.C.30117 (c)
[5] NHTSA Rollover FAQ: **http://www.safercar.gov/Rollover/pages/faqs.htm** Note that a value of 1.00 does not have any special significance. It is not an index or a minimum. It simply means the track width is exactly double the height. It is a low value of SSF, but some vehicles have had even lower values.
[6] 65 FR 34988, Appendix (June 1, 2000).
[7] 66 FR 3388, Appendix 1(January 12, 2001).
[8] 68 FR 59250, Appendix 2 (October 14, 2003).
[9] 66 FR 3388, 3403 (January 12, 2001).
[10] 66 FR 35179 (July 3, 2001).

rollover consumer information, NHTSA published its findings in a notice of proposed rulemaking in the Federal Register.[11] The final modifications to the rollover resistance ratings in NCAP, including the addition of dynamic rollover tests, were announced[12] and took effect beginning with model year 2004 vehicles.

The new dynamic maneuvering test used by NHTSA to help evaluate rollover risk utilizes a heavily loaded vehicle (to represent a five-occupant load), and a full tank of gas. Using a fishhook pattern, the vehicle simulates a high-speed collision avoidance maneuver—steering sharply in one direction, then sharply in the other direction—within about one second. Test instruments on the vehicle measure if the vehicle's inside tires lift off the pavement during the maneuver ("inside" meaning the left wheels if turning left, and the right wheels if turning right). The vehicle is considered to have tipped up in the maneuver if both inside tires lift at least two inches off the pavement simultaneously. The tip-up/no tip-up results are then used with the SSF measurement as inputs in a statistical model that estimates the vehicle's overall risk of rollover in a single-vehicle crash.[13]

Thus, for model years prior to 2004, rollover resistance ratings were based solely on the SSF. Starting with 2004 model year vehicles, rollover ratings combine both SSF and the tip-up or no tip-up results of the dynamic maneuvering rollover test. The results of this new process of generating rollover ratings, and its effect on future SSF trends as well as the design of future vehicle, are outside the scope of this report. They can be evaluated in the future as data becomes available.

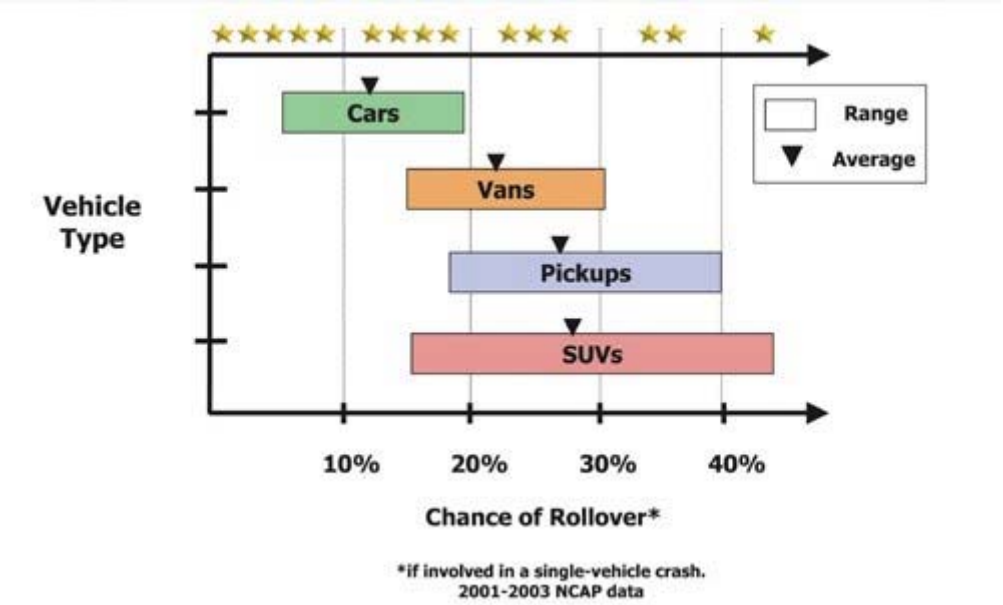
NHTSA's Web site and Buying A Safer Car brochure provide rollover resistance information as well as ratings for specific make and models of vehicles by model year. Rollover ratings for individual vehicles can be viewed by visiting **www.safercar.gov**. Passenger vehicles of all types (cars and LTVs) are included. For simplicity, ratings are converted to a graphical star system, similar to NCAP's impact testing program. A vehicle's rollover resistance rating is an estimate of its risk of rolling over in a single-vehicle crash, not a prediction of the likelihood of a crash. As the chart below indicates, the lowest-rated vehicles (1 star) are at least four times more likely to roll over than the highest-rated vehicles (5 stars) when involved in a single-vehicle crash.

| | |
|---|---|
| ★★★★★ | Has a risk of rollover of less than 10% |
| ★★★★ | Has a risk of rollover between 10% and 20% |
| ★★★ | Has a risk of rollover between 20% and 30% |
| ★★ | Has a risk of rollover between 30% and 40% |
| ★ | Has a risk of rollover greater than 40% |

Source: http://www.safercar.gov/Rollover/pages/RatSysInterpret.htm

[11] 67 FR 62528 (October 7, 2002).
[12] 68 FR 59250 (October 14, 2003).
[13] http://www.safercar.gov/Rollover/pages/faqs.htm#dynamic

Because rollover risk is a function of vehicle design, the different vehicle types tend to have differing patterns of risk. The injury and fatality experience also bear this out, as previously noted. The chart below helps consumers make comparisons across vehicle classes. The information is based on data from all vehicles tested under NHTSA's 2001-2003 rollover resistance ratings system (SSF only). For example, all passenger cars that were tested have 4- or 5-star ratings, and an average chance of rollover of approximately 12 percent if involved in a single-vehicle crash. The range for passenger cars is approximately 6 percent to 19 percent.




Source: http://www.safercar.gov/Rollover/pages/RatSysVCompare.htm

The purpose of this report was to track the trend in SSF over several years for numerous vehicles, to determine whether more recent models have higher SSF values and are therefore less prone to rollover. The rollover ratings are produced for consumer information only; no regulatory requirements specifically related to rollover mitigation are placed on vehicle manufacturers. If consumers use the information to purchase vehicles with higher rollover reliability ratings, then manufacturers would presumably design and produce vehicles to meet that public demand. This report attempts to see if that is what has indeed occurred in the marketplace.

## Data Acquisition

In order to examine the trends in the static stability factor over time, it was necessary to locate SSF values for as many different vehicles, over as many model years, as possible. Several

published sources of data [14] [15] [16] [17] provided such data over a number of years. More recent information was obtained from NHTSA's NCAP data.

An SSF value for a given model year was considered to be the same for all model years of a particular vehicle during which it had not undergone a major redesign. For example, an SSF measurement of 1.334 was obtained for a 1987 Toyota Camry. The Camry was first introduced in model year 1983. Although numerous changes were made over the years (including noticeably increased power and a sleeker look in 1987), it wasn't until 1992 that there was what would be characterized as a major redesign. (An example of a major redesign would include a change in wheelbase – for the Camry this remained at 102.4 inches until model year 1992, when it increased to 103.1.) Thus, the value of 1.334 was used for all model year 1983 through 1991 Toyota Camrys. Another SSF measurement, 1.460, was obtained for the model year grouping 1992 through 1996 (after which there was another major redesign), and this value was used for this set of model years.

If more than one SSF value was obtained for a model year grouping, the midpoint model year between two consecutive values would be determined, with the earlier value being used for all model years earlier than that point, and the later value for the more recent years. If two distinct SSF measurements were obtained for the same model year, these were averaged. In some cases, however, while the SSF value was known for a model year grouping, it could not be determined which model year vehicle had been measured. In this case, the value itself was used for the appropriate span of model years. However, if a second value was obtained for a vehicle in that model year grouping, the values were averaged, since a specific model year was not known for one of the values. This was the procedure used to assign SSF values to each model year for a particular vehicle.

Along with covering a span of model years, vehicles that were clones ("sisters," "corporate cousins") of one another were also considered to have the same SSF value in cases where the vehicles were virtually identical. These sister vehicles are predominantly comparable, being built on the same platform. Measurements of vehicle height and width were used to determine whether specific models were alike enough to be considered as having the same SSF value, since these would directly affect the SSF. For example, one group of corporate cousins consists of the Dodge Daytona, model years 1984 through 1993; Plymouth Sundance, 1987-1994; Dodge Shadow, 1987-1994; and the Chrysler Laser, 1984-1986. An SSF measurement was available for the 1987 Plymouth Sundance. While the four vehicles all have a wheelbase of 97 inches and are built on the same platform, only the Plymouth Sundance and the Dodge Shadow had identical height and width measurements (52.7 and 67.3 inches, respectively). The Plymouth Laser,

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[14] Technical Assessment Paper: Relationship Between Rollover and Vehicle Factors," National Highway Traffic Safety Administration, Rulemaking, Office of Vehicle Safety Standards, July 1991, available from Docket 91-68-N01.

[15] Harwin, E.A. and Brewer, H.K., "Analysis of the Relationship between Vehicle Rollover Stability and Rollover Risk Using the NHTSA CARDfile Accident Database," *Journal of Traffic Medicine*, Vol. 18, No. 3, 1990; *Technical Assessment Paper: Relationship between Rollover and Vehicle Factors*, NHTSA Docket No. 91-068-N01-0003, Washington, 1992

[16] Heydinger, G.J., Bixel, R.A., Garrott, W.R., Pyne, M., Howe, J.G., Guenther, D.A., *Measured Vehicle Inertial Parameters – NHTSA's Data through November 1998*, SAE Paper 1999-01-1333, 1999.

[17] 66 FR 3388, 3412-3415 (January 12, 2001).

however, had a height of only 50.3 inches, and a width of 69.3 inches. The Dodge Daytona's height was 51.8 inches, with a width of 69.3 inches. Thus, the SSF for the Sundance was also used for the Shadow, over the full range of model years, but not for either the Laser or Daytona.

In order to determine the trend in SSF in the motor vehicle fleet over time, it was necessary to examine the data weighted by vehicle sales. Thus, vehicles that represented a larger portion of the fleet would correspondingly contribute more to the SSF value for the model year. Registration data from the National Vehicle Population Profile[18] (NVPP) was primarily used to approximate the number of vehicle sales. The number of vehicles of a given model year registered in the following calendar year (e.g., the number of model year 2001 Pontiac Bonnevilles registered in calendar year 2002) is a good estimate of total sales, because by the following year nearly all the vehicles of the model year have been sold, and very few have already been retired. This registration was supplemented with registration and sales information from several years of the Ward's Automotive Yearbook.[19]

Exhibit 1 presents, for data used in the analysis, the percentage of each type of vehicle for which both SSF values and sales (approximated from the next year's registration) were obtained. In all cases SSF values were available for earlier model years, but did not provide a large enough sample to be considered representative. At least 35% of the fleet was required in order for the data of that model year and vehicle type to be used. The one exception is full-sized vans, typically more of a commercial vehicle than the other types, which are more consumer oriented. This could account for their lack of available historical SSF values.

The SSF measurements for full-size vans that were available were for those vehicles more likely to be owned and used by individuals rather than commercially. For example, Ford E150 vans were used in the study, but there were no SSF measurements available for E250 or E350 vans. In order to include the full range of passenger vehicles, it was decided to retain the full-size vans, keeping them as a separate group and noting the small sample size. Minivans, however, are well represented, as are all other passenger vehicle types. Knowing that such a large proportion of vehicles were included in the analysis lends confidence that the findings are indeed representative of the fleet for each model year.

[18] R. L. Polk & Co., Cincinnati, OH.
[19] Ward's Communications, Southfield, MI.

**Exhibit 1: Percent of Each Vehicle Type with SSF and Sales Data, by Model Year**

| Model Year | Passenger Cars | SUVs | Pickup Trucks | Mini Vans | Full Vans |
|---|---|---|---|---|---|
| **1975** | | 46% | | | |
| **1976** | | 52% | | | |
| **1977** | | 81% | | | |
| **1978** | 50% | 59% | | | |
| **1979** | 56% | 80% | | | |
| **1980** | 61% | 58% | | | |
| **1981** | 61% | 62% | 49% | | |
| **1982** | 58% | 93% | 37% | | |
| **1983** | 58% | 77% | 74% | | |
| **1984** | 61% | 92% | 51% | | |
| **1985** | 64% | 71% | 71% | 94% | 10% |
| **1986** | 66% | 73% | 70% | 98% | 9% |
| **1987** | 71% | 79% | 72% | 94% | 9% |
| **1988** | 72% | 75% | 73% | 91% | 7% |
| **1989** | 70% | 71% | 76% | 94% | 7% |
| **1990** | 65% | 66% | 74% | 94% | 6% |
| **1991** | 66% | 82% | 83% | 93% | 4% |
| **1992** | 72% | 78% | 82% | 92% | 13% |
| **1993** | 69% | 81% | 82% | 84% | 11% |
| **1994** | 67% | 82% | 84% | 84% | 10% |
| **1995** | 62% | 81% | 76% | 82% | 11% |
| **1996** | 65% | 66% | 74% | 78% | 10% |
| **1997** | 67% | 74% | 72% | 67% | 11% |
| **1998** | 64% | 75% | 80% | 77% | 15% |
| **1999** | 66% | 71% | 64% | 73% | 14% |
| **2000** | 69% | 65% | 66% | 72% | 13% |
| **2001** | 73% | 74% | 59% | 83% | 12% |
| **2002** | 77% | 75% | 57% | 84% | 12% |
| **2003** | 76% | 80% | 60% | 85% | 12% |

## Changes in SSF Over Time

The objective of this report was to monitor the trend in static stability over time. The average SSF value was determined by vehicle type for each model year, weighted by vehicle sales. Thus, a passenger car with sales of 100,000 units would influence the average SSF twice as much as a vehicle selling 50,000.

Exhibit 2 presents the average SSF, by vehicle type, over the model years for which data were available. Several interesting trends are apparent. Passenger cars have had very stable SSF

values over the years. Note the slight lowering of SSF scores throughout the 1980s, possibly due to the concurrent trend of vehicle downsizing. However, passenger car scores have not only recovered but actually improved over the years. SUVs have consistently and substantially improved their scores over time. More specifically, there was only slight variation in SSF values for SUV from as far back as 1978 through 1998. In 1999, the average SSF for SUVs reached higher than it ever had, and has been rising since then, particularly in the last three years. Pickup trucks have maintained consistent SSF values over the full span of years of available data. Minivans have shown considerable improvement since they were first introduced in the mid-1980s. Full-size vans, on the other hand, have had little change, but did show small, consistent improvement.

**Exhibit 2: Average SSF by Vehicle Type, by Model Year (Weighted by Vehicle Sales Data)**

| Model Year | Passenger Cars | SUVs | Pickup Trucks | Mini Vans | Full Vans |
|---|---|---|---|---|---|
| **1975** | | 1.09 | | | |
| **1976** | | 1.10 | | | |
| **1977** | | 1.09 | | | |
| **1978** | 1.38 | 1.10 | | | |
| **1979** | 1.38 | 1.08 | | | |
| **1980** | 1.36 | 1.07 | | | |
| **1981** | 1.37 | 1.07 | 1.20 | | |
| **1982** | 1.36 | 1.08 | 1.20 | | |
| **1983** | 1.36 | 1.07 | 1.17 | | |
| **1984** | 1.36 | 1.06 | 1.15 | | |
| **1985** | 1.36 | 1.08 | 1.18 | 1.11 | 1.09 |
| **1986** | 1.36 | 1.07 | 1.18 | 1.11 | 1.09 |
| **1987** | 1.36 | 1.07 | 1.18 | 1.11 | 1.09 |
| **1988** | 1.35 | 1.07 | 1.17 | 1.15 | 1.09 |
| **1989** | 1.36 | 1.08 | 1.18 | 1.15 | 1.09 |
| **1990** | 1.37 | 1.07 | 1.17 | 1.16 | 1.09 |
| **1991** | 1.38 | 1.08 | 1.18 | 1.17 | 1.09 |
| **1992** | 1.39 | 1.08 | 1.18 | 1.17 | 1.11 |
| **1993** | 1.39 | 1.09 | 1.18 | 1.17 | 1.11 |
| **1994** | 1.40 | 1.09 | 1.18 | 1.17 | 1.11 |
| **1995** | 1.41 | 1.09 | 1.18 | 1.19 | 1.11 |
| **1996** | 1.41 | 1.09 | 1.18 | 1.21 | 1.11 |
| **1997** | 1.41 | 1.10 | 1.18 | 1.20 | 1.11 |
| **1998** | 1.42 | 1.10 | 1.17 | 1.22 | 1.12 |
| **1999** | 1.42 | 1.11 | 1.18 | 1.23 | 1.12 |
| **2000** | 1.42 | 1.11 | 1.18 | 1.24 | 1.12 |
| **2001** | 1.42 | 1.14 | 1.18 | 1.24 | 1.12 |
| **2002** | 1.42 | 1.15 | 1.19 | 1.24 | 1.12 |
| **2003** | 1.41 | 1.17 | 1.18 | 1.24 | 1.12 |

Exhibit 3 presents the number of different make/models that contributed to the average SSF values presented above. This was not based on registered vehicles or sales data, but the number of unique vehicle make/models that were incorporated into the data. Corporate cousin vehicles were counted as individual vehicles in the table, since they are individual models that a consumer would consider purchasing. In addition, where data were available for both two-wheel and four-wheel drives, these were treated as separate vehicles. Some of the numbers of vehicles here are quite low, but still cover a large portion of the total vehicles sales (see Exhibit 1). These data are presented to provide information on the variety of vehicles used in the analysis.

**Exhibit 3: Number of Vehicles used to Determine Average MY SSF**

| Model Year | Passenger Cars | SUVs | Pickup Trucks | Mini Vans | Full Vans |
|---|---|---|---|---|---|
| **1975** | 49 | 4 | | | |
| **1976** | 55 | 6 | | | |
| **1977** | 62 | 5 | | | |
| **1978** | 94 | 5 | | | |
| **1979** | 114 | 5 | | | |
| **1980** | 115 | 5 | | | |
| **1981** | 105 | 13 | 15 | | |
| **1982** | 107 | 12 | 17 | | |
| **1983** | 118 | 15 | 18 | | |
| **1984** | 124 | 19 | 18 | | |
| **1985** | 125 | 19 | 23 | 11 | 6 |
| **1986** | 119 | 19 | 33 | 13 | 6 |
| **1987** | 105 | 23 | 34 | 16 | 6 |
| **1988** | 108 | 23 | 39 | 17 | 6 |
| **1989** | 106 | 26 | 38 | 21 | 6 |
| **1990** | 100 | 27 | 38 | 28 | 6 |
| **1991** | 83 | 36 | 43 | 31 | 6 |
| **1992** | 78 | 36 | 42 | 29 | 7 |
| **1993** | 80 | 38 | 41 | 28 | 7 |
| **1994** | 66 | 37 | 44 | 28 | 5 |
| **1995** | 65 | 36 | 47 | 24 | 5 |
| **1996** | 68 | 36 | 42 | 22 | 3 |
| **1997** | 76 | 41 | 42 | 22 | 3 |
| **1998** | 81 | 45 | 43 | 17 | 3 |
| **1999** | 90 | 52 | 42 | 15 | 3 |
| **2000** | 94 | 52 | 42 | 14 | 3 |
| **2001** | 49 | 68 | 38 | 14 | 3 |
| **2002** | 55 | 80 | 36 | 16 | 3 |
| **2003** | 62 | 89 | 37 | 14 | 3 |

While looking at the SSF of the full fleet of vehicles each model year is quite useful, examining scores for vehicles as they are introduced gives a picture of the changes that occur each year as new vehicles are established. That is, what is the average SSF value for each vehicle type, looking only at the year a specific make/model is introduced or redesigned? This gives a more immediate picture of how vehicles are changing, but does not take into account that the design may stay the same in subsequent model years. For example, the 1983 through 1991 Camry (see above) had an SSF of 1.334, and the redesigned Camry in 1992 had an SSF of 1.460. The value of 1.334 would contribute only to the passenger car average of 1.31 for the model year 1983 in Exhibit 4, while the value of 1.460 would be a factor only in the 1992 average of 1.44. Table entries of N/A signify there were no available data on vehicles introduced or redesigned that model year. These data are presented in Exhibit 4.

**Exhibit 4: Average SSF by Vehicle Type, by Model Year Introduced (Weighted by Sales Data)**

| Model Year | Passenger Cars | SUVs | Pickup Trucks | Mini Vans | Full Vans |
|---|---|---|---|---|---|
| **1978** | 1.38 | N/A | | | |
| **1979** | 1.43 | N/A | | | |
| **1980** | 1.36 | 1.05 | | | |
| **1981** | 1.36 | 1.12 | 1.20 | | |
| **1982** | 1.38 | 1.11 | 1.18 | | |
| **1983** | 1.31 | 1.11 | 1.09 | | |
| **1984** | 1.35 | 1.06 | 1.13 | | |
| **1985** | 1.36 | 1.05 | 1.15 | 1.11 | 1.09 |
| **1986** | 1.37 | N/A | 1.15 | 1.11 | N/A |
| **1987** | 1.38 | 1.08 | 1.25 | 1.04 | N/A |
| **1988** | 1.36 | N/A | 1.20 | 1.21 | N/A |
| **1989** | 1.39 | 1.14 | 1.07 | 1.13 | N/A |
| **1990** | 1.42 | 1.07 | N/A | 1.12 | N/A |
| **1991** | 1.39 | 1.09 | 1.20 | 1.21 | N/A |
| **1992** | 1.44 | 1.08 | N/A | 1.13 | 1.11 |
| **1993** | 1.44 | 1.11 | 1.15 | N/A | N/A |
| **1994** | 1.45 | N/A | 1.18 | N/A | N/A |
| **1995** | 1.41 | 1.13 | 1.24 | 1.24 | N/A |
| **1996** | 1.43 | 1.08 | 1.15 | 1.23 | 1.10 |
| **1997** | 1.43 | 1.10 | 1.20 | 1.18 | N/A |
| **1998** | 1.41 | 1.15 | 1.14 | 1.25 | 1.14 |
| **1999** | 1.41 | 1.18 | 1.22 | 1.27 | N/A |
| **2000** | 1.40 | 1.12 | 1.16 | 1.21 | N/A |
| **2001** | 1.40 | 1.20 | 1.14 | 1.22 | N/A |
| **2002** | 1.41 | 1.15 | 1.17 | 1.25 | N/A |
| **2003** | 1.39 | 1.22 | 1.14 | N/A | N/A |

Vehicles manufactured, unchanged, over a number of years would contribute to each model year it was available for Exhibit 2, but only once for Exhibit 4. Thus, the data in Exhibit 4 are based

on much smaller samples than those in Exhibit 2, and it is not surprising that the SSF values are more variable in Exhibit 4.

Passenger cars show the drop in SSF values from the early to late 1980s that was also seen in Exhibit 2, along with the following increase. The SSF measurements for passenger cars have remained high and comparatively consistent since then, although the trend after 1997 indicates newly designed models look to have slightly lower SSF values than models introduced in the early 1990s. SUV introductions have relatively consistent SSF values for most of the model years with available data, but do show an increase from about 1998 onward.

Newly introduced pickup truck SSFs range from 1.07 to 1.25, with no discernable pattern. It is clear, though, from comparing these data to those in Exhibit 2, that those newly introduced pickups with low SSF scores are offset by other available models and do not substantially affect the consistent model year average.

Minivans have shown substantial, consistent improvement in SSF values over the most recent decade. The average SSF of those introduced in 1995 through 2002 was about 0.10 higher than the preceding decade (an increase from 1.13 to 1.23). Little data are available for full van introductions, certainly not enough from which to draw inference.

The recently introduced "crossover" utility vehicles (CUVs) are the most consistently stable SUVs that have been manufactured. Real improvement is seen in this group of vehicles. Exhibit 5 presents SSF information on SUVs, separately for standard and crossover models. The original data for all SUV are repeated from Exhibit 2 for reference purposes. 1997 was the first model year with available data for any crossover SUV, so from that point on SSFs are presented separately for standard and crossover vehicles as well as for all SUVs combined.

**Exhibit 5: Average SSF by SUV Type, by Model Year**

| Model Year | All SUV | Standard SUV | Crossover SUV |
|---|---|---|---|
| **1991** | 1.08 | | |
| **1992** | 1.09 | | |
| **1993** | 1.09 | | |
| **1994** | 1.09 | | |
| **1995** | 1.09 | | |
| **1996** | 1.09 | | |
| **1997** | 1.10 | 1.10 | 1.19 |
| **1998** | 1.10 | 1.10 | 1.19 |
| **1999** | 1.11 | 1.10 | 1.19 |
| **2000** | 1.11 | 1.10 | 1.19 |
| **2001** | 1.14 | 1.11 | 1.22 |
| **2002** | 1.15 | 1.13 | 1.21 |
| **2003** | 1.17 | 1.13 | 1.22 |

Note that SSF values for crossover SUVs were clearly higher than standard SUVs since their introduction. In addition, standard SUVs showed no change in SSF for a number of years, but by

model year 2002 were showing a noticeable increase. Even the SSF values for crossover vehicles, which started relatively high, have increased over time. Thus, the SSF values for SUVs have increased, due to both the introduction of crossover vehicles as well as increases in SSF for traditional SUVs. The introduction of crossover vehicles, and their subsequent increase in percentage of fleet vehicles, has been an important factor in the increase in SSF values of SUVs. Exhibit 6 shows the percentage of the SUV fleet made up of crossover vehicles. In the first model year crossover vehicles were introduced, 1997, they made up less than 6 percent of all SUVs. Six years later, more than one out of every three SUVs sold is a crossover vehicle.

**Exhibit 6: Percentage of new SUVs that are Crossover Vehicles**

| Model Year | Percentage CUV |
|---|---|
| **1997** | 5.5% |
| **1998** | 7.4% |
| **1999** | 9.5% |
| **2000** | 15.4% |
| **2001** | 25.5% |
| **2002** | 29.4% |
| **2003** | 36.8% |

Exhibit 7 presents the percentage of each type of vehicle (standard and crossover, as well as all SUVs) for which data were available. For crossover vehicles, the number of models with available SSF information is also listed. Note that for model year 1997, only one model was used, but accounted for 58 percent of crossover vehicles. Over time, more models became available, and sales of such vehicles increased as well, as shown in Exhibit 6.

**Exhibit 7: Percent of Each SUV Type with SSF and Sales Data, by Model Year**

| Model Year | All SUV | Standard SUV | Crossover SUV |
|---|---|---|---|
| **1991** | 82% | | |
| **1992** | 78% | | |
| **1993** | 81% | | |
| **1994** | 82% | | |
| **1995** | 81% | | |
| **1996** | 66% | | |
| **1997** | 74% | 75% | 58% ( 1) |
| **1998** | 75% | 76% | 62% ( 2) |
| **1999** | 71% | 74% | 51% ( 3) |
| **2000** | 65% | 71% | 32% ( 4) |
| **2001** | 74% | 69% | 90% (15) |
| **2002** | 75% | 75% | 77% (21) |
| **2003** | 80% | 75% | 89% (30) |

**Number of crossover models shown in parentheses**

Overall, the news is good. Static stability factor has tended to increase for all vehicles, particularly SUVs, which tended to have the worst SSF values in the earlier years. Exhibit 2 shows that SUVs have recently raised their SSF values well above those of the full-size vans. The popularity of SUVs with consumers makes this a most welcome improvement.

## SSF Increases in Specific Vehicles

Greater vehicle stability, as evidenced by increasing SSF values across vehicle types, occurs both as new make/models enter the market and as previous models are redesigned to appeal to a larger number of consumers. In the first category, perhaps the most noteworthy examples are the crossover vehicles that have been introduced in recent years. These are vehicles that have characteristics of two vehicle types, typically combining aspects of a passenger car with a sport utility vehicle. Examples would be the corporate cousins Ford Escape and Mazda Tribute, both introduced in model year 2001. These vehicles (classified as SUVs in this report) had SSF values of 1.23. The introduction of this new type of vehicle has been beneficial in increasing the SSF of SUVs.

A redesigned vehicle can be compared to its earlier model when SSF values are available for both versions, to note improvements that have occurred. Exhibit 8 presents some examples of passenger cars that increased their SSF values by 0.09 or more as part of a major redesign, while Exhibit 9 contains the same information on LTVs. Note that this report concerns vehicles

**Exhibit 8: Passenger Cars Redesigned with Increased SSF**

| Make/Model | Corporate Cousins | Model Years | SSF |
|---|---|---|---|
| Chevrolet Cavalier 2-DR | Pontiac Sunbird 2-DR | 1982-1994 | 1.30 |
| | Pontiac Sunfire 2-DR | 1995-2003 | 1.40 |
| Ford Escort Wagon | Mercury Lynx Wagon | 1987-1990 | 1.26 |
| | Mercury Tracer Wagon | 1991-1996 | 1.38 |
| Ford Crown Victoria | Mercury Grand Marquis | 1982-2000 | 1.40 |
| | | 2001-2003 | 1.51 |
| Honda Civic Hatchback | | 1980-1983 | 1.30 |
| | | 1984-1987 | 1.40 |
| Nissan Maxima | | 1987-1988 | 1.34 |
| | | 1989-1994 | 1.44 |
| Nissan Sentra 4-DR | | 1982-1986 | 1.32 |
| | | 1987-1994 | 1.46 |
| Oldsmobile Delta 88 4-DR | | 1977-1985 | 1.30 |
| | | 1986-1999 | 1.40 |
| Oldsmobile 98 4-DR | | 1981-1984 | 1.31 |
| | | 1985-1987 | 1.40 |
| Toyota Camry 4-DR | | 1983-1991 | 1.34 |
| | | 1992-1996 | 1.46 |

**Exhibit 9: LTVs Redesigned with Increased SSF**

| Make/Model | Model Years | SSF |
|---|---|---|
| Ford Bronco 4x4 | 1980-1984 | 1.04 |
| | 1985-1996 | 1.13 |
| Ford Bronco II 4x4 | 1987-1990 | 0.99 |
| Ford Explorer 2-DR 4x4 | 1991-1995 | 1.09 |
| Chevrolet S10 4x4 Blazer 4-DR | 1991-2003 | 1.09 |
| Chevrolet Trailblazer 4x4 4-DR | 2002-2003 | 1.18 |
| Nissan Pathfinder 4x4 4-DR | 1990-1995 | 1.07 |
| | 1996-2003 | 1.16 |
| Ford Aerostar Wagon | 1988-1997 | 1.11 |
| Ford Windstar Wagon | 1995-1998 | 1.24 |
| Toyota Passenger Van | 1985-1989 | 1.11 |
| Toyota Previa Van | 1991-1997 | 1.23 |

through model year 2003 only; thus that is the last possible model year listed in the Exhibits. Note also, in some cases what is listed as a redesigned vehicle is actually a successor vehicle, replacing a vehicle the manufacturer stopped producing. For example, the Ford Explorer is the successor to the Ford Bronco II. (There may exist other examples, but these are the ones for which NHTSA has before-and-after SSF test results.)

The previous listed examples are all of consecutive (and for some successor vehicles, concurrent) model year redesigns resulting in increased SSF values. Other examples are available in which an earlier vehicle has a substantially lower SSF than its redesigned counterpart, but SSF data are unavailable for some interim period. For example, the SSF for the 1983-1988 Ford Thunderbird is available. No measurement is available for the redesigned version produced from 1989 through 1997. The Thunderbird was not in production from 1998 through 2001, but in 2002 reappeared on a new platform, having undergone a major overhaul. Exhibits 10 and 11 present, for passenger cars and LTVs, respectively, examples of these interrupted or "long term" increases in SSF.

**Exhibit 10: Passenger Cars Redesigned with Long-Term Increased SSF**

| Make/Model | Corporate Cousins | Model Years | SSF |
|---|---|---|---|
| BMW 300 | | 1985-1994 | 1.20 |
| | | 1999-2003 | 1.41 |
| Chevrolet Corvette | | 1968-1982 | 1.57 |
| | | 1997-2003 | 1.75 |
| Ford Thunderbird 2-DR | | 1983-1988 | 1.29 |
| | | 2002-2003 | 1.51 |
| Mazda GLC | | 1981-1983 | 1.25 |
| Mazda Protégé | | 1999-2003 | 1.42 |
| Toyota Corolla | Chevrolet Nova | 1984-1988 | 1.30 |
| | Geo/Chevrolet Prizm | 1993-2002 | 1.42 |
| Toyota Cressida 4-DR | | 1978-1984 | 1.28 |
| Toyota Avalon 4-DR | | 1995-2003 | 1.42 |
| Toyota Starlet Hatchback | | 1981-1984 | 1.21 |
| Toyota Tercel Hatchback | | 1987-1990 | 1.41 |
| Volkswagen Jetta | | 1981-1984 | 1.21 |
| | | 2000-2003 | 1.37 |
| Volvo 240 | | 1975-1993 | 1.23 |
| Volvo S 60 | | 2001-2003 | 1.49 |

**Exhibit 11: LTVs Redesigned with Long-Term Increased SSF**

| Make/Model | Corporate Cousins | Model Years | SSF |
|---|---|---|---|
| Chevrolet Suburban | | 1981-1991 | 1.02 |
| | | 2000-2003 | 1.10 |
| Isuzu Rodeo 4x4 4-DR | | 1992-1997 | 1.05 |
| Isuzu Axiom 4x4 | | 2002-2003 | 1.20 |
| Toyota 4Runner 4x4 | | 1984-1987 | 0.99 |
| | | 2003 | 1.16 |
| Jeep CJ-5 | | 1972-1976 | 1.01 |
| | | 1981-1983 | 1.03 |
| Jeep CJ-7 4x4 | | 1976-1981 | 1.03 |
| | | 1982-1982 | 1.04 |
| | | 1983-1984 | 1.05 |
| Jeep Wrangler 4x4 | | 1987 | 1.16 |
| | | 1998-2003 | 1.13 |

Of course, not every new vehicle has a higher SSF than those that preceded it. If that were the case, the average SSF would have increased even more sharply than seen in Figure 2. The vehicles noted in Exhibits 8 through 11 are presented as some outstanding examples of passenger cars and LTVs that have been redesigned and/or succeeded by vehicles offering substantially improved stability.

As seen in this report, vehicles today are considerably improved with respect to stability as compared to those of the past, particularly in the case of sport utility vehicles. By providing information on SSF, NHTSA has enabled the consumer to make a better-informed purchase. Given the lead time necessary to introduce a new vehicle or redesign an existing vehicle extensively enough to alter its SSF, it is unlikely that market incentives begun in model year 2001 (when NCAP consumer rollover ratings were first available) could have influenced SSF values by model year 2003. However, it seems that by model year 2003, both manufacturers and consumers were in agreement of the need for greater stability in passenger vehicles. Examining trends in SSF over an even longer period of time would enable a more definitive statement on the impact that published NCAP information has had. However, the evidence suggests that manufacturers are responding to the marketplace and incorporating desirable changes into the new vehicle fleet.

## Appendix: SSF Measurements and Vehicles Used in Analysis

The tables that follow present the vehicles for which SSF values were obtained. Also shown are the similar (corporate cousin) vehicles and range of models years for which the SSF value was used in the analysis. SSF values are presented here to two decimal places, but exact values as stated in the literature were used in the analysis.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| **Passenger Cars** | | | | | |
| 2002 | Chrysler 300M 4-DR | 1.43 | 1999 | 2003 | Chrysler 300M 4-DR |
| [20] | Chrysler Cordoba | 1.47 | 1978 | 1979 | Chrysler Cordoba |
| | | | 1978 | 1979 | Dodge Charger/Magnum |
| 1987 | Chrysler LeBaron | 1.33 | 1982 | 1995 | Chrysler LeBaron |
| | | | 1982 | 1983 | Dodge 400 |
| | | | 1984 | 1986 | Dodge 600 |
| 1985 | Chrysler LeBaron GTS | 1.24 | 1985 | 1989 | Chrysler LeBaron GTS |
| | | | 1983 | 1988 | Dodge 600 4-DR |
| | | | 1985 | 1988 | Plymouth Caravelle |
| 1985 | Chrysler New Yorker | 1.31 | 1983 | 1988 | Chrysler New Yorker |
| 2003 | Chrysler Sebring Convertible | 1.51 | 1996 | 2003 | Chrysler Sebring Convertible |
| 1978 | Dodge Diplomat | 1.39 | 1978 | 1979 | Dodge Diplomat |
| [21] | Dodge Diplomat | 1.44 | 1980 | 1989 | Dodge Diplomat |
| | | | 1978 | 1980 | Dodge Aspen |
| | | | 1978 | 1980 | Plymouth Volare |
| | | | 1978 | 1981 | Chrysler Lebaron |
| | | | 1980 | 1983 | Dodge Mirada |
| | | | 1980 | 1983 | Chrysler Cordoba |
| | | | 1981 | 1983 | Chrysler Imperial |
| | | | 1982 | 1989 | Plymouth Gran Fury |
| | | | 1984 | 1989 | Chrysler New Yorker 5th Ave |
| 1989 | Dodge Dynasty LE | 1.37 | 1988 | 1993 | Dodge Dynasty LE |
| | | | 1988 | 1993 | Chrysler New Yorker |
| 2003 | Dodge Intrepid 4-DR | 1.45 | 1993 | 2003 | Dodge Intrepid 4-DR |
| | | | 1993 | 2003 | Chrysler Concorde 4-DR |
| 1985 | Dodge Lancer | 1.38 | 1985 | 1989 | Dodge Lancer |
| 1998 | Dodge Neon | 1.44 | 1995 | 1999 | Dodge Neon |
| | | | 1995 | 1999 | Plymouth Neon |
| 2001 | Dodge Neon 4-DR | 1.41 | 2000 | 2003 | Dodge Neon 4-DR |
| | | | 2000 | 2001 | Plymouth Neon 4-DR |
| 1983 | Dodge Omni | 1.38 | 1978 | 1990 | Dodge Omni |
| | | | 1981 | 1990 | Plymouth Horizon |
| 2003 | Dodge Stratus 2-DR | 1.44 | 2001 | 2003 | Dodge Stratus 2-DR |
| | | | 1995 | 2003 | Chrysler Sebring 2-DR |
| 2001 | Dodge Stratus 4-DR | 1.49 | 1995 | 2003 | Dodge Stratus 4-DR |
| | | | 2001 | 2003 | Chrysler Sebring 4-DR |
| 1985 | Plymouth Reliant | 1.34 | 1982 | 1989 | Plymouth Reliant |
| | | | 1981 | 1989 | Dodge Aries 81-89 |
| 1987 | Plymouth Sundance | 1.36 | 1987 | 1994 | Plymouth Sundance |
| | | | 1987 | 1994 | Dodge Shadow 87-94 |

[20] Literature states 1977–79 Cordoba had 1.47 SSF; exact model year of test vehicle not specified.
[21] Literature states 1980 – 81 Diplomat had 1.44 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| [22] | Ford Crown Victoria | 1.47 | 1979 | 1981 | Ford Crown Victoria |
| | | | 1979 | 1981 | Mercury Grand Marquis |
| 1984 | Ford Crown Victoria | 1.40 | 1982 | 2000 | Ford Crown Victoria |
| | | | 1982 | 2001 | Mercury Grand Marquis |
| 2001 | Ford Crown Victoria 4-DR | 1.51 | 2001 | 2003 | Ford Crown Victoria 4-DR |
| | | | 2002 | 2003 | Mercury Grand Marquis |
| 1985 | Ford Escort | 1.38 | 1981 | 1985 | Ford Escort |
| | | | 1982 | 1985 | Ford EXP |
| | | | 1981 | 1985 | Mercury Lynx |
| | | | 1982 | 1983 | Mercury LN7 |
| 1986 | Ford Escort | 1.42 | 1986 | 1986 | Ford Escort |
| | | | 1986 | 1986 | Ford EXP |
| | | | 1986 | 1986 | Mercury Lynx |
| 1989 | Ford Escort | 1.26 | 1987 | 1990 | Ford Escort |
| | | | 1981 | 1987 | Mercury Lynx |
| 2001 | Ford Focus | 1.33 | 2000 | 2003 | Ford Focus |
| 2001 | Ford Focus Wagon | 1.31 | 2000 | 2003 | Ford Focus Wagon |
| [23] | Ford Mustang | 1.43 | 1979 | 1984 | Ford Mustang |
| | | | 1979 | 1986 | Mercury Capri |
| 1988 | Ford Mustang | 1.37 | 1985 | 1993 | Ford Mustang |
| 2001 | Ford Taurus 4-DR | 1.43 | 1996 | 2003 | Ford Taurus 4-DR |
| | | | 1996 | 2003 | Mercury Sable 4-DR |
| 2002 | Ford Taurus Wagon | 1.38 | 1996 | 2003 | Ford Taurus Wagon |
| | | | 1996 | 2003 | Mercury Sable 4-DR Wagon |
| 1988 | Ford Taurus | 1.45 | 1986 | 1989 | Ford Taurus |
| | | | 1986 | 1989 | Mercury Sable |
| 1992 | Ford Taurus | 1.40 | 1990 | 1995 | Ford Taurus |
| | | | 1990 | 1995 | Mercury Sable |
| 1987 | Ford Tempo | 1.31 | 1984 | 1994 | Ford Tempo |
| | | | 1984 | 1994 | Mercury Topaz |
| 2002 | Ford Thunderbird 2-DR Convertible | 1.51 | 2002 | 2003 | Ford Thunderbird 2-DR Convertible |
| 1987 | Ford Thunderbird | 1.29 | 1983 | 1988 | Ford Thunderbird |
| | | | 1983 | 1988 | Mercury Cougar |
| 2003 | Jaguar S-Type 4-DR | 1.51 | 2003 | 2003 | Jaguar S-Type 4-DR |
| 1992 | Lincoln Continental | 1.43 | 1988 | 2002 | Lincoln Continental |
| 2001 | Lincoln LS 4-DR | 1.51 | 2000 | 2003 | Lincoln LS 4-DR |
| | | | 2000 | 2002 | Jaguar S-Type 4-DR |
| [24] | Lincoln Town Car | 1.44 | 1987 | 1997 | Lincoln Town Car |
| 2003 | Lincoln Town Car 4-DR | 1.48 | 2003 | 2003 | Lincoln Town Car 4-DR |
| 1986 | Buick Century Estate Wagon | 1.34 | 1984 | 1996 | Buick Century Estate Wagon |
| | | | 1984 | 1996 | Oldsmobile Ciera Wagon |
| | | | 1984 | 1990 | Chevrolet Celebrity Wagon |

[22] 1.47 SSF is average of 1980 (1.434) and "1979-81" (1.5) vehicles.
[23] Literature states 1979 – 81 Mustang had 1.43 SSF; exact model year of test vehicle not specified.
[24] Literature states 1990 – 96 Town Car had 1.44 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1986 | Buick Electra | 1.41 | 1985 | 1996 | Buick Electra |
| 1980 | Buick LeSabre | 1.39 | 1978 | 1985 | Buick LeSabre |
| | | | 1992 | 1996 | Buick Roadmaster |
| [25] | Buick LeSabre | 1.39 | 1986 | 1999 | Buick LeSabre |
| | | | 1987 | 1999 | Pontiac Bonneville |
| 2003 | Buick Park Avenue 4-DR | 1.43 | 2003 | 2003 | Buick Park Avenue 4-DR |
| [26] | Buick Regal | 1.40 | 1978 | 1981 | Buick Regal |
| | | | 1978 | 1987 | Oldsmobile Cutlass |
| | | | 1978 | 1988 | Chevrolet Monte Carlo |
| | | | 1978 | 1986 | Pontiac Grand Prix |
| 2003 | Buick Regal 4-DR | 1.41 | 1997 | 2003 | Buick Regal 4-DR |
| | | | 1997 | 2003 | Buick Century 4-DR |
| [27] | Buick Skylark | 1.38 | 1992 | 1997 | Buick Skylark |
| | | | 1992 | 1998 | Oldsmobile Achieva |
| | | | 1992 | 1998 | Pontiac Grand Am |
| 2003 | Cadillac CTS 4-DR | 1.40 | 2003 | 2003 | Cadillac CTS 4-DR |
| [28] | Cadillac Deville | 1.42 | 1978 | 1983 | Cadillac Deville |
| | | | 1985 | 1993 | Cadillac Brougham |
| 2002 | Cadillac Deville 4-DR | 1.48 | 2000 | 2003 | Cadillac Deville 4-DR |
| [29] | Chevrolet Camaro | 1.60 | 1978 | 1981 | Chevrolet Camaro |
| | | | 1978 | 1981 | Pontiac Firebird |
| [30] | Chevrolet Camaro | 1.53 | 1982 | 1992 | Chevrolet Camaro |
| | | | 1982 | 1992 | Pontiac Firebird |
| [31] | Chevrolet Camaro | 1.50 | 1993 | 2002 | Chevrolet Camaro |
| | | | 1993 | 2002 | Pontiac Firebird |
| 1983 | Chevrolet Caprice | 1.30 | 1978 | 1996 | Chevrolet Caprice |
| | | | 1978 | 1985 | Olds Delta 88 |
| 1984 | Chevrolet Caprice Wagon | 1.40 | 1978 | 1993 | Chevrolet Caprice Wagon |
| | | | 1978 | 1991 | Buick Estate Wagon |
| | | | 1978 | 1992 | Olds Custom Cruiser |
| | | | 1978 | 1989 | Pontiac Safari |
| | | | 1981 | 1984 | Buick Electra Wagon |
| | | | 1992 | 1996 | Buick Roadmaster Wagon |
| 1983 | Chevrolet Cavalier 2-DR | 1.28 | 1982 | 1994 | Chevrolet Cavalier 2-DR |
| 2003 | Chevrolet Cavalier 2-DR | 1.39 | 1995 | 2003 | Chevrolet Cavalier 2-DR |
| 1985 | Chevrolet Cavalier 4-DR/wagon | 1.32 | 1982 | 1994 | Chevrolet Cavalier 4-DR/wagon |
| | | | 1985 | 1994 | Poniac Sunbird |

[25] Literature states 1992 – 96 LeSabre had 1.39 SSF; exact model year of test vehicle not specified.
[26] Literature states 1978 – 81 Regal had 1.40 SSF; exact model year of test vehicle not specified.
[27] Literature states 1992 – 97 Skylark had 1.38 SSF; exact model year of test vehicle not specified.
[28] Literature states 1981 – 84 DeVille/Broughm had 1.42 SSF; exact model year of test vehicle not specified
[29] Literature states 1974 – 81 Camaro had 1.60 SSF; exact model year of test vehicle not specified.
[30] Literature states 1988 – 92 Camaro had 1.53 SSF; exact model year of test vehicle not specified.
[31] Literature states 1993 – 98 Camaro had 1.50 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 2001 | Chevrolet Cavalier 4-DR | 1.35 | 1995 | 2003 | Chevrolet Cavalier 4-DR |
| | | | 1995 | 2002 | Pontiac Sunfire 4-DR |
| 1979 | Chevrolet Chevette | 1.38 | 1978 | 1979 | Chevrolet Chevette |
| | | | 1981 | 1987 | Pontiac T-1000 |
| 1980 | Chevrolet Chevette | 1.22 | 1980 | 1987 | Chevrolet Chevette |
| [32] | Chevrolet Citation | 1.38 | 1980 | 1985 | Chevrolet Citation |
| | | | 1980 | 1984 | Pontiac Phoenix |
| | | | 1980 | 1984 | Oldsmobile Omega |
| | | | 1980 | 1985 | Buick Skylark |
| [33] | Chevrolet Corsica | 1.30 | 1987 | 1996 | Chevrolet Corsica |
| 1973 | Chevrolet Corvette | 1.57 | 1978 | 1982 | Chevrolet Corvette |
| 2002 | Chevrolet Corvette | 1.75 | 1997 | 2003 | Chevrolet Corvette |
| 2001 | Chevrolet Impala 4-DR | 1.36 | 2001 | 2003 | Chevrolet Impala 4-DR |
| [34] | Chevrolet Lumina | 1.34 | 1990 | 2001 | Chevrolet Lumina |
| [35] | Chevrolet Malibu | 1.40 | 1978 | 1981 | Chevrolet Malibu |
| | | | 1978 | 1985 | Oldsmobile Cutlass |
| | | | 1979 | 1980 | Buick Century |
| | | | 1982 | 1986 | Pontiac Bonneville |
| 2002 | Chevrolet Malibu 4-DR | 1.40 | 1997 | 2003 | Chevrolet Malibu 4-DR |
| 2003 | Chevrolet Monte Carlo 2-DR | 1.42 | 2000 | 2003 | Chevrolet Monte Carlo 2-DR |
| | | | 1997 | 2003 | Pontiac Grand Prix 4-DR |
| 1980 | Oldsmobile 98 | 1.31 | 1978 | 1984 | Oldsmobile 98 |
| 1986 | Oldsmobile 98 | 1.40 | 1985 | 1987 | Oldsmobile 98 |
| | | | 1986 | 1999 | Oldsmobile-Delta 88 |
| | | | 1997 | 1998 | Oldsmobile Regency |
| 1985 | Oldsmobile Ciera A | 1.36 | 1982 | 1996 | Oldsmobile Ciera |
| | | | 1982 | 1989 | Chevy Celebrity |
| | | | 1982 | 1996 | Buick Century |
| [36] | Oldsmobile 98 | 1.38 | 1988 | 1996 | Oldsmobile-98 |
| | | | 1985 | 1993 | Cadillac Deville |
| 2003 | Pontiac Bonneville 4-DR | 1.45 | 2000 | 2003 | Pontiac Bonneville 4-DR |
| | | | 2003 | 2003 | Buick LeSabre 4-DR |
| 1984 | Pontiac Fiero | 1.47 | 1984 | 1988 | Pontiac Fiero |
| 1990 | Pontiac Grand Am | 1.35 | 1985 | 1991 | Pontiac Grand Am |
| | | | 1985 | 1991 | Oldsmobile Cutlass Calais |
| | | | 1986 | 1991 | Buick Skylark |
| 2003 | Pontiac Grand Am 2-DR | 1.41 | 1999 | 2003 | Pontiac Grand Am 2-DR |
| | | | 1999 | 2003 | Oldsmobile Alero 2-DR |
| [37] | Pontiac Grand Prix | 1.41 | 1988 | 1996 | Pontiac Grand Prix |

[32] Literature states 1980 – 81 Citation had 1.38 SSF; exact model year of test vehicle not specified.
[33] Literature states 1988 – 96 Corsica had 1.30 SSF; exact model year of test vehicle not specified.
[34] Literature states 1995 – 98 Lumina had 1.34 SSF; exact model year of test vehicle not specified.
[35] Literature states 1978 – 81 Malibu had 1.40 SSF; exact model year of test vehicle not specified.
[36] Literature states 1991 – 96 Oldsmobile 98 had 1.38 SSF; exact model year of test vehicle not specified.
[37] Literature states 1988 – 96 Grand Prix had 1.41 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1978 | Pontiac Lemans | 1.34 | 1978 | 1981 | Pontiac Lemans |
| 2003 | Pontiac Sunfire 2-DR | 1.40 | 1995 | 2003 | Pontiac Sunfire 2-DR |
| 2003 | Saturn Ion 4-DR | 1.38 | 2003 | 2003 | Saturn Ion 4-DR |
| 2002 | Saturn L 100 4-DR | 1.42 | 2000 | 2003 | Saturn L 100 4-DR |
| [38] | Saturn SL Z | 1.39 | 1991 | 1995 | Saturn SL Z |
| 1998 | Saturn SL Z | 1.35 | 1996 | 2001 | Saturn SL Z |
| 1980 | AMC Concord | 1.36 | 1978 | 1982 | AMC Concord |
| [39] | Audi 4000 2-DR | 1.36 | 1981 | 1987 | Audi 4000 2-DR |
| 1984 | Audi 4000 4-DR | 1.38 | 1980 | 1987 | Audi 4000 4-DR |
| 2003 | Audi A4 4-DR | 1.42 | 2002 | 2003 | Audi A4 4-DR |
| 2003 | Audi TT 2-DR Convertible | 1.51 | 2003 | 2003 | Audi TT 2-DR Convertible |
| 1981 | BMW 3-Series | 1.20 | 1978 | 1993 | BMW 3-Series |
| 2002 | BMW 3 Series 4-DR | 1.41 | 1999 | 2003 | BMW 3 Series 4-DR |
| 2002 | Mini Cooper | 1.44 | 2002 | 2003 | Mini Cooper |
| 2002 | Daewoo Nubira | 1.39 | 1999 | 2003 | Daewoo Nubira |
| 1988 | Pontiac Lemans | 1.35 | 1988 | 1993 | Pontiac Lemans |
| 2002 | Acura 3.2 TL 4-DR | 1.44 | 1999 | 2003 | Acura 3.2 TL 4-DR |
| 2002 | Acura RSX | 1.39 | 2002 | 2003 | Acura RSX |
| 1991 | Honda Accord | 1.47 | 1990 | 1993 | Honda Accord |
| 2001 | Honda Accord | 1.45 | 1994 | 2002 | Honda Accord |
| 2003 | Honda Accord 2-DR | 1.44 | 1998 | 2003 | Honda Accord 2-DR |
| [40] | Honda Civic Hatchback | 1.30 | 1980 | 1983 | Honda Civic Hatchback |
| 1984 | Honda Civic Hatchback | 1.40 | 1984 | 1987 | Honda Civic Hatchback |
| 2002 | Honda Civic 2-DR Hatchback | 1.35 | 2002 | 2003 | Honda Civic 2-DR Hatchback |
| 1982 | Honda Civic Sedan/Wagon | 1.32 | 1981 | 1983 | Honda Civic Sedan/Wagon |
| | | | 1979 | 1982 | Honda Prelude |
| [41] | Honda Civic | 1.48 | 1992 | 1995 | Honda Civic |
| 1998 | Honda Civic | 1.43 | 1996 | 2003 | Honda Civic |
| 2003 | Honda S2000 Convertible | 1.57 | 2000 | 2003 | Honda S2000 Convertible |
| 1989 | Dodge Colt | 1.39 | 1989 | 1992 | Dodge Colt |
| | | | 1989 | 1992 | Plymouth Colt |
| | | | 1990 | 1992 | Mitsubishi Mirage |
| | | | 1992 | 1992 | Eagle Summit |
| 2001 | Hyundai Accent 4-DR | 1.42 | 2001 | 2003 | Hyundai Accent 4-DR |
| 2003 | Hyundai Elantra 4-DR | 1.38 | 2001 | 2003 | Hyundai Elantra 4-DR |
| 1987 | Hyundai Excel | 1.23 | 1986 | 1989 | Hyundai Excel |
| | | | 1988 | 1989 | Mitsubishi Precis |
| 2002 | Hyundai Sonata 4-DR | 1.45 | 1995 | 2003 | Hyundai Sonata 4-DR |
| 2002 | Mitsubishi Eclipse 2HB | 1.46 | 2000 | 2003 | Mitsubishi Eclipse 2HB |
| 2003 | Mitsubishi Galant 4-DR | 1.43 | 1994 | 2003 | Mitsubishi Galant 4-DR |
| 2002 | Mitsubishi Lancer 4-DR | 1.37 | 2002 | 2002 | Mitsubishi Lancer 4-DR |

[38] Literature states 1990 – 95 SL Z had 1.39 SSF; exact model year of test vehicle not specified.
[39] Literature states 1980 – 87 Audi 4000 2 Door had 1.36 SSF; exact model year of test vehicle not specified.
[40] 1.30 SSF is average of 1983 (1.328) and "1980-83" (1.27) vehicles.
[41] Literature states 1992 – 95 Civic had 1.48 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | |
|---|---|---|---|---|
| Model Year | Make/Model | | Model years | Make/Model |
| 2003 | Mitsubishi Lancer 4-DR | 1.42 | 2003 2003 | Mitsubishi Lancer 4-DR |
| 2002 | Jaguar X-Type 4-DR | 1.43 | 2002 2003 | Jaguar X-Type 4-DR |
| 1991 | Ford Festiva | 1.34 | 1988 1993 | Ford Festiva |
| 2003 | Kia Optima 4-DR | 1.45 | 2001 2003 | Kia Optima 4-DR |
| 2002 | Kia Rio | 1.36 | 2001 2003 | Kia Rio |
| [42] | Ford Escort | 1.38 | 1991 1996 | Ford Escort |
| | | | 1990 1994 | Mazda Protégé |
| [43] | Ford Escort | 1.37 | 1997 2003 | Ford Escort |
| | | | 1991 1999 | Mercury Tracer |
| [44] | Ford Probe | 1.41 | 1993 1997 | Ford Probe |
| | | | 1993 1997 | Mazda Mx-6 |
| 1986 | Mazda 323 | 1.34 | 1986 1989 | Mazda 323 |
| 2003 | Mazda 6 4-DR | 1.46 | 2003 2003 | Mazda 6 4-DR |
| [45] | Mazda GLC | 1.25 | 1978 1980 | Mazda GLC |
| 2003 | Mazda Miata/MX-5 2-DR Convertible | 1.59 | 1990 2003 | Mazda Miata/MX-5 2-DR Convertible |
| 1998 | Mazda Protege | 1.40 | 1995 1998 | Mazda Protege |
| 2003 | Mazda Protege 4-DR | 1.42 | 1999 2003 | Mazda Protege 4-DR |
| 1987 | Mercedes 190 | 1.28 | 1984 1993 | Mercedes 190 |
| 2003 | Mercedes C Sedan | 1.35 | 2001 2003 | Mercedes C Sedan |
| 2003 | Mercedes E Sedan | 1.45 | 1996 2003 | Mercedes E Sedan |
| 1980 | Datsun 200SX | 1.26 | 1980 1983 | Datsun 200SX |
| [46] | Datsun 210 | 1.25 | 1978 1982 | Datsun 210 |
| 1979 | Datsun 280ZX | 1.42 | 1979 1989 | Datsun 280ZX |
| 2003 | Nissan 350z 2-DR | 1.57 | 2003 2003 | Nissan 350z 2-DR |
| 2002 | Nissan Altima 4-DR | 1.44 | 2002 2003 | Nissan Altima 4-DR |
| 1986 | Nissan Maxima | 1.35 | 1985 1986 | Nissan Maxima |
| 1988 | Nissan Maxima | 1.34 | 1987 1988 | Nissan Maxima |
| | | | 1987 1989 | Nissan Stanza Sedan |
| | | | 1991 1996 | Infiniti G20 |
| [47] | Nissan Maxima | 1.44 | 1989 1994 | Nissan Maxima |
| 2002 | Nissan Maxima 4-DR | 1.38 | 2000 2003 | Nissan Maxima 4-DR |
| 1983 | Nissan Sentra | 1.32 | 1982 1986 | Nissan Sentra |
| 1987 | Nissan Sentra | 1.36 | 1987 1990 | Nissan Sentra |
| [48] | Nissan Sentra | 1.46 | 1991 1994 | Nissan Sentra |
| 1998 | Nissan Sentra | 1.40 | 1995 2002 | Nissan Sentra |
| | | | 1996 1998 | Nissan 200SX 2-DR |
| 2003 | Nissan Sentra 4-DR | 1.38 | 2003 2003 | Nissan Sentra 4-DR |

[42] Literature states 1991 – 96 Escort had 1.38 SSF; exact model year of test vehicle not specified.
[43] Literature states 1997 – 2001 Escort had 1.37 SSF; exact model year of test vehicle not specified.
[44] Literature states 1993 – 97 Probe had 1.41 SSF; exact model year of test vehicle not specified.
[45] 1.25 SSF is average of 1979 (1.279) and "pre-1980" (1.22) vehicles.
[46] 1.25 SSF is average of 1974 3-door hatchback (1.278), 1979 wagon (1.272) and "No model year given" (1.19) vehicles.
[47] Literature states 1989 – 94 Maxima had 1.44 SSF; exact model year of test vehicle not specified.
[48] Literature states 1991 – 94 Sentra had 1.46 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1985 | Nissan Stanza | 1.29 | 1982 | 1986 | Nissan Stanza |
| [49] | Renault Le Car | 1.16 | 1978 | 1983 | Renault Le Car |
| 2003 | Saab 9-5 4-DR | 1.37 | 1999 | 2003 | Saab 9-5 4-DR |
| 2002 | Subaru Impreza Station Wagon 4-DR | 1.37 | 2002 | 2003 | Subaru Impreza Station Wagon 4-DR |
| 1991 | Subaru Justy GL | 1.23 | 1987 | 1994 | Subaru Justy GL |
| 2002 | Subaru Legacy 4-DR | 1.42 | 2000 | 2003 | Subaru Legacy 4-DR |
| 2002 | Subaru Legacy 4-DR Wagon | 1.37 | 2000 | 2003 | Subaru Legacy 4-DRWagon |
| 1991 | Chevrolet/Geo Metro | 1.32 | 1989 | 1994 | Chevrolet/Geo Metro |
| | | | 1989 | 1994 | Suzuki Swift |
| 1998 | Chevrolet/Geo Metro | 1.29 | 1995 | 2000 | Chevrolet/Geo Metro |
| | | | 1995 | 2001 | Suzuki Swift |
| [50] | Geo Prizm | 1.38 | 1990 | 1992 | Geo Prizm |
| | | | 1989 | 1989 | Chevrolet Nova |
| 2002 | Lexus ES300 4-DR | 1.36 | 2002 | 2002 | Lexus ES300 4-DR |
| 2003 | Lexus ES300 4-DR | 1.37 | 2003 | 2003 | Lexus ES300 4-DR |
| 2003 | Lexus IS300 4-DR | 1.47 | 2001 | 2003 | Lexus IS300 4-DR |
| 2002 | Toyota Avalon 4-DR | 1.42 | 1995 | 2003 | Toyota Avalon 4-DR |
| 1987 | Toyota Camry Hatchback | 1.38 | 1983 | 1987 | Toyota Camry Hatchback |
| 1987 | Toyota Camry | 1.33 | 1983 | 1991 | Toyota Camry |
| [51] | Toyota Camry | 1.46 | 1992 | 1996 | Toyota Camry |
| | | | 1992 | 1996 | Lexus ES-250/300 |
| 2001 | Toyota Camry | 1.45 | 1997 | 2001 | Toyota Camry |
| 2002 | Toyota Camry 4-DR | 1.40 | 2002 | 2003 | Toyota Camry 4-DR |
| 1976 | Toyota Corolla | 1.32 | 1978 | 1979 | Toyota Corolla |
| 1987 | Toyota Corolla | 1.30 | 1984 | 1988 | Toyota Corolla |
| | | | 1985 | 1988 | Chevrolet Nova |
| [52] | Toyota Corolla | 1.36 | 1989 | 1991 | Toyota Corolla |
| 2001 | Toyota Corolla 4-DR | 1.42 | 1997 | 2002 | Toyota Corolla 4-DR |
| | | | 1993 | 2002 | Geo/Chevrolet Prizm 4-DR |
| 2003 | Toyota Corolla 4-DR | 1.34 | 2003 | 2003 | Toyota Corolla 4-DR |
| 1982 | Toyota Cressida | 1.28 | 1978 | 1984 | Toyota Cressida |
| 2001 | Toyota Echo 4-DR | 1.32 | 2000 | 2003 | Toyota Echo 4-DR |
| 1986 | Toyota MR2 | 1.49 | 1985 | 1989 | Toyota MR2 |
| 1982 | Toyota Starlet | 1.21 | 1981 | 1984 | Toyota Starlet |
| [53] | Toyota Tercel | 1.41 | 1987 | 1994 | Toyota Tercel |
| [54] | Toyota Tercel | 1.39 | 1995 | 1998 | Toyota Tercel |
| 1991 | Volvo 240 | 1.23 | 1978 | 1993 | Volvo 240 |
| | | | 1978 | 1982 | Volvo 260 |

[49] 1.16 SSF is average of 1977 (1.15) and "No model year given" (1.5) vehicles.
[50] Literature states 1989 – 92 Prizm had 1.38 SSF; exact model year of test vehicle not specified.
[51] Literature states 1992 – 96 Camry had 1.46 SSF; exact model year of test vehicle not specified.
[52] Literature states 1989 – 92 Corolla had 1.46 SSF; exact model year of test vehicle not specified.
[53] Literature states 1991 – 94 Tercel had 1.41 SSF; exact model year of test vehicle not specified.
[54] Literature states 1995 – 98 Tercel had 1.39 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1991 | Volvo 740 | 1.38 | 1986 | 1992 | Volvo 740 |
| | | | 1983 | 1990 | Volvo 760 |
| | | | 1998 | 1998 | Volvo 90 Series |
| 2003 | Volvo S60 4-DR | 1.49 | 2001 | 2003 | Volvo S60 4-DR |
| 1971 | Volkswagen Beetle | 1.32 | 1978 | 1979 | Volkswagen Beetle |
| 2001 | Volkswagen Jetta 4-DR | 1.37 | 2000 | 2003 | Volkswagen Jetta 4-DR |
| 2002 | Volkswagen Jetta 4-DR Wagon | 1.34 | 2001 | 2003 | Volkswagen Jetta 4-DR Wagon |
| 2003 | Volkswagen New Beetle | 1.39 | 1998 | 2003 | Volkswagen New Beetle |
| 2003 | Volkswagen Passat 4-DR | 1.41 | 1998 | 2003 | Volkswagen Passat 4-DR |
| [55] | VW Cabriolet | 1.25 | 1985 | 1993 | VW Cabriolet |
| 1983 | VW Jetta | 1.21 | 1981 | 1984 | VW Jetta |
| [56] | VW Rabbit | 1.28 | 1978 | 1984 | VW Rabbit |
| 1987 | Yugo GV | 1.22 | 1986 | 1987 | Yugo GV |
| 1988 | Yugo GV | 1.22 | 1988 | 1991 | Yugo GV |

[55] 1.25 SSF is average of 1983 Jetta (1.21) and "1975-84" Rabbit (1.28), sister vehicles of the Cabriolet. These individual vehicles were included in the analysis with their respective SSF values.
[56] Literature states 1975 – 84 Rabbit had 1.28 SSF; exact model year of test vehicle not specified.

| Test Vehicle Model Year | Make/Model | SSF | SSF Also Applies to Model years | Make/Model |
|---|---|---|---|---|
| **Sport Utility Vehicles** | | | | |
| 1977 | Jeep Cherokee | 1.17 | 1975 1983 | Jeep Cherokee |
| 1984 | Jeep Cherokee 4x4 | 1.11 | 1984 1984 | Jeep Cherokee 4x4 |
| 1997 | Jeep Cherokee 4x4 | 1.08 | 1997 2001 | Jeep Cherokee 4x4 |
| [57] | Jeep CJ-5 | 1.01 | 1975 1976 | Jeep CJ-5 |
| 1981 | Jeep CJ-5 | 1.03 | 1981 1983 | Jeep CJ-5 |
| 1981 | Jeep CJ-7 | 1.03 | 1976 1981 | Jeep CJ-7 |
| [58] | Jeep CJ-7 | 1.04 | 1982 1982 | Jeep CJ-7 |
| 1983 | Jeep CJ-7 | 1.05 | 1983 1984 | Jeep CJ-7 |
| 1984 | Jeep Wagoneer 4WD | 1.08 | 1984 1992 | Jeep Wagoneer 4WD |
| 1987 | Jeep Wrangler 4x4 | 1.16 | 1987 1987 | Jeep Wrangler 4x4 |
| 1988 | Jeep Wrangler 4x4 | 1.13 | 1988 2003 | Jeep Wrangler 4x4 |
| 2003 | BMW X5 4-DR 4x4 | 1.14 | 2000 2003 | BMW X5 4-DR 4x4 |
| 2001 | Chrysler PT Cruiser 4-DR | 1.26 | 2001 2003 | Chrysler PT Cruiser 4-DR |
| 2001 | Dodge Durango 4-DR 4x2 | 1.20 | 1999 2003 | Dodge Durango 4-DR 4x2 |
| 1998 | Dodge Durango 4-DR 4x4 | 1.14 | 1998 1999 | Dodge Durango 4-DR 4x4 |
| 2001 | Dodge Durango 4-DR 4x4 | 1.16 | 2000 2003 | Dodge Durango 4-DR 4x4 |
| 1991 | Dodge RamCharger 4x4 | 1.13 | 1980 1993 | Dodge RamCharger 4x4 |
| 2001 | Jeep Grand Cherokee 4x2 | 1.09 | 1993 2003 | Jeep Grand Cherokee 4x2 |
| 2001 | Jeep Grand Cherokee 4x4 | 1.11 | 1993 2003 | Jeep Grand Cherokee 4x4 |
| 2002 | Jeep Liberty 4-DR 4x2 | 1.10 | 2002 2002 | Jeep Liberty 4-DR 4x2 |
| 2003 | Jeep Liberty 4-DR 4x2 | 1.12 | 2003 2003 | Jeep Liberty 4-DR 4x2 |
| 2002 | Jeep Liberty 4-DR 4x4 | 1.12 | 2002 2002 | Jeep Liberty 4-DR 4x4 |
| 2003 | Jeep Liberty 4-DR 4x4 | 1.15 | 2003 2003 | Jeep Liberty 4-DR 4x4 |
| 1978 | Ford Bronco | 1.06 | 1975 1979 | Ford Bronco |
| 1983 | Ford Bronco 4x4 | 1.04 | 1980 1984 | Ford Bronco 4x4 |
| 1985 | Ford Bronco 4x4 | 1.13 | 1985 1996 | Ford Bronco 4x4 |
| 1984 | Ford Bronco II 4x4 | 1.05 | 1984 1986 | Ford Bronco II 4x4 |
| 1988 | Ford Bronco II 4x4 | 0.99 | 1987 1990 | Ford Bronco II 4x4 |
| 1987 | Ford Bronco II 4x2 | 1.04 | 1987 1988 | Ford Bronco II 4x2 |
| 1989 | Ford Bronco II 4x2 | 0.99 | 1989 1990 | Ford Bronco II 4x2 |
| 2001 | Ford Escape 4-DR 4x2/4x4 | 1.23 | 2001 2003 | Ford Escape 4-DR 4x2/4x4 |
| | | | 2001 2003 | Mazda Tribute 4-DR 4x2/4x4 |
| 1998 | Ford Expedition 4-DR | 1.07 | 1997 2003 | Ford Expedition 4-DR |
| | | | 1998 1999 | Lincoln Navigator 4-DR |
| [59] | Ford Explorer 2-DR 4x2 | 1.07 | 1991 1994 | Ford Explorer 2-DR 4x2 |
| | | | 1992 1994 | Mazda Navajo |
| 1992 | Ford Explorer 2-DR 4x4 | 1.09 | 1991 1995 | Ford Explorer 2-DR 4x4 |
| | | | 1991 1994 | Mazda Navajo 4x4 |

[57] Literature states 1972 – 75 CJ-5 had 1.01 SSF; exact model year of test vehicle not specified.
[58] 1.04 SSF is average of 1981 (1.033) and 1983 (1.0505) vehicles.
[59] Literature states 1991 – 94 Explorer had 1.07 SSF; exact model year of test vehicle not specified.

| Test Vehicle Model Year | Make/Model | SSF | SSF Also Applies to Model years | Make/Model |
|---|---|---|---|---|
| | [60] Ford Explorer 2-DR 4x2 | 1.06 | 1995 2003 | Ford Explorer 2-DR 4x2 |
| | | | 1996 2003 | Ford Explorer 2-DR 4x4 |
| | | | 1996 2001 | Ford Explorer 4-DR |
| 1992 | Ford Explorer 4-DR 4x2 | 1.07 | 1991 1995 | Ford Explorer 4-DR 4x2 |
| 2002 | Ford Explorer 4-DR 4x2 | 1.10 | 2002 2003 | Ford Explorer 4-DR 4x2 |
| | | | 2002 2003 | Mercury Mountaineer 4-DR |
| 1991 | Ford Explorer 4-DR 4x4 | 1.09 | 1991 1995 | Ford Explorer 4-DR 4x4 |
| 2002 | Ford Explorer 4-DR 4x4 | 1.14 | 2002 2003 | Ford Explorer 4-DR 4x4 |
| | | | 2002 2003 | Mercury Mountaineer 4-DR |
| 2002 | Ford Explorer Sport 2-DR 4x2 | 1.05 | 2001 2003 | Ford Explorer Sport 2-DR 4x2 |
| 2002 | Ford Explorer Sport 2-DR 4x4 | 1.07 | 2001 2003 | Ford Explorer Sport 2-DR 4x4 |
| 2001 | Mercury Mountaineer 4-DR | 1.06 | 1997 2001 | Mercury Mountaineer 4-DR |
| 1998 | Mercury Mountaineer 4-DR 4x4 | 1.07 | 1997 2001 | Mercury Mountaineer 4-DR 4x4 |
| 2002 | Buick Rendezvous 4-DR 4x2 | 1.18 | 2002 2003 | Buick Rendezvous 4-DR 4x2 |
| 2002 | Buick Rendezvous 4-DR 4x4 | 1.21 | 2002 2003 | Buick Rendezvous 4-DR 4x4 |
| 2002 | Chevrolet Avalanche 4-DR 4x4 | 1.12 | 2002 2003 | Chevrolet Avalanche 4-DR 4x4 |
| | | | 2002 2003 | Chevrolet Avalanche 4-DR4x2 |
| | | | 2002 2003 | Cadillac Escalade Ext 4-DR 4x4 |
| 1983 | Chevrolet S10 Blazer 2-DR | 1.08 | 1981 1983 | Chevrolet S10 Blazer 2-DR |
| | | | 1981 1983 | GMC S15 Jimmy 2-DR |
| 2002 | Chevrolet S10 Blazer 2-DR | 1.03 | 1984 2003 | Chevrolet S10 Blazer 2-DR |
| | | | 1984 2003 | GMC S15 Jimmy 2-DR |
| 1984 | Chevrolet S10 4x4 Blazer 2-DR | 1.11 | 1983 1987 | Chevrolet S10 4x4 Blazer 2-DR |
| | | | 1982 1987 | GMC S15 4x4 Jimmy 2-DR |
| 1989 | Chevrolet S10 4x4 Blazer 2-DR | 1.10 | 1988 1989 | Chevrolet S10 4x4 Blazer 2-DR |
| | | | 1988 1989 | GMC S15 4x4 Jimmy 2-DR |
| 1990 | Chevrolet S10 4x4 Blazer 2-DR | 1.06 | 1990 1991 | Chevrolet S10 4x4 Blazer 2-DR |
| | | | 1990 1991 | GMC S15 4x4 Jimmy 2-DR |
| 1992 | Chevrolet S10 4x4 Blazer 2-DR | 1.07 | 1992 2003 | Chevrolet S10 4x4 Blazer 2-DR |
| | | | 1992 2001 | GMC S15 4x4 Jimmy 2-DR |
| 1998 | Chevrolet S10 4x2 Blazer 4-DR | 1.09 | 1991 2002 | Chevrolet S10 4x2 Blazer 4-DR |
| | | | 1991 1999 | GMC S15 4x2/4x4 Jimmy 4-DR |
| | | | 1991 1999 | Olds Bravada 4x4 |
| 2001 | Chevrolet S10 4x4 Blazer 4-DR | 1.09 | 1991 2003 | Chevrolet S10 4x4 Blazer 4-DR |
| 1978 | Chevrolet K-10 Blazer | 1.12 | 1975 1980 | Chevrolet K-10 Blazer |
| 1982 | Chevrolet K10/V10 4x4 Blazer | 1.17 | 1981 1991 | Chevrolet K10/V10 4x4 Blazer |
| | | | 1981 1991 | GMC K15/V15 4x4 Jimmy |
| 1998 | Chevrolet K1500 4x4 Suburban | 1.08 | 1992 1999 | Chevrolet K1500 4x4 Suburban |
| | | | 1992 1999 | Chevrolet K2500 4x4 Suburban |
| | | | 1992 1999 | GMC K1500 4x4 Suburban |
| | | | 1992 1999 | GMC K2500 4x4 Suburban |
| 1982 | Chevrolet K20/V20 4x4 Suburban | 1.02 | 1985 1991 | Chevrolet K20/V20 4x4 Suburban |
| | | | 1985 1991 | GMC K25/V25 4x4 Suburban |

[60] Literature states 1995 – 98 Explorer had 1.06 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 2001 | Chevrolet Suburban 4-DR 4x2 | 1.13 | 2000 | 2003 | Chevrolet Suburban 4-DR4x2 |
| | | | 2001 | 2003 | GMC Yukon Denali 4-DR |
| 2001 | Chevrolet Suburban 4-DR 4x4 | 1.14 | 2000 | 2003 | Chevrolet Suburban 4-DR 4x4 |
| [61] | Chevrolet Tahoe 2-DR 4x4 | 1.12 | 1992 | 1999 | Chevrolet Tahoe 2-DR 4x4 |
| | | | 1992 | 1997 | GMC Yukon 2-DR 4x4 |
| 1998 | Chevrolet Tahoe 4-DR 4x4 | 1.13 | 1995 | 1999 | Chevrolet Tahoe 4-DR 4x4 |
| | | | 1995 | 1999 | GMC Yukon 4-DR 4x4 |
| 2001 | Chevrolet Tahoe 4-DR 4x4 | 1.14 | 2000 | 2003 | Chevrolet Tahoe 4-DR 4x4 |
| | | | 2000 | 2003 | GMC Yukon 4-DR 4x4 |
| | | | 2002 | 2003 | Cadillac Escalade 4-DR 4x4 |
| 2002 | Chevrolet Trailblazer 4-DR 4x2 | 1.16 | 2002 | 2003 | Chevrolet Trailblazer 4-DR 4x2 |
| | | | 2002 | 2003 | GMC Envoy 4-DR 4x2 |
| | | | 2003 | 2003 | Oldsmobile Bravada 4-DR 4x2 |
| 2002 | Chevrolet Trailblazer 4-DR 4x4 | 1.18 | 2002 | 2003 | Chevrolet Trailblazer 4-DR 4x4 |
| | | | 2002 | 2003 | GMC Envoy 4-DR 4x4 |
| | | | 2003 | 2003 | Oldsmobile Bravada 4-DR 4x4 |
| 1984 | GMC C25/R25 Suburban | 1.01 | 1981 | 1991 | GMC C25/R25 Suburban |
| | | | 1981 | 1991 | Chevrolet C20/R20 Suburban |
| 1990 | GMC K15/V15 4x4 Suburban | 1.10 | 1981 | 1991 | GMC K15/V15 4x4 Suburban |
| 2001 | GMC S15 4x4 Jimmy 4-DR | 1.03 | 2000 | 2001 | GMC S15 4x4 Jimmy 4-DR |
| | | | 2000 | 2001 | 7802 Olds Bravada 4x4 |
| 2001 | GMC Yukon 4-DR 4x2 | 1.12 | 2000 | 2003 | GMC Yukon 4-DR 4x2 |
| 2003 | Oldsmobile Bravada 4x4 | 1.17 | 2003 | 2003 | Oldsmobile Bravada 4x4 |
| 2001 | Pontiac Aztek 4-DR 4x2 | 1.21 | 2001 | 2003 | Pontiac Aztek 4-DR 4x2 |
| 2001 | Pontiac Aztek 4-DR 4x4 | 1.26 | 2001 | 2003 | Pontiac Aztek 4-DR 4x4 |
| 2002 | Saturn Vue 4-DR 4x2 | 1.19 | 2002 | 2003 | Saturn Vue 4-DR 4x2 |
| 2002 | Saturn Vue 4-DR 4x4 | 1.22 | 2002 | 2003 | Saturn Vue 4-DR 4x4 |
| 2002 | Acura MDX 4-DR 4x4 | 1.29 | 2001 | 2003 | Acura MDX 4-DR 4x4 |
| 2002 | Honda CR-V 4x2 | 1.17 | 2002 | 2003 | Honda CR-V 4x2 |
| 1998 | Honda CR-V 4x4 97-2001 | 1.19 | 1997 | 2001 | Honda CR-V 4x4 |
| 2002 | Honda CR-V 4x4 | 1.16 | 2002 | 2003 | Honda CR-V 4x4 |
| 2003 | Honda Element 4-DR 4x2 | 1.14 | 2003 | 2003 | Honda Element 4-DR 4x2 |
| 2003 | Honda Element 4-DR 4x4 | 1.12 | 2003 | 2003 | Honda Element 4-DR 4x4 |
| 2003 | Honda Pilot 4-DR 4x4 | 1.30 | 2003 | 2003 | Honda Pilot 4-DR 4x4 |
| 2002 | Hyundai Santa Fe 4-DR 4x2 | 1.18 | 2001 | 2003 | Hyundai Santa Fe 4-DR 4x2 |
| 2002 | Hyundai Santa Fe 4-DR 4x4 | 1.20 | 2002 | 2003 | Hyundai Santa Fe 4-DR 4x4 |
| 1991 | Isuzu Amigo 4x4 | 1.12 | 1989 | 1994 | Isuzu Amigo 4x4 |
| 2002 | Isuzu Axiom 4-DR 4x4 | 1.20 | 2002 | 2003 | Isuzu Axiom 4-DR 4x4 |
| 2002 | Isuzu Axiom 4-DR 4x2 | 1.14 | 2002 | 2003 | Isuzu Axiom 4-DR 4x2 |
| 2001 | Isuzu Rodeo 4-DR 4x2 | 1.15 | 1998 | 2003 | Isuzu Rodeo 4-DR 4x2 |
| | | | 1998 | 2002 | Honda Passport 4x2 |
| 1991 | Isuzu Rodeo 4x4 | 1.08 | 1991 | 1991 | Isuzu Rodeo 4x4 |
| 1992 | Isuzu Rodeo 4x4 | 1.05 | 1992 | 1997 | Isuzu Rodeo 4x4 |

[61] Literature states 1992 – 98 Tahoe had 1.12 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1998 | Isuzu Rodeo 4-DR 4x4 | 1.20 | 1998 | 2002 | Isuzu Rodeo 4x4 |
| 1994 | Isuzu Trooper 4-DR 4x4 | 1.07 | 1992 | 1994 | Isuzu Trooper 4x4 |
| 1996 | Isuzu Trooper 4-DR 4x4 | 1.09 | 1995 | 2002 | Isuzu Trooper 4x4 |
| | | | 1996 | 1999 | Acura SLX 4x4 |
| 1984 | Isuzu Trooper II 4x4 | 1.02 | 1984 | 1986 | Isuzu Trooper II 4x4 |
| 1988 | Isuzu Trooper II 4x4 | 1.01 | 1987 | 1991 | Isuzu Trooper II 4x4 |
| 2003 | Kia Sorento 4-DR 4x2 | 1.14 | 2003 | 2003 | Kia Sorento 4-DR 4x2 |
| 2003 | Kia Sorento 4-DR 4x4 | 1.16 | 2003 | 2003 | Kia Sorento 4-DR 4x4 |
| 1999 | Mercedes-Benz ML 320/450 | 1.12 | 1998 | 2003 | Mercedes-Benz ML 320/450 |
| 2003 | Mercedes-Benz ML-Class 4x4 | 1.15 | 2000 | 2003 | Mercedes-Benz ML-Class 4x4 |
| 1987 | Dodge Raider 2-DR 4x4 | 0.99 | 1987 | 1987 | Dodge Raider 2-DR4x4 |
| | | | 1985 | 1987 | Mitsubishi Montero 2-DR |
| | [62] Dodge Raider 2-DR 4x4 | 1.03 | 1988 | 1988 | Dodge Raider 2-DR4x4 |
| | | | 1988 | 1988 | Mitsubishi Montero 2-DR |
| 1989 | Dodge Raider 2-DR4x4 | 1.07 | 1989 | 1989 | Dodge Raider 2-DR 4x4 |
| | | | 1989 | 1990 | Mitsubishi Montero 2-DR |
| | [63] Mitsubishi Montero 4-DR 4x4 | 0.95 | 1992 | 2000 | Mitsubishi Montero 4-DR 4x4 |
| 2001 | Mitsubishi Montero Sport 4-DR4x2 | 1.07 | 2000 | 2003 | Mitsubishi Montero Sport 4-DR 4x2 |
| 2001 | Mitsubishi Montero Sport 4-DR 4x4 | 1.11 | 2000 | 2003 | Mitsubishi Montero Sport 4-DR 4x4 |
| 2003 | Mitsubishi Outlander 4-DR 4x2 | 1.18 | 2003 | 2003 | Mitsubishi Outlander 4-DR 4x2 |
| 2003 | Mitsubishi Outlander 4-DR 4x4 | 1.22 | 2003 | 2003 | Mitsubishi Outlander 4-DR 4x4 |
| 2003 | Nissan Murano 4-DR 4x2/4x4 | 1.30 | 2003 | 2003 | Nissan Murano 4-DR 4x2/4x4 |
| 1987 | Nissan Pathfinder 2-DR 4x4 | 1.07 | 1987 | 1990 | Nissan Pathfinder 2-DR 4x4 |
| 2001 | Nissan Pathfinder 4-DR 4x2 | 1.07 | 1996 | 2003 | Nissan Pathfinder 4-DR 4x2 |
| 1991 | Nissan Pathfinder 4-DR 4x4 | 1.07 | 1990 | 1995 | Nissan Pathfinder 4-DR 4x4 |
| 2001 | Nissan Pathfinder 4-DR 4x4 | 1.16 | 1996 | 2003 | Nissan Pathfinder 4-DR 4x4 |
| 2001 | Nissan Xterra 4-DR 4x2 | 1.09 | 2000 | 2003 | Nissan Xterra 4-DR 4x2 |
| 2001 | Nissan Xterra 4-DR 4x4 | 1.12 | 2000 | 2002 | Nissan Xterra 4-DR 4x4 |
| 2001 | Subaru Forester 4-DR 4x4 | 1.19 | 1998 | 2002 | Subaru Forester 4-DR 4x4 |
| 2003 | Subaru Forester 4-DR 4x4 Wagon | 1.24 | 2003 | 2003 | Subaru Forester 4-DR 4x4 Wagon |
| 1991 | Chevrolet Geo Tracker 4x4 | 1.14 | 1989 | 1994 | Chevrolet Geo Tracker 2-DR 4x4 |
| | | | 1989 | 1994 | Suzuki Sidekick 2-DR 4x4 |
| 1998 | Chevrolet Geo Tracker 4x4 | 1.13 | 1995 | 1998 | Chevrolet Geo Tracker 2-DR 4x4 |
| | | | 1995 | 1998 | Suzuki Sidekick 2-DR 4x4 |
| | [64] Chevrolet Geo Tracker 4-DR 4x4 | 1.13 | 1996 | 1998 | Chevrolet Geo Tracker 4-DR 4x4 |
| | | | 1991 | 1998 | Suzuki Sidekick 4-DR4x4 |
| 2002 | Chevrolet Tracker 2-DR 4x2 | 1.23 | 1999 | 2003 | Chevrolet Tracker 2-DR 4x2 |
| | | | 1999 | 2002 | Suzuki Vitara 2-DR 4x2 |
| 2002 | Chevrolet Tracker 2-DR 4x4 | 1.18 | 1999 | 2003 | Chevrolet Tracker 2-DR 4x4 |
| | | | 1999 | 2002 | Suzuki Vitara 2-DR 4x4 |
| 2001 | Chevrolet Tracker 4-DR 4x2 | 1.16 | 1999 | 2003 | Chevrolet Tracker 4-DR 4x2 |
| | | | 1999 | 2003 | Suzuki Grand Vitara 4-DR 4x2 |

[62] 1.03 SSF is average of 1987 (0.99) and 1989 (1.07) vehicles.
[63] Literature states 1992 – 2000 Montero had 0.95 SSF; exact model year of test vehicle not specified.
[64] Literature states 1989 – 98 Tracker had 1.13 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 2001 | Chevrolet Tracker 4-DR 4x4 | 1.15 | 1999 | 2003 | Chevrolet Tracker 4-DR 4x4 |
| | | | 1999 | 2003 | Suzuki Vitara 4-DR4x4 |
| | | | 1999 | 2003 | Suzuki Grand Vitara 4-DR 4x4 |
| 1988 | Suzuki Samurai 4x4 | 1.09 | 1984 | 1995 | Suzuki Samurai 4x4 |
| 2001 | Lexus RX300 4-DR 4x2 | 1.20 | 1999 | 2003 | Lexus RX300 4-DR 4x2 |
| [65] | Toyota 4Runner 90-95 | 1.07 | 1990 | 1995 | Toyota 4Runner 4x2 |
| 2001 | Toyota 4Runner 4-DR 4x2 | 1.08 | 1996 | 2002 | Toyota 4Runner 4-DR 4x2 |
| 2003 | Toyota 4Runner 4-DR 4x2 | 1.15 | 2003 | 2003 | Toyota 4Runner 4-DR 4x2 |
| 1987 | Toyota 4Runner 4x4 | 0.99 | 1984 | 1987 | Toyota 4Runner 4x4 |
| 1989 | Toyota 4Runner 4x4 | 1.08 | 1988 | 1989 | Toyota 4Runner 4x4 |
| 1990 | Toyota 4Runner 4x4 | 1.00 | 1990 | 1995 | Toyota 4Runner 4x4 |
| 1998 | Toyota 4Runner 4x4 | 1.06 | 1996 | 1999 | Toyota 4Runner 4x4 |
| 2001 | Toyota 4Runner 4x4 | 1.06 | 2000 | 2002 | Toyota 4Runner 4x4 |
| 2003 | Toyota 4Runner 4-DR 4x4 | 1.17 | 2003 | 2003 | Toyota 4Runner 4-DR 4x4 |
| 2002 | Toyota Highlander 4-DR 4x2 | 1.20 | 2001 | 2003 | Toyota Highlander 4-DR 4x2 |
| 2002 | Toyota Highlander 4-DR 4x4 | 1.20 | 2001 | 2003 | Toyota Highlander 4-DR 4x4 |
| 1979 | Toyota Landcruiser 72-80 | 0.97 | 1976 | 1979 | Toyota Landcruiser |
| 1991 | Toyota 4Runner 4x4 | 1.05 | 1991 | 1997 | Toyota Landcruiser |
| 2001 | Toyota RAV4 4-DR4x2 | 1.19 | 2001 | 2003 | Toyota RAV4 4-DR 4x2 |
| 2001 | Toyota RAV4 4-DR 4x4 | 1.22 | 2001 | 2003 | Toyota RAV4 4-DR 4x4 |
| 2002 | Toyota Sequoia 4-DR 4x2 | 1.14 | 2001 | 2003 | Toyota Sequoia 4-DR 4x2 |
| 2002 | Toyota Sequoia 4-DR 4x4 | 1.14 | 2001 | 2003 | Toyota Sequoia 4-DR 4x4 |

[65] Literature states 1990 – 95 4Runner had 1.07 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | |
|---|---|---|---|---|
| Model Year | Make/Model | | Model years | Make/Model |
| ***Pickup Trucks*** | | | | |
| 1991 | Dodge D100 Pickup | 1.28 | 1986 1991 | Dodge D100 Pickup |
| 1983 | Dodge D150 Pickup | 1.24 | 1981 1986 | Dodge D150 Pickup |
| 1991 | Dodge D150 Pickup | 1.28 | 1987 1993 | Dodge D150 Pickup |
| 1987 | Dodge Dakota 4x2 | 1.26 | 1987 1996 | Dodge Dakota 4x2 |
| 2002 | Dodge Dakota 4x2 | 1.23 | 1997 2003 | Dodge Dakota 4x2 |
| | | | 2000 2003 | Dodge Dakota Quad Cab 4x2 |
| 1991 | Dodge Dakota 4x4 | 1.21 | 1987 1996 | Dodge Dakota 4x4 |
| 2002 | Dodge Dakota 4x4 | 1.13 | 1997 2003 | Dodge Dakota 4x4 |
| 1998 | Dodge Dakota Club Cab 4x2 | 1.25 | 1997 2002 | Dodge Dakota Club Cab 4x2 |
| 1992 | Dodge Dakota Club Cab 4x4 | 1.24 | 1991 1996 | Dodge Dakota Club Cab 4x4 |
| 2001 | Dodge Dakota Extended Cab 4x4 | 1.17 | 2001 2002 | Dodge Dakota Club Cab 4x4 |
| 2003 | Dodge Dakota Quad Cab 4x4 | 1.13 | 2000 2003 | Dodge Dakota Quad Cab 4x4 |
| 2002 | Dodge Ram 1500 4-DR 4x2 | 1.19 | 2002 2003 | Dodge Ram 1500 4-DR 4x2 |
| | | | 2002 2003 | Dodge Ram 1500 Quad Cab 4x2 |
| 1998 | Dodge Ram 1500 Club Cab Pickup | 1.22 | 1995 2001 | Dodge Ram 1500 Club Cab Pickup |
| 2001 | Dodge Ram 1500 Quad Cab 4x4 | 1.16 | 1998 2001 | Dodge Ram 1500 Quad Cab 4x4 |
| 2002 | Dodge Ram 1500 Quad Cab 4x4 | 1.15 | 2002 2003 | Dodge Ram 1500 Quad Cab 4x4 |
| | | | 2002 2003 | Dodge Ram 1500 Pickup |
| 2001 | Dodge Ram 1500 Quad Cab Pickup | 1.22 | 1998 2001 | Dodge Ram 1500 Club Cab Pickup |
| | | | 1994 2001 | Dodge Ram 1500 Quad Cab 4x4 |
| 1980 | Plymouth Arrow | 1.30 | 1981 1982 | Plymouth Arrow |
| | | | 1983 1984 | Mitsubishi Pickup |
| 1981 | Ford F100 2WD | 1.24 | 1981 1984 | Ford F100 2WD |
| 1987 | Ford F-150 Pickup | 1.19 | 1981 1988 | Ford F-150 Pickup |
| 1990 | Ford F-150 Pickup | 1.19 | 1989 1990 | Ford F-150 Pickup |
| 1991 | Ford F-150 Pickup | 1.23 | 1991 1991 | Ford F-150 Pickup |
| 1992 | Ford F-150 Pickup | 1.24 | 1992 1996 | Ford F-150 Pickup |
| 1998 | Ford F-150 Pickup | 1.18 | 1997 2000 | Ford F-150 Pickup |
| 2001 | Ford F-150 Pickup | 1.22 | 2001 2003 | Ford F-150 Pickup |
| 1984 | Ford F-150 4x4 Pickup | 1.15 | 1981 1984 | Ford F-150 4x4 Pickup |
| 1985 | Ford F-150 4x4 Pickup | 1.20 | 1985 1996 | Ford F-150 4x4 Pickup |
| 2001 | Ford F-150 4x4 Pickup | 1.12 | 2003 2003 | Ford F-150 4x4 Pickup |
| 1987 | Ford F-150 Supercab Pickup | 1.19 | 1985 1996 | Ford F-150 Supercab Pickup |
| 2002 | Ford F-150 Supercab Pickup | 1.23 | 1997 2003 | Ford F-150 Supercab Pickup |
| 1987 | Ford F-150 Supercab Pickup 4x4 | 1.08 | 1985 1987 | Ford F-150 Supercab Pickup 4x4 |
| [66] | Ford F-150 Supercab Pickup 4x4 | 1.15 | 1988 1996 | Ford F-150 Supercab Pickup 4x4 |
| 2002 | Ford F-150 Extended Cab 4x4 | 1.16 | 1997 2003 | Ford F-150 Extended Cab 4x4 |
| 2002 | Ford F-150 Supercrew 4-DR 4x2 | 1.19 | 2001 2003 | Ford F-150 Supercrew 4-DR 4x2 |
| 2002 | Ford F-150 Supercrew 4-DR 4x4 | 1.08 | 2001 2003 | Ford F-150 Supercrew 4-DR 4x4 |
| 1984 | Ford F250 Pickup | 1.11 | 1981 1997 | Ford F250 Pickup |
| 1985 | Ford F250 4x4 Pickup | 1.11 | 1981 1997 | Ford F250 4x4 Pickup |
| 1985 | Ford Ranger | 1.09 | 1983 1987 | Ford Ranger |

[66] Literature states 1988 – 96 F-150 Supercab had 1.15 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | |
|---|---|---|---|---|
| Model Year | Make/Model | | Model years | Make/Model |
| 1991 | Ford Ranger | 1.13 | 1988 1991 | Ford Ranger |
| 1992 | Ford Ranger | 1.12 | 1992 1992 | Ford Ranger |
| [67] | Ford Ranger | 1.17 | 1993 1997 | Ford Ranger |
| | | | 1993 1997 | Ford Ranger Supercab |
| | | | 1994 1997 | Mazda B Pickup |
| | | | 1994 1997 | Mazda B Cab-Plus Pickup |
| 2002 | Ford Ranger 2-DR 4x2 | 1.14 | 1998 2003 | Ford Ranger 2-DR 4x2 |
| | | | 1998 2003 | Mazda B-Series 2-DR 4x2 |
| 1986 | Ford Ranger 4x4 | 1.03 | 1983 1992 | Ford Ranger 4x4 |
| | | | 1986 1992 | Ford Ranger Supercab 4x4 |
| 1997 | Ford Ranger 4x4 | 1.07 | 1993 1997 | Ford Ranger 4x4 |
| | | | 1994 1997 | Mazda B-Series 2-DR 4x4 |
| 2002 | Ford Ranger 4x4 | 1.05 | 1998 2003 | Ford Ranger 4x4 |
| | | | 1998 2001 | Mazda B-Series 2-DR 4x4 |
| 1991 | Ford Ranger Supercab | 1.14 | 1986 1991 | Ford Ranger Supercab |
| 1992 | Ford Ranger Supercab | 1.13 | 1992 1992 | Ford Ranger Supercab |
| 2001 | Ford Ranger Supercab | 1.13 | 1998 2003 | Ford Ranger Supercab |
| | | | 1998 2003 | Mazda B-Series Extended Cab 4x2 |
| 1997 | Ford Ranger Supercab 4x4 | 1.07 | 1993 1997 | Ford Ranger Supercab 4x4 |
| | | | 1994 1997 | Mazda B Cab-Plus 4x4 |
| 2001 | Ford Ranger Supercab 4x4 | 1.04 | 1998 2003 | Ford Ranger Supercab 4x4 |
| | | | 1998 2003 | Mazda B-Series Extended Cab 4x4 |
| 1988 | GMC Sierra K1500 4x4 Pickup | 1.12 | 1988 1998 | GMC Sierra K1500 4x4 Pickup |
| 1981 | Chevrolet C10/R10 Pickup | 1.22 | 1981 1987 | Chevrolet C10/R10 Pickup |
| 1991 | Chevrolet C10 Pickup | 1.20 | 1988 1994 | Chevrolet C10 Pickup |
| 1998 | Chevrolet C10 Pickup | 1.23 | 1995 1998 | Chevrolet C10 Pickup |
| [68] | Chevrolet C10 X-Cab Pickup | 1.22 | 1991 1999 | Chevrolet C10 X-Cab Pickup |
| | | | 1991 1999 | GMC Sierra C1500 X-Cab Pickup |
| 1991 | Chevrolet K10 4x4 Pickup | 1.14 | 1988 1991 | Chevrolet K10 4x4 Pickup |
| 1992 | Chevrolet K10 4x4 Pickup | 1.14 | 1992 1998 | Chevrolet K10 4x4 Pickup |
| [69] | Chevrolet K10 4x4 X-Cab Pickup | 1.14 | 1991 1999 | Chevrolet K10 4x4 X-Cab Pickup |
| | | | 1991 1999 | Chevrolet K10 4x4 X-Cab Pickup |
| 1982 | Chevrolet K20/V20 4x4 Pickup | 1.19 | 1981 1983 | Chevrolet K20/V20 4x4 Pickup |
| 1985 | Chevrolet K20/V20 4x4 Pickup | 1.14 | 1984 1987 | Chevrolet K20/V20 4x4 Pickup |
| 1981 | Chevrolet LUV | 1.24 | 1981 1981 | Chevrolet LUV |
| [70] | Chevrolet S10 Maxicab Pickup | 1.19 | 1988 1993 | Chevrolet S10 Maxicab Pickup |
| | | | 1988 1993 | Chevrolet T10 4x4 Maxicab Pickup |
| | | | 1988 1993 | GMC S15/Sonoma Maxicab Pickup |
| | | | 1988 1993 | GMC T15/Sonoma 4x4 Maxicab |

[67] Literature states 1993 – 97 Ranger had 1.17 SSF; exact model year of test vehicle not specified.
[68] Literature states 1988 – 98 C10 X-cab had 1.22 SSF; exact model year of test vehicle not specified.
[69] Literature states 1988 – 98 K10 X-cab had 1.14 SSF; exact model year of test vehicle not specified.
[70] Literature states 1988 – 93 S10 Maxicab had 1.19 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 2001 | Chevrolet S10 Maxicab Pickup | 1.14 | 1994 | 2002 | Chevrolet S10 Maxicab Pickup |
| | | | 1994 | 2003 | Chevrolet T10 4x4 Maxicab Pickup |
| | | | 1994 | 2002 | GMC S15/Sonoma Maxicab Pickup |
| | | | 1994 | 2003 | GMC T15/Sonoma 4x4 Maxicab |
| | | | 1997 | 2000 | Isuzu Hombre Spacecab Pickup |
| | | | 1998 | 2000 | Isuzu Hombre Spacecab 4x4 |
| 2003 | Chevrolet S10 Maxicab Pickup | 1.15 | 2003 | 2003 | Chevrolet S10 Maxicab Pickup |
| | | | 2003 | 2003 | GMC S15/Sonoma Maxicab Pickup |
| 1986 | Chevrolet S10 Pickup | 1.21 | 1981 | 1987 | Chevrolet S10 Pickup |
| | | | 1981 | 1987 | GMC S15 Pickup |
| 1991 | Chevrolet S10 Pickup | 1.24 | 1988 | 1994 | Chevrolet S10 Pickup |
| | | | 1988 | 1994 | GMC S15/Sonoma Pickup |
| 1998 | Chevrolet S10 Pickup | 1.15 | 1995 | 2003 | Chevrolet S10 Pickup |
| | | | 1995 | 2003 | GMC S15/Sonoma Pickup |
| | | | 1996 | 2000 | Isuzu Hombre Pickup |
| 2001 | Chevrolet Silverado Extended Cab 4x2 | 1.27 | 1999 | 2003 | Chevrolet Silverado Extend Cab 4x2 |
| | | | 1999 | 2003 | GMC Sierra Extended Cab 4x2 |
| 2001 | Chevrolet Silverado Extended Cab 4x4 | 1.19 | 1999 | 2003 | Chevrolet Silverado Extend Cab 4x2 |
| | | | 1999 | 2003 | GMC Sierra Extended Cab 4x4 |
| 1987 | Chevrolet T10 4x4 Pickup | 1.17 | 1982 | 1987 | Chevrolet T10 4x4 Pickup |
| | | | 1982 | 1987 | GMC T15 4x4 Pickup |
| 1992 | Chevrolet T10 4x4 Pickup | 1.24 | 1988 | 2000 | Chevrolet T10 4x4 Pickup |
| | | | 1988 | 2000 | GMC T15/Sonoma 4x4 Pickup |
| | | | 1998 | 2000 | Isuzu Hombre 4x4 Pickup |
| 1985 | GMC C15/R15 Pickup | 1.23 | 1981 | 1987 | GMC C15/R15 Pickup |
| 1991 | GMC Sierra C1500 Pickup | 1.16 | 1988 | 1998 | GMC Sierra C1500 Pickup |
| 1987 | GMC K35/V35 4x4 Pickup | 1.21 | 1985 | 1988 | GMC K35/V35 4x4 Pickup |
| 1991 | Isuzu 4x4 P'up Standard Bed | 1.16 | 1988 | 1995 | Isuzu 4x4 P'up Standard Bed |
| 1986 | Isuzu P'up Standard Bed | 1.27 | 1982 | 1987 | Isuzu P'up Standard Bed |
| 1984 | Mazda B2000 | 1.21 | 1981 | 1984 | Mazda B2000 |
| [71] | Nissan Longbed Pickup | 1.20 | 1986 | 1995 | 8109 Nissan Longbed Pickup |
| 2001 | Nissan Frontier 4x2 Pickup | 1.14 | 1998 | 2001 | Nissan Frontier 4x2 Pickup |
| 2001 | Nissan Frontier 4x4 Pickup | 1.13 | 1998 | 2003 | Nissan Frontier 4x4 Pickup |
| 1998 | Nissan Frontier King Cab Pickup | 1.17 | 1998 | 2003 | Nissan Frontier King Cab Pickup |
| 1987 | Nissan King Cab Pickup | 1.17 | 1986 | 1997 | Nissan King Cab Pickup |
| 1988 | Nissan Std-Bed 4x4 Pickup | 1.11 | 1986 | 1997 | Nissan Std-Bed 4x4 Pickup |
| | | | 1986 | 1988 | Nissan Longbed 4x4 Pickup |
| | | | 1986 | 1997 | Nissan King Cab 4x4 Pickup |
| 1985 | Nissan Standard-Bed Pickup | 1.22 | 1984 | 1986 | Nissan Standard-Bed Pickup |
| 1988 | Nissan Standard-Bed Pickup | 1.16 | 1987 | 1988 | Nissan Standard-Bed Pickup |
| 1989 | Nissan Standard-Bed Pickup | 1.17 | 1989 | 1997 | Nissan Standard-Bed Pickup |
| 1980 | Toyota 4x4 Longbed Pickup | 1.07 | 1981 | 1983 | Toyota 4x4 Longbed Pickup |

[71] Literature states 1986 – 95 Nissan Longbed Pickup had 1.20 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| [72] | Toyota 4x4 Longbed Pickup | 1.07 | 1984 | 1992 | Toyota 4x4 Longbed Pickup |
| | | | 1989 | 1995 | Toyota 4x4 Pickup Xcab Longbed |
| 1986 | Toyota 4x4 Pickup Shortbed | 1.08 | 1984 | 1995 | Toyota 4x4 Pickup Shortbed |
| 1989 | Toyota Pickup Longbed | 1.26 | 1984 | 1993 | Toyota Pickup Longbed |
| 1986 | Toyota Pickup Shortbed | 1.23 | 1984 | 1987 | Toyota Pickup Shortbed |
| 1988 | Toyota Pickup Shortbed | 1.24 | 1988 | 1995 | Toyota Pickup Shortbed |
| 1986 | Toyota Pickup Xtracab Longbed | 1.23 | 1986 | 1995 | Toyota Pickup Xtracab Longbed |
| 2003 | Toyota Tacoma Extended Cab 4x4 | 1.12 | 2001 | 2003 | Toyota Tacoma Extended Cab 4x4 |
| [73] | Toyota Tacoma Pickup | 1.26 | 1995 | 2003 | Toyota Tacoma Pickup |
| | | | 1995 | 2003 | Toyota Tacoma Pickup Xtracab |
| 2002 | Toyota Tundra Access Cab 4x2 | 1.16 | 2000 | 2003 | Toyota Tundra Access Cab 4x2 |
| 2001 | Toyota Tundra Extended Cab 4x4 | 1.15 | 2000 | 2003 | Toyota Tundra Extended Cab 4x4 |

[72] Literature states 1989 – 94 Toyota Longbed Pickup had 1.07 SSF; exact model year of test vehicle not specified.
[73] Literature states 1995 – 98 Tacoma Pickup had 1.26 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | |
|---|---|---|---|---|
| Model Year | Make/Model | | Model years | Make/Model |
| ***Minivans*** | | | | |
| 2001 | Chrysler Voyager | 1.20 | 2001 2003 | Chrysler Voyager |
| 1992 | Dodge Caravan Cargo | 1.23 | 1991 1995 | Dodge Caravan Cargo |
| 1987 | Dodge Caravan | 1.13 | 1985 1987 | Dodge Caravan |
| | | | 1985 1987 | Plymouth Voyager |
| 1988 | Dodge Caravan | 1.18 | 1988 1990 | Dodge Caravan |
| | | | 1988 1990 | Plymouth Voyager |
| 1991 | Dodge Caravan | 1.22 | 1991 1991 | Dodge Caravan |
| 1992 | Dodge Caravan | 1.20 | 1992 1995 | Dodge Caravan |
| 1998 | Dodge Caravan | 1.25 | 1996 2000 | Dodge Caravan |
| | | | 1996 2000 | Plymouth Voyager |
| 1991 | Plymouth Voyager | 1.22 | 1991 1991 | Plymouth Voyager |
| 1992 | Plymouth Voyager | 1.22 | 1992 1995 | Plymouth Voyager |
| 1990 | Plymouth Grand Voyager | 1.21 | 1988 1990 | Plymouth Grand Voyager |
| | | | 1988 1990 | Dodge Grand Caravan |
| 1991 | Plymouth Grand Voyager | 1.20 | 1991 1995 | Plymouth Grand Voyager |
| | | | 1991 1995 | Dodge Grand Caravan |
| | | | 1991 1995 | Dodge Caravan Cargo Ext |
| 1998 | Plymouth Grand Voyager | 1.22 | 1996 2000 | Plymouth Grand Voyager |
| | | | 1996 2000 | Dodge Grand Caravan |
| 2001 | Dodge Grand Caravan | 1.23 | 2001 2003 | Dodge Grand Caravan |
| | | | 2001 2003 | Chrysler Town & Country LX |
| 1992 | Ford Aerostar 4x4 Extended Wagon | 1.13 | 1990 1997 | Ford Aerostar 4x4 Extended Wagon |
| 1986 | Ford Aerostar Wagon | 1.11 | 1986 1987 | Ford Aerostar Wagon |
| 1988 | Ford Aerostar Wagon | 1.11 | 1988 1997 | Ford Aerostar Wagon |
| 1992 | Ford Aerostar 4x4 Wagon | 1.15 | 1990 1994 | Ford Aerostar 4x4 Wagon |
| 1988 | Ford Aerostar Cargo Van | 1.10 | 1986 1997 | Ford Aerostar Cargo Van |
| | | | 1989 1994 | Ford Aerostar Ext Van |
| [74] | Ford Windstar Wagon | 1.24 | 1995 1998 | Ford Windstar |
| 2001 | Ford Windstar | 1.26 | 1999 2003 | Ford Windstar |
| 2001 | Mercury Villager Van | 1.27 | 2001 2002 | Mercury Villager Van |
| 1988 | Chevrolet Astro Passenger Van | 1.12 | 1985 1992 | Chevrolet Astro Van |
| | | | 1985 1992 | GMC Safari Pass Van |
| | | | 1985 1992 | GMC Safari Cargo Van |
| | | | 1990 1992 | Chevrolet Astro Ext Psgr Van |
| | | | 1990 1992 | Chevrolet Astro Ext Cargo Van |
| | | | 1990 1992 | GMC Safari Ext Pass Van |
| | | | 1990 1992 | GMC Safari Ext Cargo Van |

[74] Literature states 1995 – 98 Windstar had 1.24 SSF; exact model year of test vehicle not specified.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| 1998 | Chevrolet Astro Passenger Van | 1.13 | 1993 | 1994 | Chevrolet Astro Van |
| | | | 1993 | 1994 | GMC Safari Pass Van |
| | | | 1993 | 1994 | GMC Safari Cargo Van |
| | | | 1993 | 2002 | Chevrolet Astro Ext Cargo Van |
| | | | 1993 | 2003 | Chevrolet Astro Ext Psgr Van |
| | | | 1993 | 2003 | GMC Safari Ext Pass Van |
| | | | 1993 | 2003 | GMC Safari Ext Cargo Van |
| 1990 | Chevrolet Lumina APV | 1.13 | 1990 | 1996 | Chevrolet Lumina APV |
| | | | 1990 | 1996 | Olds Silhouette |
| | | | 1990 | 1996 | Pontiac Trans Sport |
| | | | 1992 | 1996 | Chevrolet APV Cargo Van |
| 1998 | Chevrolet Venture Van | 1.18 | 1997 | 2003 | Chevrolet Venture Van |
| | | | 1997 | 1998 | Pontiac Trans Sport |
| | | | 1999 | 1999 | Pontiac Montana |
| 2001 | Oldsmobile Silhouette | 1.18 | 1997 | 2003 | Oldsmobile Silhouette |
| 2001 | Honda Odyssey | 1.32 | 1999 | 2003 | Honda Odyssey |
| 2002 | Kia Sedona Van | 1.25 | 2002 | 2003 | Kia Sedona Van |
| 2001 | Mazda MPV | 1.21 | 2000 | 2003 | Mazda MPV |
| 1991 | Mazda MPV 4x4 Wagon | 1.16 | 1989 | 1998 | Mazda MPV 4x4 Wagon |
| 1989 | Mazda MPV Cargo Van | 1.17 | 1989 | 1992 | Mazda MPV Cargo Van |
| | | | 1989 | 1998 | Mazda MPV Wagon |
| 1987 | Nissan Van | 1.02 | 1987 | 1990 | Nissan Van |
| 1987 | Toyota Cargo Van | 1.05 | 1985 | 1989 | Toyota Cargo Van |
| [75] | Toyota Passenger Van 4WD | 1.08 | 1987 | 1989 | Toyota Passenger Van 4WD |
| | | | 1987 | 1989 | Toyota Cargo 4x4 Van |
| 1986 | Toyota Passenger Van | 1.11 | 1985 | 1989 | Toyota Passenger Van |
| 1991 | Toyota Previa Van 2WD/4WD | 1.23 | 1991 | 1997 | Toyota Previa Van |
| 2001 | Toyota Sienna | 1.25 | 1998 | 2003 | Toyota Sienna |
| 1984 | VW Vanogan Van | 1.03 | 1985 | 1991 | VW Vanogan Van |
| | | | 1985 | 1987 | VW Vanogan Kombi |
| | | | 1985 | 1991 | VW Camper+R33 |
| | | | 1990 | 1991 | VW Multi-Van |

[75] 1.08 SSF is average of 1987 (1.048) and "1984-90" (1.11) vehicles.

| Test Vehicle | | SSF | SSF Also Applies to | | |
|---|---|---|---|---|---|
| Model Year | Make/Model | | Model years | | Make/Model |
| ***Full-Size Vans*** | | | | | |
| 1987 | Dodge B150 Ram Van | 1.09 | 1985 | 1997 | Dodge B150 Ram Van |
| 2001 | Dodge B150 Ram Van | 1.14 | 1998 | 2003 | Dodge B150 Ram Van |
| 2001 | Ford E-150 | 1.11 | 1992 | 2003 | Ford E-150 |
| 1984 | Ford E-150 Club Wagon | 1.09 | 1985 | 1985 | Ford E-150 Club Wagon |
| 1987 | Ford E-150 Club Wagon | 1.11 | 1986 | 1991 | Ford E-150 Club Wagon |
| 1998 | Ford E-150 Club Wagon | 1.11 | 1992 | 2003 | Ford E-150 Club Wagon |
| 1988 | Chevrolet G10 Pass Van | 1.08 | 1985 | 1993 | Chevrolet G10 Pass Van |
| | | | 1985 | 1995 | Chevrolet G20 Pass Van |
| | | | 1985 | 1993 | GMC G10 Pass Van |
| | | | 1985 | 1995 | GMC G20 Pass Van 85-95 |

DOT HS 809 868
June 2005

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**