Consumers Union
NONPROFIT PUBLISHER OF CONSUMER REPORTS

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**Comments of Consumers Union of the U.S. Inc.**
**to the U.S. Department of Transportation**
**National Highway Traffic Safety Administration**
**In response to Notice of Proposed Rulemaking**
**49 C.F.R. Part 523, 533, and 537**
**Docket Number 2005-22223**
**RIN 2127-AJ61**
**Average Fuel Economy Standards for Light Trucks**

Introduction

Consumers Union (CU), publisher of *Consumer Reports* Magazine, submits the attached documents to inform the agency of its recently completed analysis of vehicle fuel economy. Attached is: (1) A report entitled, "An In-Depth Comparison of Consumers Union's Passenger Vehicle Average MPG Estimates With Those Published by EPA and NHTSA" (August 11, 2005); and (2) "Fuel Economy, Why you're not getting the MPG you Expect" (*Consumer Reports*, October 2005), based in part, on the above report.

Key Findings of August 11, 2005 Study

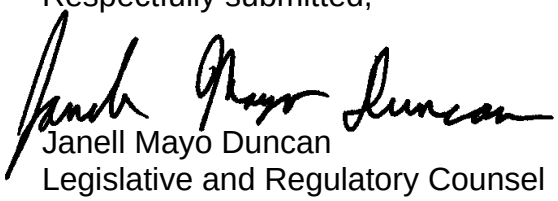
In a study of 303 cars and trucks, model years 2000 to 2006, *Consumer Reports* testing revealed that shortfalls in overall mpg occurred in 274 vehicles. According to these numbers, 90 percent of the cars we tested appear to have EPA stickers that over promise fuel economy. The largest discrepancies involved city driving, with some models falling short of claimed mpg by 35 to 50 percent. Our review found that EPA ratings were inaccurate, and concluded, in part, that EPA testing procedures do not accurately reflect today's consumer driving habits. In addition, the study finds that the EPA's "adjusted numbers," while inaccurate, were more accurate than Congressionally mandated unadjusted EPA numbers used by NHTSA for CAFE purposes.

Urgent Need for reform of CAFE Standard

According to the results of the *Consumer Reports* study, only one in ten of the vehicles consumers drive actually achieve fuel economies at or above that advertised on window-stickers. The vast majority of consumers therefore typically pay hundreds of dollars more per year to operate their vehicles than promised. This shortfall, coupled with daily increases in gas prices, is becoming an unsustainable burden for many consumers. The study findings also indicate that car makers fail to meet CAFE levels because of the EPA's unrealistic data and NHTSA's inappropriate methods of calculation. We believe that if more accurate mpg figures were used by NHTSA to rate CAFE compliance, most automakers likely would fail to meet the standards.

CU currently is reviewing NHTSA's Notice of Proposed Rulemaking to reform CAFE, NHTSA Docket No. 2005-22223, 70 Fed. Reg. 52413 (August 30, 2005). "Light Trucks, Average Fuel Economy; Model Years 2008-2011." Upon completion of our analysis, we may elect to provide additional technical comments during the comment period.

Respectfully submitted,



Janell Mayo Duncan
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**ATTACHMENT 1**


# AN IN-DEPTH COMPARISON OF CONSUMERS UNION'S PASSENGER VEHICLE AVERAGE MPG ESTIMATES WITH THOSE PUBLISHED BY EPA AND NHTSA

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## INTRODUCTION

Consumers Union (CU) has had a longstanding public concern about the national need to require better vehicle fuel economy across the fleet of passenger vehicles. America's dependence on foreign oil is a national security concern. The fact that two-thirds of the oil consumed in the United States today is used for passenger vehicles tells us that the nation needs to accurately assess and improve fuel efficiency to the maximum extent possible, consistent with what is technologically and economically feasible. We are also concerned with the effects of ever-increasing emissions on air quality, on the environment, and the increased threat of global warming. All of these problems make accuracy in fuel economy ratings more immediate than ever.

Currently, the Environmental Protection Agency (EPA) uses a dynamometer-based testing system to estimate city and highway miles per gallon (MPG), and uses these to compute an overall MPG estimate. The city and highway estimates are based on an urban/suburban/highway driving cycle that was developed in the 1970s and replicated the type of driving conditions that were typical then. Today, the driving conditions are very different; there is more freeway driving, both cruising and stop-and-go in rush hour traffic. Highways are generally posted for 55 mph and, although many sections of the U.S. interstate system are restricted by a 55-mph speed limit, there are numerous sections posted for 65 mph and higher. The EPA recognizes that its preliminary fuel economy estimates are overstated, and downweights them for posting on new vehicles at the point of sale. Despite this, Congress has mandated that the National Highway Traffic Safety Administration (NHTSA) use the preliminary, unadjusted estimates to evaluate compliance with Corporate Average Fuel Economy (CAFE) standards. (See the NHTSA website at www.nhtsa.dot.gov for a detailed description of the CAFE system.) This approach forces CAFE assessments yet further away from real-world experience.

As part of our ongoing product testing program, CU tests approximately 60 new vehicle models each year. We publish the results in Consumer Reports (CR) magazine and on our website, www.ConsumerReports.org. Our ratings include an evaluation, via road and track tests, of the fuel economy of all the vehicles we rate. These testing procedures, outlined below, are designed to replicate real-world driving patterns, and are intended to include factors like the higher levels of urban congestion existing today. CU measures the actual amount of fuel consumed by the vehicle during its controlled road tests by inserting an accurate fuel meter into the vehicle's fuel system. We believe these fuel economy estimates better reflect real-world driving conditions than those developed by the EPA. Although we accept the basic EPA dynamometer testing system, CU recommends that the EPA conduct a new analysis to re-map the urban/suburban/highway driving cycle to more closely replicate today's driving conditions so that their fuel mileage figures will more closely represent what a typical driver can expect to achieve.

In this paper, we seek to accomplish three specific goals: (1) to compare the CR and EPA fuel economy estimates; (2) to evaluate the uniformity of any differences across

model categories; and (3) to estimate how well the CAFE system reflects consumer experience and actual fuel consumption across the new vehicle fleet.

## SUMMARY OF KEY CONCLUSIONS

Our in-depth analysis of 303 vehicles from model years 2000 thru 2006 tested by CU shows that 274 models delivered lower fuel economy using CU's tests than that promised by the EPA sticker. Only 29 models achieved fuel economies as good as or better than EPA estimates. Hence, 90% of the vehicles tested had EPA stickers that overpromised the vehicle's fuel economy to the consumer. In today's consumer gasoline market, this is especially significant. While we recognize that the auto market has many more models than the 303 we tested, these are mainstream, higher-volume models and account for a large percentage of new vehicle sales. (For example, the 156 vehicles that were either manufactured in 2003, or were essentially the same as a vehicle manufactured in 2003, accounted for more than 42% of the 2003 model year sales.)

Of the 303 vehicles tested by CU, 293 were powered by conventional gas engines, four by diesel engines, and six by hybrid systems. For conventional gas-powered vehicles, the average overall fuel economy estimates (listed or implied on the EPA stickers) are approximately 2.0 MPG (10.3%) higher than the levels obtained by CU, with individual differences ranging from -4.7 MPG to 5.3 MPG; for diesel and hybrid powered vehicles, the average differences are even higher: 11.5 MPG (27.1%) for smaller hybrids, 5.6 MPG (21.4%) for larger hybrids, and 4.7 MPG (18.8%) for diesels. These findings echo the letters we receive from consumers complaining that their vehicle's real-world fuel economy was lower than the EPA sticker's value.

Further examination shows that the differences in overall MPG between the EPA's and CR's estimates are largely due to differences in the city MPG estimates. In particular, the EPA City estimates are approximately 5.9 MPG (44.2%) higher than the CR City estimates for conventional gas-powered vehicles, 11.3 MPG (62.3%) higher for diesel powered vehicles, 23.5 MPG (74.7%) higher for smaller hybrid powered vehicles, and 11.0 MPG (55.6%) higher for larger hybrid powered vehicles. On the other hand, the EPA Highway estimates are 2.5 MPG (8.5%) lower than the CR Highway estimates for conventional gas-powered vehicles, 2.3 MPG (4.3%) lower for diesel powered vehicles, and 0.8 MPG (1.1%) higher for small hybrid powered vehicles. There were no difference between the EPA and CR Highway estimates for larger hybrid powered vehicles.

One of the most significant findings of our analysis is that the estimated 2003 model year fleet average based on the individual fuel economy estimates used by NHTSA is more than 30% higher than the corresponding estimated fleet average based on the CR estimates. (This was the most recent model year for which sales data was available from NHTSA at the time of this analysis.) This would indicate that the nation is using far more fuel than envisioned by Congress through the use of the CAFE system.

## CONSUMERS UNION'S TESTING PROCEDURES

CU's fuel economy testing procedures are designed to replicate real-world driving patterns, and are intended to reflect factors like the higher levels of urban congestion existing today than when EPA's tests were originally implemented 30 or more years ago. Three different tests are conducted by CU: city, highway, and one-day trip of mixed driving (referred to as the 150-mile test). In order to minimize test variability, all vehicles are pre-conditioned to a minimum of 2,000 miles on the odometer. They are parked overnight in our shop prior to testing. Tire pressures are set to the vehicle manufacturer's recommended pressures and the fuel tank is filled at the start of each test. All testing is done at an ambient temperature at or above 32 degrees Fahrenheit with winds not to exceed 15 mph and no precipitation. Air conditioning is turned off. A fuel flow meter with readout in the cabin of the vehicle is used to measure fuel consumption. The fuel meter is zeroed at the start of each leg of the test. The ambient temperature is measured at the start and finish of each test.

The CU city fuel economy tests are run on a one mile course precisely marked out on our test track. It is a stop-and-go city driving simulation that has three stops, includes 40 seconds of total idle time, and 40 mph is the top speed reached. We use two different drivers, and they each do three runs on every test vehicle. All six runs are averaged together and are corrected (SAE) for ambient temperature. Each run is timed and limited to 2 minutes and 40 seconds +/- 3 seconds. The in-line fuel meter measures fuel consumption to the nearest cubic centimeter (cc). The resulting city fuel economy number (in MPG) is rounded and published to the nearest whole number.

The CU highway fuel economy test is run on a specific section of Route 2 in Connecticut. The course is driven at a constant 65 mph and is 5.0 miles long. The test consists of eight runs, two east and two west runs by each of two drivers. The test is run in both directions to limit the effects of wind and grade differences. An in-line fuel meter measures fuel consumption to the nearest cubic centimeter. All eight runs are averaged together and corrected (SAE) for ambient temperature. Each run is timed and limited to 4 minutes and 38 seconds +/- 3 seconds. The resulting highway fuel economy number (in MPG) is rounded and published to the nearest whole number.

The CU one-day trip fuel economy test is conducted over a 31 mile route that includes 26% (8.2 miles) freeway, 11% (3.6 miles) highway, and 63% (19.2 miles) stop-and-go driving conditions. This test is done with five different engineers back to back on the same day. An in-line fuel meter measures fuel consumption to the nearest cubic centimeter. As before, all runs are averaged together and corrected (SAE) for average temperature during the trip, then rounded to the nearest whole number. The CR Overall MPG estimate is calculated as an equally weighted harmonic average of the city, highway, and one-day trip estimates.

## The Data

Two datasets were used in our analysis; one from CR and one from NHTSA. The dataset from CR contains information on 303 vehicles from model years 2000 thru 2006 tested at CU's Auto Test Center (ATC) and is provided in Appendix A. In addition to the published test information, the CR dataset contains published EPA City and Highway sticker estimates. The dataset from NHTSA contains information for the entire U.S. passenger fleet of 960 model year 2003 vehicles, including sales figures and various attributes. (This was the most recent model year available at the time of this analysis.) This dataset also contains EPA MPG estimates used for CAFE calculations. These estimates are higher than those found on new vehicle stickers because:

1. The EPA adjusts the city and highway MPG estimates from its dynamometer tests to reflect its perception of consumer experience. The adjusted city estimate is 90% of the unadjusted value and the adjusted highway estimate is 78% of the unadjusted value. (As mandated by Congress, NHTSA is required to use the unadjusted EPA estimates for CAFE purposes, thereby inflating the CAFE estimates.)

2. NHTSA gives a credit for vehicles that run on alternative fuels.

To avoid confusion, the EPA data referred to in this report, unless otherwise stated, refer to the downweighted MPG estimates used on new car stickers. The CAFE data refer to the preliminary, raw EPA estimates adjusted for credits given to alternative fuel vehicles. CU did not test any alternative fuel vehicles.

## Comparison of MPG Estimates

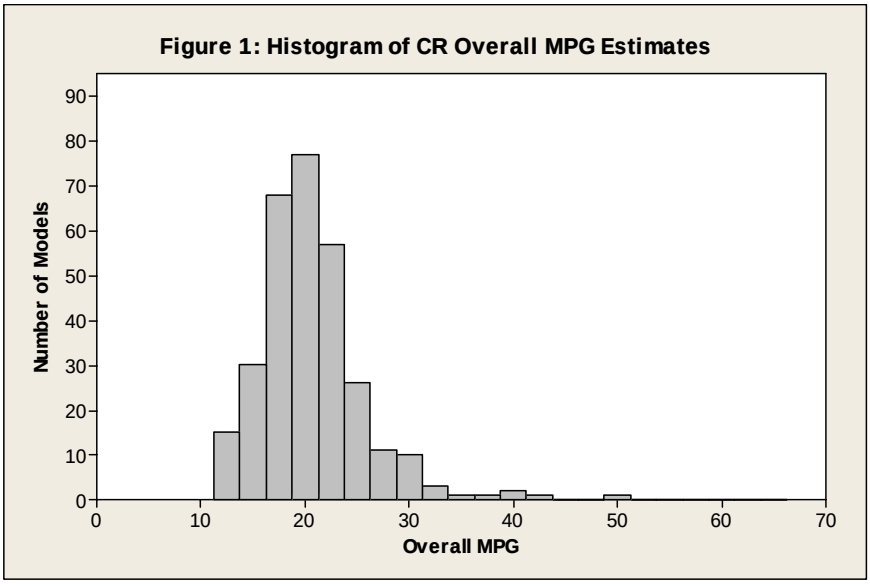
The following figures display histograms of the individual MPG data. Figures 1 and 2 show the distribution of the CR Overall MPG and EPA Overall MPG estimates for the 303 new vehicles from model year 2000 to model year 2006. With the exception of the Toyota Echo, the observations with the highest overall MPG estimates (in the right tails of the histograms) are for diesel and hybrid powered vehicles.

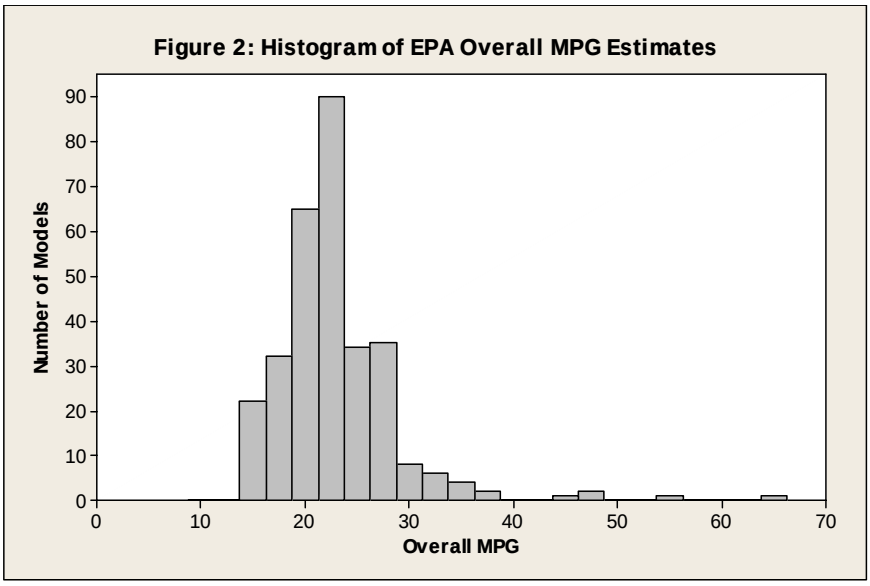
As previously discussed, the CR Overall MPG estimates were calculated as an equally weighted harmonic average of the CR City, CR Highway, and CR 150-mile MPG estimates:

$$CR_{Overall} = \frac{1}{\frac{1/3}{CR_{City}} + \frac{1/3}{CR_{Highway}} + \frac{1/3}{CR_{150}}}.$$

Likewise, the EPA Overall MPG estimates were calculated as a harmonic average of the EPA City and EPA Highway MPG estimates in accordance with the definition used by EPA:

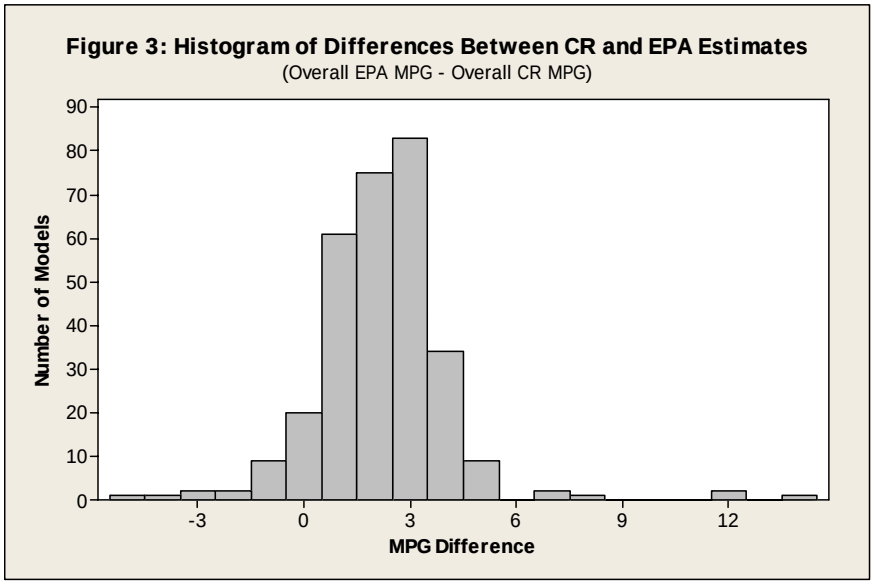
$$EPA_{Overall} = \frac{1}{\frac{0.55}{EPA_{City}} + \frac{0.45}{EPA_{Highway}}}.$$




The individual EPA City and Highway estimates used in this calculation were obtained from the sticker on the vehicle tested by CU. (For purposes of this analysis, the CR and EPA Overall MPG estimates were calculated to the nearest 0.1 MPG.)

Figure 3 displays a histogram of the difference between the EPA Overall MPG and CR Overall MPG estimates, i.e., EPA Overall MPG minus CR Overall MPG.




Examination of the data shows that the four vehicles with the largest differences are all smaller-sized hybrid cars. Although not as extreme, the differences for the two larger-sized hybrids (Ford Escape and Honda Accord) were 4.6 and 6.5 MPG, respectively. In addition, the differences for the four diesel vehicles ranged from 2.8 to 6.8 MPG.

Figure 4 displays a histogram of the MPG differences as a percentage of the CR MPG estimate. As would be expected, the percentage differences show fewer extreme outliers since the larger differences in Figure 3 are associated with the higher MPG vehicles.

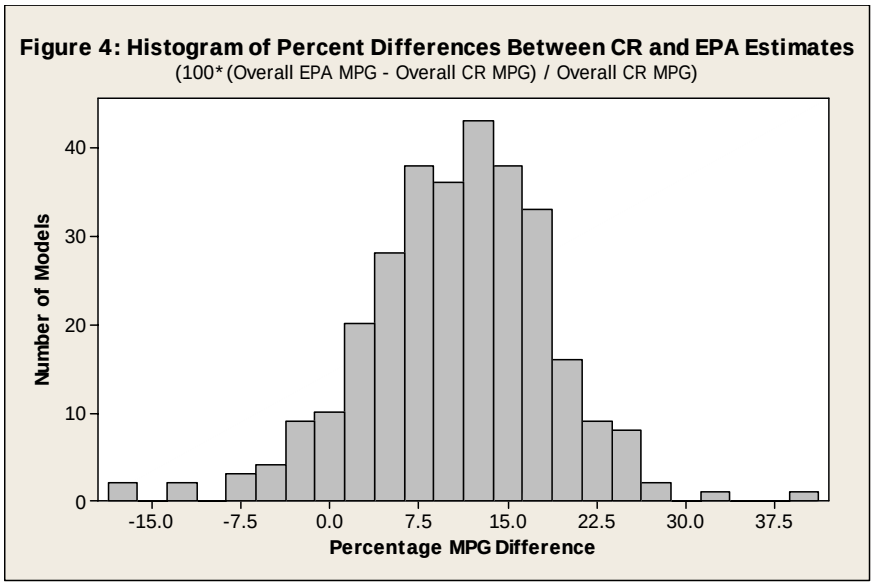
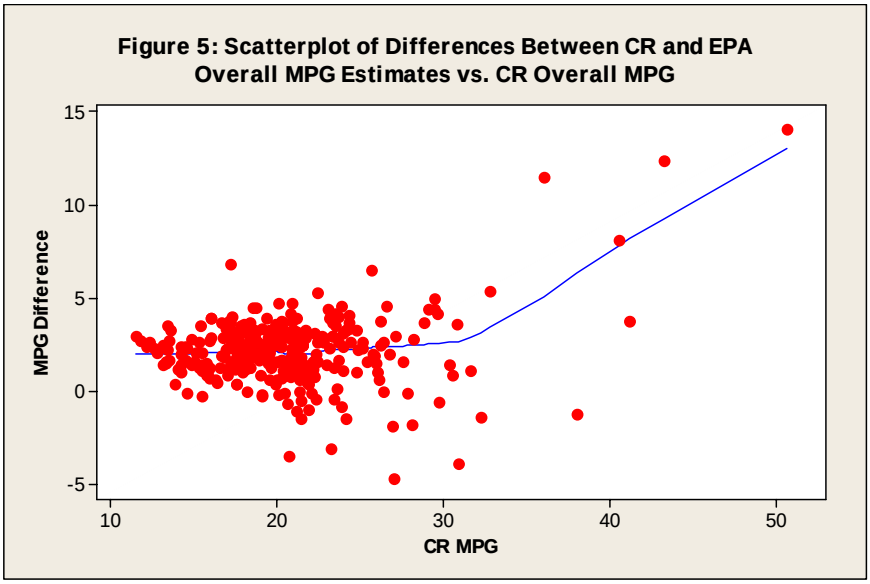



Figure 5 is a scatterplot of the differences between the CR and EPA MPG estimates plotted against the CR Overall MPG estimates. The smooth line is a lowess curve (locally weighed scatterplot smoothing) which shows the trend in the relationship

between the MPG differences and CR Overall MPG. (A lowess curve is a non-parametric smoothed curve fit to the data to explore the relationship between two continuous variables.) Note that the lowess curve is approximately horizontal up to about 30 MPG, suggesting that the average of the MPG differences is approximately constant, i.e., it does not increase as CR Overall MPG increases. (The increasing trend beyond 30 MPG is due to the larger differences between EPA and CR for hybrid and diesel powered vehicles.) However, the scatterplot itself also shows an increase in variability as a function of CR Overall MPG.




The following tables show the average CR Overall and EPA Overall MPG estimates for the 303 vehicles tested by CU. (Fleet average estimates will be discussed later.) Table 1a shows the averages by model year for conventional gas-powered vehicles. Despite the somewhat different sampling by CU of vehicle categories from year to year, and the low percentage of available models selected for testing in any given year, Table 1a shows that the average MPG differences are relatively consistent over the time period examined. The last column labeled 'Average % Difference' in this table represents the average of the individual vehicle percentage differences, not the percent difference between the average EPA Overall and CR Overall MPG estimates.

Tables 1b thru 1d show the MPG differences for vehicles powered with hybrid, diesel, and conventional gas engines. As mentioned previously, the hybrids were separated into smaller and larger size vehicles.

As shown in Table 1b, the average EPA Overall MPG estimate for conventional gas-powered vehicles is 2.0 MPG (10.3%) higher than the corresponding CR estimate, with individual vehicle MPG differences ranging from a low of -4.7 MPG to a high of 5.3 MPG. The average EPA Overall MPG estimate for the four smaller hybrid vehicles is approximately 11.5 MPG (27.1%) higher than the corresponding CR estimate. The average EPA Overall MPG estimate for the two larger hybrids is approximately 5.6 MPG

(21.4%) higher than the corresponding CR estimate. And the average EPA Overall MPG estimate for the four diesel vehicles is approximately 4.7 MPG (18.8%) higher than the corresponding CR estimate.

**Table 1a: Overall MPG* by Model Year**

| Model Year | # Models | CR | EPA | Average MPG Difference | Average %Difference |
|---|---|---|---|---|---|
| 2000 | 40 | 21.8 | 23.2 | 1.4 | 7.1 |
| 2001 | 45 | 18.9 | 20.8 | 1.9 | 10.4 |
| 2002 | 44 | 20.6 | 22.1 | 1.5 | 8.0 |
| 2003 | 50 | 19.9 | 22.1 | 2.3 | 11.8 |
| 2004 | 62 | 20.6 | 22.5 | 1.9 | 10.0 |
| 2005 | 49 | 19.9 | 22.5 | 2.6 | 13.4 |
| 2006 | 3 | 17.7 | 20.3 | 2.5 | 14.3 |
| Total | 293 | 20.2 | 22.2 | 2.0 | 10.3 |
| Light Truck | 102 | 16.6 | 18.7 | 2.1 | 12.7 |
| Passenger Car | 191 | 22.1 | 24.0 | 1.9 | 9.0 |

* Excluding hybrid and diesel vehicles

**Table 1b: Average Overall MPG by Vehicle Type**

| Category | # Models | CR | EPA | Average MPG Difference | Average % Difference |
|---|---|---|---|---|---|
| Diesel | 4 | 29.8 | 34.5 | 4.7 | 18.8 |
| Smaller Hybrid | 4 | 42.6 | 54.1 | 11.5 | 27.1 |
| Larger Hybrid | 2 | 26.1 | 31.6 | 5.6 | 21.4 |
| Conventional | 293 | 20.2 | 22.2 | 2.0 | 10.3 |

**Table 1c: Average City MPG by Vehicle Type**

| Category | # Models | CR | EPA | Average MPG Difference | Average % Difference |
|---|---|---|---|---|---|
| Diesel | 4 | 20.0 | 31.3 | 11.3 | 62.3 |
| Smaller Hybrid | 4 | 31.8 | 55.3 | 23.5 | 74.7 |
| Larger Hybrid | 2 | 20.0 | 31.0 | 11.0 | 55.6 |
| Conventional | 293 | 13.8 | 19.7 | 5.9 | 44.2 |

**Table 1d: Average Highway MPG by Vehicle Type**

| Category | # Models | CR | EPA | Average MPG Difference | Average % Difference |
|---|---|---|---|---|---|
| Diesel | 4 | 42.0 | 39.8 | -2.3 | -4.3 |
| Smaller Hybrid | 4 | 52.5 | 53.3 | 0.8 | 1.1 |
| Larger Hybrid | 2 | 33.0 | 33.0 | 0.0 | 0.0 |
| Conventional | 293 | 28.8 | 26.3 | -2.5 | -8.5 |

As shown in Table 1c, the average EPA City MPG estimate for conventional gas-powered vehicles is 5.9 MPG (44.2%) higher than the corresponding CR estimate. The average EPA City MPG estimate for the smaller hybrids is approximately 23.5 MPG (74.7%) higher than the corresponding CR estimate. The average EPA City MPG estimate for the larger hybrids is 11.0 MPG (55.6%) higher than the corresponding CR estimate. The average EPA City MPG estimate for the diesels is 11.3 MPG (62.3%) higher than the corresponding CR estimate.

As shown in Table 1d, the average EPA Highway MPG estimate for conventional gas-powered vehicles is 2.5 MPG (8.5%) lower than the corresponding CR estimate. The average EPA Highway MPG estimate for the smaller hybrids is approximately 0.8 MPG (1.1%) higher than the corresponding CR estimate. There was no difference between the average EPA and CR Highway estimates for larger hybrids. Finally, the average EPA Highway MPG estimate for diesels is 2.3 MPG (4.3%) lower than the corresponding CR estimate

Table 1e provides approximate 95% confidence intervals for the average city, highway, and overall MPG differences, together with the corresponding average percent differences:

**Table 1e: Approximate 95% Confidence Intervals**

| | | MPG Difference | | | Percent MPG Difference | | |
|---|---|---|---|---|---|---|---|
| **Category** | **# Models** | **Lower CL** | **Average** | **Upper CL** | **Lower CL** | **Average** | **Upper CL** |
| City | 293 | 5.7 | 5.9 | 6.1 | 43.0 | 44.2 | 45.8 |
| Highway | 293 | -2.7 | -2.5 | -2.3 | -9.1 | -8.5 | -7.8 |
| Overall | 293 | 1.8 | 2.0 | 2.1 | 9.4 | 10.3 | 11.1 |

* Excluding hybrid and diesel vehicles

In all cases, the confidence intervals do not contain zero, hence we can conclude that there is a statistically significant difference between the EPA and CR estimates.

### VARIATION IN MAGNITUDE OF EPA "OVERESTIMATE" RELATIVE TO CR

In this section we explore the differences in MPG estimates in further detail by examining the relationship between the magnitude of the differences relative to vehicle category (as defined by CU). Since the MPG differences are defined as EPA minus CR, a positive number indicates an overestimate by EPA relative to the CR value and a negative number indicates an underestimate.

Table 2 shows the extent of EPA overestimate/underestimate of Overall MPG with respect to the CR estimate of Overall MPG by CR vehicle category. The observed values represent the number of models in each of the overestimate/underestimate categories, while the expected values represent the expected count assuming

independence between CR Category and the amount of overestimation/ underestimation.

**Table 2: EPA Overestimate/Underestimate vs. CR Catagory**

| CR Vehicle Category | Count | MPG Overestimate | | | | Total |
|---|---|---|---|---|---|---|
| | | < -1 | -1 to 1 | 1 to 3 | > 3 | |
| **Smaller Hybrid** | Observed | 0 | 0 | 0 | 4 | 4 |
| | Expected | 0.1 | 0.6 | 2.1 | 1.1 | |
| **Larger Hybrid** | Observed | 0 | 0 | 0 | 2 | 2 |
| | Expected | 0.1 | 0.3 | 1.0 | 0.6 | |
| **Diesel** | Observed | 0 | 0 | 1 | 3 | 4 |
| | Expected | 0.1 | 0.6 | 2.1 | 1.1 | |
| **Small wagon** | Observed | 0 | 0 | 2 | 4 | 6 |
| | Expected | 0.2 | 1.0 | 3.1 | 1.7 | |
| **Large car** | Observed | 0 | 1 | 5 | 7 | 13 |
| | Expected | 0.5 | 2.1 | 6.8 | 3.6 | |
| **Minivan** | Observed | 0 | 0 | 10 | 7 | 17 |
| | Expected | 0.6 | 2.7 | 8.9 | 4.8 | |
| **Family car** | Observed | 0 | 7 | 31 | 23 | 61 |
| | Expected | 2.2 | 9.7 | 32.0 | 17.1 | |
| **Small sport-utility vehicle** | Observed | 0 | 2 | 16 | 6 | 24 |
| | Expected | 0.9 | 3.8 | 12.6 | 6.7 | |
| **Pickup truck** | Observed | 0 | 0 | 17 | 2 | 19 |
| | Expected | 0.7 | 3.0 | 10.0 | 5.3 | |
| **Small car** | Observed | 4 | 7 | 21 | 16 | 48 |
| | Expected | 1.7 | 7.6 | 25.2 | 13.5 | |
| **Luxury car** | Observed | 0 | 4 | 15 | 3 | 22 |
| | Expected | 0.8 | 3.5 | 11.5 | 6.2 | |
| **Midsized sport-utility vehicle** | Observed | 0 | 8 | 22 | 3 | 33 |
| | Expected | 1.2 | 5.2 | 17.3 | 9.3 | |
| **Large sport-utility vehicle** | Observed | 0 | 2 | 5 | 0 | 7 |
| | Expected | 0.3 | 1.1 | 3.7 | 2.0 | |
| **Upscale car** | Observed | 1 | 8 | 9 | 4 | 22 |
| | Expected | 0.8 | 3.5 | 11.5 | 6.2 | |
| **Sports/sporty car** | Observed | 3 | 6 | 4 | 1 | 14 |
| | Expected | 0.5 | 2.2 | 7.3 | 3.9 | |
| **Convertible** | Observed | 3 | 3 | 1 | 0 | 7 |
| | Expected | 0.3 | 1.1 | 3.7 | 2.0 | |
| **Total** | Observed | 11 | 48 | 159 | 85 | 303 |

* Shaded cells have more vehicles than expected.

The relationship between the magnitude of the MPG differences and CR vehicle category is complex and appears to be affected by many different vehicle attributes. Furthermore, this relationship differs for the city and highway estimates. However, a few general results are given here. First, Table 2 shows that for 244 of the 303 (80.5%) vehicles tested the EPA MPG estimates were overestimated by 1 or more MPG. More than a quarter of the models (85) were overestimated by at least 3 mpg. The most notable differences occurred for hybrid and diesel vehicles, which were consistently overestimated by EPA. On the other hand, sports/sporty cars and convertibles tend to be more accurately estimated, and in some cases, underestimated by the EPA.

## ESTIMATES OF THE U.S. FLEET AVERAGE MPG BY NHTSA

In the previous sections we examined individual vehicle differences between the EPA and CR MPG estimates. In this section, we compare MPG estimates for the fleet of new model year vehicles. The fleet average MPG is calculated as a weighted harmonic average of the individual vehicle MPG estimates using the individual model sales as the weights:

$$FleetMPG = \frac{\sum_{i=1}^{n} Sales_i}{\sum_{i=1}^{n} \frac{Sales_i}{MPG_i}} = \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{MPG_1} + \frac{Sales_2}{MPG_2} + \ldots + \frac{Sales_n}{MPG_n}}.$$

In this equation, $Sales_i$, i=1,2, …, n, represents the corresponding model year sales for the $i^{th}$ model and $MPG_i$ represents the MPG estimate for the $i^{th}$ model. (This formula applies regardless of which fundamental tests are used, i.e., the road and track tests used by CU or the dynamometer tests used by EPA, or which scaling is used to arrive at an estimate of fuel economy for city and highway.) In order to obtain sales data, it was necessary to merge the CR dataset with the 2003 model year NHTSA dataset, the most recent sales data available at the time this analysis was conducted.

Although many of the CR tested vehicles were not from model year 2003, in many cases the corresponding 2003 model year vehicle was either unchanged or had minor changes that would not be expected to affect the vehicle's MPG estimates measured for a version from another model year. Of the 303 vehicles in the CR database, 143 models were matched to corresponding models in the 2003 NHTSA database. An additional 13 vehicles were considered 'closely matched', i.e., these models were similar enough to models in the NHTSA 2003 dataset that their fuel economy would also be essentially the same. The descriptions of the other tested models could not be definitively matched to the NHTSA model descriptions or were new models that were unavailable in 2003. Table 3a contains the sales information for these vehicles. Examination of this table shows that the 156 matched or closely matched vehicles account for more than 42% of the 2003 model year vehicle sales.

**Table 3a: Vehicle Sales for Model Year 2003**

| Model Year | Total # Models | # Matched Models | Total Sales | Sales of Tested Vehicles | Tested Vehicle Sales as a Percentage of All Vehicles Sold |
|---|---|---|---|---|---|
| 2003 | 960 | 143 | 15,714,135 | 5,950,044 | 37.9% |
| 2003 | 960 | 156* | 15,714,135 | 6,647,160 | 42.3% |

* Includes 13 additional 'closely matched' vehicles

Table 3b contains the 2003 new vehicle fleet average MPG estimates, as well as approximate 95% confidence limits, for 143 models using the 2003 sales figures. Note that three separate fleet average estimates are given: one using the CR Overall MPG estimates (referred to as CR), one using the Overall MPG estimates obtained from the published EPA sticker estimates (referred to as EPA), and one using the MPG estimates used by NHTSA for CAFE compliance (referred to as CAFE). Once again, we can conclude that these three fleet average estimates are statistically different since their confidence intervals do not overlap. (Recall from previous discussions that the published EPA sticker estimates have been downweighted from EPA's initial estimates to reflect its perception of consumer experience.)

**Table 3b: Estimated Model Year 2003 Fleet Average MPG (143 Models)**

| | | | Estimated Model Year 2003 Fleet Average MPG | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CR | | | EPA | | | CAFE | | |
| Vehicle Category | # Matched Models | Sales of Tested Models | Lower 95% CL | CR | Upper 95% CL | Lower 95% CL | EPA | Upper 95% CL | Lower 95% CL | CAFE | Upper 95% CL |
| Light Truck | 54 | 2,322,187 | 15.3 | 16.0 | 16.7 | 17.5 | 18.1 | 18.9 | 20.6 | 21.4 | 22.3 |
| Passenger Car | 89 | 3,627,857 | 22.1 | 22.7 | 23.5 | 24.6 | 25.3 | 26.1 | 28.8 | 29.7 | 30.6 |
| Domestic | 28 | 1,558,437 | 20.6 | 21.9 | 23.3 | 23.4 | 24.7 | 26.1 | 27.4 | 28.7 | 30.3 |
| Imported | 61 | 2,069,420 | 22.7 | 23.5 | 24.3 | 24.9 | 25.8 | 26.8 | 29.2 | 30.4 | 31.5 |
| **Total** | 143 | 5,950,044 | 18.8 | 19.5 | 20.3 | 21.2 | 21.9 | 22.8 | 24.9 | 25.8 | 26.7 |

Table 3c shows the estimated percent differences between the three fleet average MPG estimates (EPA vs CR, CAFE vs EPA, and CAFE vs CR). Examination of this table shows that the EPA fleet average MPG estimate (for model year 2003) is more than 12% higher than the corresponding CR estimate. Furthermore, the CAFE fleet average MPG estimate is nearly one third higher than the corresponding CR estimate.

**Table 3c: Estimated Model Year 2003 Percent Differences in Fleet Average MPG (143 Models)**

| | | | Percent Differences in Estimated Fleet Averages | | |
|---|---|---|---|---|---|
| Vehicle Category | # Matched | Sales of | EPA vs CR | CAFE vs EPA | CAFE vs CR |
| Light Truck | 54 | 2,322,187 | 13.8% | 17.6% | 33.8% |
| Passenger Car | 89 | 3,627,857 | 11.5% | 17.4% | 30.8% |
| Domestic | 28 | 1558437 | 12.8% | 16.6% | 31.5% |
| Imported | 61 | 2069420 | 9.8% | 17.8% | 29.4% |
| **Total** | 143 | 5,950,044 | 12.3% | 17.8% | 32.3% |

We show in Appendix B that the formula used in the EPA adjustment for use on new vehicle window stickers is such that the CAFE fleet average MPG estimate must be between 11% and 28% higher than the corresponding EPA fleet average MPG estimates, i.e.,

$$1.11 \times EPA_{FleetAvgMPG} \le CAFE_{FleetAvgMPG} \le 1.28 \times EPA_{FleetAvgMPG}.$$

Tables 3d and 3e contain similar information using the 156 matched or closely matched models separated by vehicle category.

**Table 3d Estimated Model Year 2003 Fleet Average MPG (156 Models)**

| | | | Estimated Model Year 2003 Fleet Average MPG | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CR | | | EPA | | | CAFÉ | | |
| Vehicle Category | # Matched Models | Sales of Tested Models | Lower 95% CL | CR | Upper 95% CL | Lower 95% CL | EPA | Upper 95% CL | Lower 95% CL | CAFE | Upper 95% CL |
| Light Truck | 57 | 2,515,486 | 15.2 | 15.8 | 16.6 | 17.4 | 18.0 | 18.8 | 20.4 | 21.2 | 22.1 |
| Passenger Car | 99 | 4,131,674 | 22.1 | 22.7 | 23.4 | 24.6 | 25.3 | 26.0 | 28.6 | 29.4 | 30.2 |
| Domestic | 32 | 1,946,930 | 21.0 | 22.1 | 23.3 | 23.6 | 24.8 | 26.0 | 27.4 | 28.6 | 29.9 |
| Imported | 67 | 2,184,744 | 22.6 | 23.4 | 24.2 | 24.8 | 25.7 | 26.7 | 29.1 | 30.1 | 31.3 |
| **Total** | 156 | 6,647,160 | 18.8 | 19.5 | 20.3 | 21.2 | 21.9 | 22.7 | 24.8 | 25.6 | 26.5 |

**Table 3e: Estimated Model Year 2003 Percent Differences in Fleet Average MPG (156 Models)**

| | | | Percent Differences in Estimated Fleet Averages | | |
|---|---|---|---|---|---|
| Vehicle Category | # Matched Models | Sales of Tested Models | EPA vs CR | CAFE vs EPA | CAFE vs CR |
| Light Truck | 57 | 2,515,486 | 13.9% | 17.8% | 34.2% |
| Passenger Car | 99 | 4,131,674 | 11.0% | 16.7% | 29.5% |
| Domestic | 32 | 1,946,930 | 12.2% | 15.3% | 29.4% |
| Imported | 67 | 2,184,744 | 10.3% | 17.5% | 29.6% |
| **Total** | 156 | 6,647,160 | 12.3% | 16.9% | 31.3% |

Note that the results obtained by adding the additional 13 closely matched vehicles is very close to the corresponding results based on 143 exactly matched vehicles.

## CONCLUSIONS

Question 1: Do the EPA and CR MPG estimates differ statistically and systematically on an individual model basis. In other words, do these two test/estimation methodologies generate systematically different MPG estimates?

EPA and CR vehicle fuel economy estimates are substantially and statistically different from one another on average. For conventional gas-powered vehicles, the EPA Overall MPG estimates are about 10.3% higher than CR MPG estimates on average across all models and vehicle types. Based on a limited sample of models, the estimated difference for hybrids and diesels appears to be even greater.

Question 2: Is the difference between the CR and EPA estimates uniform across model categories.

The amount of difference in MPG estimates between the CR and EPA estimates does appear to depend on vehicle category. In general, the EPA overall MPG estimates for

hybrids and diesels are greatly overestimated relative to the CR estimates; those for larger vehicles are often, though not always, moderately overestimated; and those for smaller vehicles tend to be similar to or slightly less than the corresponding CR estimates. However, this relationship is complex and appears to be influenced by other vehicle attributes. Furthermore, this relationship differs for the city and highway estimates.

Question 3: Do the CR, EPA, and CAFE test methods and analytical approaches give rise to statistically different estimates of fleet average MPG?

Assuming the MPG estimates and sales figures of the tested models are representative of the fleet of model year 2003 new vehicles, the CR, EPA, and CAFE estimates for the 2003 fleet average give systematically different results since their confidence intervals do not overlap. We recognize that our calculations of fleet averages are based on less than half of the new vehicles sold in 2003. Nevertheless, the differences among them are significant and real. They raise a clear mandate for attention by NHTSA and EPA. (Although the EPA value is not a published fleet estimate, it is included here for comparative purposes.)

The consequences to the consumer as well as to society as a whole of these demonstrated differences in individual Overall MPGs and fleet Overall MPG are quite important. At the consumer level, the current rise in gasoline prices coupled with a more than 10% loss in fuel efficiency on average from that which is promised on new car stickers translates into hundreds of dollars of unanticipated increased costs to operate a motor vehicle each year. On a broader level, Congress has mandated that NHTSA achieve a specific minimum level of fuel efficiency for the entire passenger fleet. Using the current EPA estimates for individual models, NHTSA cannot help but significantly overpromise fuel efficiency of the American passenger fleet. By giving inadequate tools to the analysts and planners of our national energy policy, we run the risk of putting severe strains on U.S. fuel supplies as well as give policy makers a distorted view of our national energy needs.

## Appendix A: Consumers Union Vehicle Data

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Audi | Luxury car | Audi A6 | Conv | Nov-01 | 2001 | 2.7T sedan AWD, 2.7-liter V6 turbo, 5-speed automatic | 3915 | 1210 | 17 | 24 | 18 | 12 | 27 | 23 |
| 2 | Audi | Luxury car | Audi Allroad | Conv | Jul-01 | 2001 | Allroad wagon AWD, 2.7-liter V6 turbo, 5-speed automatic | 4275 | 1280 | 15 | 21 | 16 | 11 | 21 | 19 |
| 3 | Audi | Upscale car | Audi A4 | Conv | Mar-02 | 2002 | 3.0 sedan AWD, 3.0-liter V6, 5-speed automatic | 3745 | 1145 | 17 | 25 | 20 | 14 | 29 | 23 |
| 4 | Audi | Convertible | Audi TT | Conv | Jun-02 | 2002 | convertible AWD, 1.8-liter Four turbo, 6-speed manual | 3440 | 550 | 20 | 28 | 22 | 16 | 30 | 25 |
| 5 | Audi | Upscale car | Audi A4 | Conv | Nov-04 | 2004 | 1.8T sedan, 1.8-liter Four turbo, CVT | 3545 | 1145 | 23 | 29 | 24 | 16 | 34 | 29 |
| 6 | Audi | Sports/sporty car | Audi A4 | Conv | Sep-04 | 2004 | S4 sedan AWD, 4.2-liter V8, 6-speed manual | 3920 | 1145 | 15 | 21 | 20 | 17 | 26 | 21 |
| 7 | Audi | Luxury car | Audi A8 | Conv | Nov-03 | 2004 | L sedan AWD, 4.2-liter V8, 6-speed automatic | 4505 | 1210 | 17 | 24 | 17 | 11 | 26 | 20 |
| 8 | Audi | Luxury car | Audi A6 | Conv | Sep-05 | 2005 | 3.2 sedan AWD, 3.2-liter V6, 6-speed automatic | 4115 | 1100 | 19 | 26 | 21 | 14 | 30 | 25 |
| 9 | BMW | Midsized sport-utility vehicle | BMW X5 | Conv | Jun-00 | 2000 | 4.4i 4-door SUV AWD, 4.4-liter V8, 5-speed automatic | 4715 | 1290 | 13 | 17 | 15 | 10 | 20 | 18 |
| 10 | BMW | Upscale car | BMW 3 Series | Conv | May-01 | 2001 | 330i sedan, 3.0-liter Six, 5-speed automatic | 3390 | 1060 | 19 | 27 | 22 | 15 | 32 | 26 |
| 11 | BMW | Luxury car | BMW 5 Series | Conv | Nov-01 | 2001 | 530i sedan, 3.0-liter Six, 5-speed automatic | 3575 | 1015 | 18 | 26 | 19 | 12 | 30 | 25 |
| 12 | BMW | Luxury car | BMW 7 Series | Conv | Nov-03 | 2003 | 745Li sedan, 4.4-liter V8, 6-speed automatic | 4505 | 1060 | 18 | 26 | 18 | 11 | 28 | 21 |
| 13 | BMW | Midsized sport-utility vehicle | BMW X5 | Conv | Sep-03 | 2003 | 3.0i 4-door SUV AWD, 3.0-liter Six, 5-speed automatic | 4745 | 1260 | 16 | 21 | 17 | 12 | 26 | 20 |
| 14 | BMW | Sports/sporty car | BMW 3 Series | Conv | Sep-04 | 2004 | M3 coupe, 3.2-liter Six, 6-speed manual | 3460 | 1060 | 16 | 24 | 19 | 13 | 27 | 23 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | BMW | Luxury car | BMW 5 Series | Conv | Jun-04 | 2004 | 530i sedan, 3.0-liter Six, 6-speed automatic | 3650 | 1100 | 18 | 28 | 20 | 14 | 29 | 24 |
| 16 | BMW | Midsized sport-utility vehicle | BMW X3 | Conv | Dec-04 | 2004 | 2.5i 4-door SUV AWD, 2.5-liter Six, 5-speed automatic | 4065 | 1005 | 17 | 23 | 17 | 12 | 26 | 21 |
| 17 | BMW | Midsized sport-utility vehicle | BMW X5 | Conv | Apr-05 | 2005 | 3.0i 4-door SUV AWD, 3.0-liter Six, 5-speed automatic | 4745 | 1260 | 16 | 21 | 17 | 12 | 26 | 20 |
| 18 | Daimler-Chrysler | Small car | Dodge Neon | Conv | Sep-00 | 2000 | ES sedan, 2.0-liter Four, 3-speed automatic | 2705 | 865 | 25 | 31 | 23 | 15 | 34 | 29 |
| 19 | Daimler-Chrysler | Small wagon | Chrysler PT Cruiser | Conv | Oct-00 | 2001 | Limited wagon, 2.4-liter Four, 4-speed automatic | 3300 | 865 | 20 | 25 | 18 | 12 | 27 | 23 |
| 20 | Daimler-Chrysler | Family car | Chrysler Sebring V6 | Conv | Jun-01 | 2001 | LX sedan, 2.7-liter V6, 4-speed automatic | 3290 | 865 | 20 | 28 | 21 | 14 | 30 | 27 |
| 21 | Daimler-Chrysler | Minivan | Dodge Caravan/Grand Caravan | Conv | Jan-01 | 2001 | Sport minivan extended, 3.3-liter V6, 4-speed automatic | 4210 | 1150 | 18 | 24 | 17 | 11 | 27 | 23 |
| 22 | Daimler-Chrysler | Pickup truck | Dodge Dakota | Conv | Aug-01 | 2001 | SLT crew cab 4WD, 4.7-liter V8, 4-speed automatic | 4765 | 1100 | 13 | 18 | 13 | 8 | 20 | 16 |
| 23 | Daimler-Chrysler | Midsized sport-utility vehicle | Dodge Durango | Conv | Sep-01 | 2001 | SLT Plus 4-door SUV 4WD, 4.7-liter V8, 4-speed automatic | 4810 | 1590 | 13 | 18 | 13 | 8 | 20 | 17 |
| 24 | Daimler-Chrysler | Midsized sport-utility vehicle | Jeep Grand Cherokee | Conv | Sep-01 | 2001 | Laredo 4-door SUV 4WD, 4.0-liter Six, 4-speed automatic | 4100 | 1100 | 16 | 20 | 16 | 10 | 23 | 20 |
| 25 | Daimler-Chrysler | Family car | Dodge Intrepid | Conv | Feb-02 | 2002 | ES sedan, 3.5-liter V6, 4-speed automatic | 3460 | 865 | 18 | 26 | 19 | 12 | 30 | 24 |
| 26 | Daimler-Chrysler | Pickup truck | Dodge Ram 1500 | Conv | Sep-02 | 2002 | SLT crew cab 4WD, 4.7-liter V8, 4-speed automatic | 5300 | 1350 | 13 | 17 | 12 | 8 | 17 | 14 |
| 27 | Daimler-Chrysler | Small sport-utility vehicle | Jeep Liberty | Conv | May-02 | 2002 | Sport 4-door SUV 4WD, 3.7-liter V6, 4-speed automatic | 4125 | 1150 | 16 | 20 | 15 | 10 | 21 | 18 |
| 28 | Daimler-Chrysler | Minivan | Dodge Grand Caravan | Conv | Oct-03 | 2003 | eX minivan extended, 3.8-liter V6, 4-speed automatic | 4515 | 1185 | 18 | 25 | 17 | 11 | 28 | 22 |
| 29 | Daimler-Chrysler | Small car | Dodge Neon | Conv | Mar-03 | 2003 | SXT sedan, 2.0-liter Four, 4-speed automatic | 2730 | 865 | 25 | 32 | 24 | 16 | 34 | 29 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | Daimler-Chrysler | Sports/sporty car | Chrysler Crossfire | Conv | Dec-03 | 2004 | coupe, 3.2-liter V6, 6-speed manual | 3075 | 415 | 17 | 25 | 22 | 15 | 30 | 25 |
| 31 | Daimler-Chrysler | Midsized sport-utility vehicle | Chrysler Pacifica | Conv | Aug-03 | 2004 | 4-door SUV AWD, 3.5-liter V6, 4-speed automatic | 4635 | 1165 | 17 | 22 | 16 | 10 | 24 | 19 |
| 32 | Daimler-Chrysler | Large sport-utility vehicle | Dodge Durango | Conv | Mar-04 | 2004 | Limited 4-door SUV 4WD, 5.7-liter V8, 5-speed automatic | 5335 | 1260 | 13 | 18 | 12 | 8 | 19 | 15 |
| 33 | Daimler-Chrysler | Pickup truck | Dodge Ram 1500 | Conv | Jul-04 | 2004 | SLT crew cab 4WD, 5.7-liter V8, 5-speed automatic | 5380 | 1270 | 13 | 17 | 11 | 8 | 17 | 13 |
| 34 | Daimler-Chrysler | Family car | Dodge Stratus | Conv | May-04 | 2004 | SXT sedan, 2.4-liter Four, 4-speed automatic | 3190 | 865 | 22 | 30 | 21 | 14 | 32 | 24 |
| 35 | Daimler-Chrysler | Large car | Chrysler 300 | Conv | Jan-05 | 2005 | C sedan, 5.7-liter V8, 5-speed automatic | 4105 | 865 | 17 | 25 | 16 | 10 | 27 | 20 |
| 36 | Daimler-Chrysler | Large car | Chrysler 300 | Conv | Jan-05 | 2005 | Touring sedan, 3.5-liter V6, 4-speed automatic | 3850 | 865 | 19 | 27 | 19 | 12 | 29 | 23 |
| 37 | Daimler-Chrysler | Small wagon | Chrysler PT Cruiser | Conv | Jun-05 | 2005 | GT convertible, 2.4-liter Four turbo, 5-speed manual | 3455 | 715 | 21 | 27 | 22 | 17 | 27 | 25 |
| 38 | Daimler-Chrysler | Family car | Chrysler Sebring | Conv | Jun-05 | 2005 | Limited convertible, 2.7-liter V6, 4-speed automatic | 3520 | 715 | 21 | 28 | 21 | 14 | 30 | 26 |
| 39 | Daimler-Chrysler | Pickup truck | Dodge Dakota | Conv | Jul-05 | 2005 | SLT crew cab, 4.7-liter V8, 5-speed automatic | 4790 | 1320 | 15 | 20 | 14 | 9 | 20 | 17 |
| 40 | Daimler-Chrysler | Minivan | Dodge Grand Caravan | Conv | Mar-05 | 2005 | SXT minivan extended, 3.8-liter V6, 4-speed automatic | 4515 | 1185 | 18 | 25 | 17 | 11 | 26 | 21 |
| 41 | Daimler-Chrysler | Wagon | Dodge Magnum | Conv | Dec-04 | 2005 | SXT wagon, 3.5-liter V6, 4-speed automatic | 3950 | 865 | 19 | 27 | 19 | 12 | 30 | 23 |
| 42 | Daimler-Chrysler | Small sport-utility vehicle | Jeep Liberty | Diesel | Aug-05 | 2005 | Diesel Limited 4-door SUV 4WD, 2.8-liter Four, 5-speed automatic | 4355 | 1150 | 22 | 27 | 18 | 11 | 26 | 22 |
| 43 | Daimler-Chrysler | Small sport-utility vehicle | Jeep Wrangler | Conv | Aug-05 | 2005 | Unlimited 2-door SUV 4WD, 4.0-liter V6, 4-speed automatic | 3880 | 720 | 14 | 18 | 14 | 10 | 19 | 17 |
| 44 | Ford | Small car | Ford Focus | Conv | Sep-00 | 2000 | ZTS sedan, 2.0-liter Four, 4-speed automatic | 2715 | 880 | 25 | 31 | 25 | 17 | 35 | 31 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | Ford | Small wagon | Ford Focus | Conv | Oct-00 | 2000 | SE wagon, 2.0-liter Four, 4-speed automatic | 2790 | 880 | 25 | 32 | 23 | 15 | 32 | 28 |
| 46 | Ford | Family car | Ford Taurus | Conv | May-00 | 2000 | SE sedan, 3.0-liter V6, 4-speed automatic | 3340 | 1100 | 20 | 28 | 21 | 14 | 30 | 26 |
| 47 | Ford | Small sport-utility vehicle | Ford Escape | Conv | Mar-01 | 2001 | XLT 4-door SUV AWD, 3.0-liter V6, 4-speed automatic | 3500 | 900 | 18 | 24 | 17 | 12 | 24 | 21 |
| 48 | Ford | Pickup truck | Ford Explorer Sport Trac | Conv | Aug-01 | 2001 | crew cab 4WD, 4.0-liter V6, 5-speed automatic | 4410 | 1190 | 15 | 19 | 15 | 10 | 21 | 19 |
| 49 | Ford | Minivan | Ford Windstar | Conv | Jan-01 | 2001 | SE Sport minivan, 3.8-liter V6, 4-speed automatic | 4200 | 1360 | 18 | 24 | 17 | 11 | 24 | 22 |
| 50 | Ford | Midsized sport-utility vehicle | Ford Explorer | Conv | Sep-01 | 2002 | XLT 4-door SUV 4WD, 4.0-liter V6, 5-speed automatic | 4515 | 1325 | 15 | 20 | 16 | 11 | 23 | 20 |
| 51 | Ford | Pickup truck | Ford F-150 | Conv | Sep-02 | 2002 | XLT crew cab 4WD, 5.4-liter V8, 4-speed automatic | 5295 | 1455 | 14 | 17 | 14 | 10 | 19 | 17 |
| 52 | Ford | Small car | Ford Focus | Conv | Oct-02 | 2002 | SVT 2-door hatchback, 2.0-liter Four, 6-speed manual | 2790 | 825 | 21 | 25 | 24 | 17 | 32 | 29 |
| 53 | Ford | Small car | Ford Focus | Conv | Aug-02 | 2002 | ZX5 4-door hatchback, 2.0-liter Four, 4-speed automatic | 2760 | 825 | 26 | 32 | 24 | 17 | 33 | 29 |
| 54 | Ford | Convertible | Ford Thunderbird | Conv | Jun-02 | 2002 | Premium convertible, 3.9-liter V8, 5-speed automatic | 3905 | 455 | 17 | 23 | 17 | 12 | 25 | 21 |
| 55 | Ford | Large sport-utility vehicle | Ford Expedition | Conv | Nov-02 | 2003 | Eddie Bauer 4-door SUV 4WD, 5.4-liter V8, 4-speed automatic | 5900 | 1400 | 13 | 17 | 12 | 8 | 18 | 15 |
| 56 | Ford | Pickup truck | Ford F-150 | Conv | Jul-04 | 2004 | XLT crew cab 4WD, 5.4-liter V8, 4-speed automatic | 5690 | 1510 | 14 | 18 | 14 | 9 | 20 | 16 |
| 57 | Ford | Minivan | Ford Freestar | Conv | Mar-04 | 2004 | SEL minivan, 4.2-liter V6, 4-speed automatic | 4425 | 1315 | 16 | 23 | 17 | 11 | 25 | 20 |
| 58 | Ford | Family car | Ford Taurus | Conv | Jan-04 | 2004 | SES sedan, 3.0-liter V6, 4-speed automatic | 3325 | 1100 | 20 | 27 | 22 | 15 | 31 | 26 |
| 59 | Ford | Small sport-utility vehicle | Ford Escape | Large Hybrid | Aug-05 | 2005 | Hybrid 4-door SUV AWD, 2.3-liter Four, CVT | 3845 | 860 | 33 | 29 | 26 | 22 | 29 | 30 |
| 60 | Ford | Small sport-utility vehicle | Ford Escape | Conv | Oct-04 | 2005 | XLT 4-door SUV AWD, 3.0-liter V6, 4-speed automatic | 3575 | 950 | 18 | 22 | 18 | 12 | 27 | 22 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | Ford | Large car | Ford Five Hundred | Conv | Jan-05 | 2005 | SEL sedan AWD, 3.0-liter V6, CVT | 3950 | 950 | 19 | 26 | 20 | 13 | 30 | 25 |
| 62 | Ford | Large car | Ford Five Hundred | Conv | Jan-05 | 2005 | SEL sedan, 3.0-liter V6, 6-speed automatic | 3725 | 950 | 21 | 29 | 21 | 14 | 31 | 26 |
| 63 | Ford | Small car | Ford Focus | Conv | May-05 | 2005 | ZX4 SES sedan, 2.0-liter Four, 4-speed automatic | 2800 | 825 | 26 | 32 | 24 | 17 | 32 | 28 |
| 64 | Ford | Midsized sport-utility vehicle | Ford Freestyle | Conv | Sep-05 | 2005 | SEL 4-door SUV AWD, 3.0-liter V6, CVT | 4280 | 1150 | 19 | 24 | 18 | 12 | 27 | 23 |
| 65 | Ford | Sports/sporty car | Ford Mustang | Conv | Apr-05 | 2005 | GT Premium coupe, 4.6-liter V8, 5-speed manual | 3585 | 720 | 17 | 25 | 20 | 15 | 28 | 23 |
| 66 | Ford | Sports/sporty car | Ford Mustang | Conv | Jun-05 | 2005 | Premium convertible, 4.0-liter V6, 5-speed automatic | 3590 | 700 | 19 | 25 | 20 | 13 | 30 | 24 |
| 67 | General Motors | Large car | Buick LeSabre | Conv | Feb-00 | 2000 | Limited sedan, 3.8-liter V6, 4-speed automatic | 3640 | 1075 | 19 | 30 | 20 | 13 | 31 | 25 |
| 68 | General Motors | Luxury car | Cadillac DeVille | Conv | Nov-00 | 2000 | DHS sedan, 4.6-liter V8, 4-speed automatic | 4070 | 1085 | 17 | 28 | 19 | 12 | 29 | 23 |
| 69 | General Motors | Family car | Chevrolet Impala | Conv | May-00 | 2000 | LS sedan, 3.8-liter V6, 4-speed automatic | 3495 | 925 | 20 | 29 | 20 | 12 | 31 | 25 |
| 70 | General Motors | Large sport-utility vehicle | Chevrolet Suburban | Conv | Jun-00 | 2000 | LT 4-door SUV 4WD, 5.3-liter V8, 4-speed automatic | 5590 | 1610 | 14 | 16 | 13 | 9 | 18 | 17 |
| 71 | General Motors | Family car | Oldsmobile Intrigue | Conv | May-00 | 2000 | GL sedan, 3.5-liter V6, 4-speed automatic | 3490 | 915 | 19 | 28 | 21 | 13 | 33 | 27 |
| 72 | General Motors | Large car | Pontiac Bonneville | Conv | Feb-00 | 2000 | SE sedan, 3.8-liter V6, 4-speed automatic | 3640 | 935 | 19 | 30 | 20 | 12 | 33 | 25 |
| 73 | General Motors | Family car | Saturn L-Series | Conv | Jan-00 | 2000 | LS1 sedan, 2.2-liter Four, 4-speed automatic | 3020 | 925 | 23 | 32 | 23 | 16 | 34 | 29 |
| 74 | General Motors | Family car | Saturn L-Series | Conv | Mar-00 | 2000 | LW2 wagon, 3.0-liter V6, 4-speed automatic | 3245 | 925 | 20 | 26 | 21 | 14 | 32 | 25 |
| 75 | General Motors | Small car | Saturn S-series | Conv | Sep-00 | 2000 | SL2 sedan, 1.9-liter Four, 4-speed automatic | 2440 | 850 | 25 | 36 | 27 | 18 | 34 | 35 |
| 76 | General Motors | Small car | Chevrolet Cavalier | Conv | Feb-01 | 2001 | LS sedan, 2.4-liter Four, 4-speed automatic | 2730 | 880 | 21 | 28 | 23 | 16 | 33 | 29 |
| 77 | General Motors | Family car | Chevrolet Malibu | Conv | Jun-01 | 2001 | LS sedan, 3.1-liter V6, 4-speed automatic | 3050 | 915 | 20 | 29 | 22 | 15 | 32 | 26 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | General Motors | Pickup truck | Chevrolet S-10 | Conv | Aug-01 | 2001 | LS crew cab 4WD, 4.3-liter V6, 4-speed automatic | 4145 | 1000 | 15 | 18 | 15 | 10 | 21 | 18 |
| 79 | General Motors | Minivan | Chevrolet Venture | Conv | Jan-01 | 2001 | LS minivan extended, 3.4-liter V6, 4-speed automatic | 3990 | 1365 | 19 | 26 | 19 | 12 | 27 | 23 |
| 80 | General Motors | Family car | Oldsmobile Alero | Conv | Jun-01 | 2001 | GL sedan, 3.4-liter V6, 4-speed automatic | 3110 | 900 | 21 | 32 | 20 | 13 | 31 | 25 |
| 81 | General Motors | Upscale car | Oldsmobile Aurora | Conv | Nov-00 | 2001 | 4.0 sedan, 4.0-liter V8, 4-speed automatic | 3800 | 900 | 17 | 25 | 19 | 12 | 29 | 25 |
| 82 | General Motors | Midsized sport-utility vehicle | Buick Rendezvous | Conv | Oct-01 | 2002 | CXL 4-door SUV AWD, 3.4-liter V6, 4-speed automatic | 4230 | 1215 | 18 | 24 | 16 | 11 | 24 | 21 |
| 83 | General Motors | Pickup truck | Chevrolet Avalanche | Conv | Sep-02 | 2002 | crew cab 4WD, 5.3-liter V8, 4-speed automatic | 5810 | 1190 | 13 | 17 | 13 | 9 | 18 | 16 |
| 84 | General Motors | Convertible | Chevrolet Corvette | Conv | Jun-02 | 2002 | Base convertible, 5.7-liter V8, 6-speed manual | 3255 | 400 | 19 | 28 | 21 | 15 | 31 | 24 |
| 85 | General Motors | Large sport-utility vehicle | Chevrolet Tahoe | Conv | Nov-02 | 2002 | LT 4-door SUV 4WD, 5.3-liter V8, 4-speed automatic | 5505 | 1395 | 14 | 17 | 13 | 9 | 19 | 17 |
| 86 | General Motors | Midsized sport-utility vehicle | GMC Envoy | Conv | Sep-01 | 2002 | SLE 4-door SUV 4WD, 4.2-liter Six, 4-speed automatic | 4660 | 1090 | 15 | 21 | 15 | 10 | 22 | 19 |
| 87 | General Motors | Family car | Pontiac Grand Prix | Conv | Feb-02 | 2002 | GT sedan, 3.8-liter V6, 4-speed automatic | 3480 | 915 | 19 | 29 | 19 | 12 | 31 | 24 |
| 88 | General Motors | Small sport-utility vehicle | Saturn VUE | Conv | May-02 | 2002 | 4-door SUV AWD, 3.0-liter V6, 5-speed automatic | 3740 | 1175 | 19 | 25 | 18 | 12 | 26 | 23 |
| 89 | General Motors | Large car | Buick Park Avenue | Conv | Feb-03 | 2003 | Ultra sedan, 3.8-liter V6 supercharged, 4-speed automatic | 3970 | 1100 | 18 | 28 | 21 | 13 | 32 | 26 |
| 90 | General Motors | Upscale car | Cadillac CTS | Conv | Jul-03 | 2003 | sedan, 3.2-liter V6, 5-speed automatic | 3620 | 880 | 18 | 26 | 20 | 13 | 28 | 24 |
| 91 | General Motors | Small car | Chevrolet Cavalier | Conv | Mar-03 | 2003 | LS sedan, 2.2-liter Four, 4-speed automatic | 2770 | 880 | 24 | 33 | 26 | 18 | 37 | 30 |
| 92 | General Motors | Midsized sport-utility vehicle | Chevrolet TrailBlazer | Conv | Aug-03 | 2003 | EXT LT 4-door SUV 4WD, 4.2-liter Six, 4-speed automatic | 5040 | 1360 | 15 | 20 | 13 | 9 | 20 | 16 |
| 93 | General Motors | Small sport-utility vehicle | Pontiac Aztek | Conv | Jun-03 | 2003 | 4-door SUV AWD, 3.4-liter V6, 4-speed automatic | 4170 | 1185 | 18 | 24 | 17 | 12 | 24 | 20 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94 | General Motors | Small wagon | Pontiac Vibe | Conv | Aug-02 | 2003 | Base wagon, 1.8-liter Four, 4-speed automatic | 2805 | 860 | 28 | 33 | 26 | 18 | 36 | 32 |
| 95 | General Motors | Small car | Saturn Ion | Conv | Mar-03 | 2003 | 3 sedan, 2.2-liter Four, 5-speed automatic | 2855 | 900 | 24 | 32 | 24 | 17 | 34 | 29 |
| 96 | General Motors | Family car | Saturn L-Series | Conv | Jan-03 | 2003 | L200 sedan, 2.2-liter Four, 4-speed automatic | 3040 | 925 | 24 | 32 | 24 | 15 | 36 | 30 |
| 97 | General Motors | Sports/sporty car | Cadillac CTS | Conv | Sep-04 | 2004 | CTS-V sedan, 5.7-liter V8, 6-speed manual | 3950 | 880 | 16 | 25 | 17 | 11 | 27 | 20 |
| 98 | General Motors | Midsized sport-utility vehicle | Cadillac SRX | Conv | Mar-04 | 2004 | V8 4-door SUV AWD, 4.6-liter V8, 5-speed automatic | 4685 | 1200 | 15 | 20 | 16 | 11 | 24 | 20 |
| 99 | General Motors | Small car | Chevrolet Aveo | Conv | Aug-04 | 2004 | LS 4-door hatchback, 1.6-liter Four, 4-speed automatic | 2530 | 860 | 26 | 34 | 28 | 19 | 38 | 33 |
| 100 | General Motors | Small car | Chevrolet Aveo | Conv | Aug-04 | 2004 | LS 4-door hatchback, 1.6-liter Four, 5-speed manual | 2515 | 860 | 27 | 35 | 27 | 19 | 36 | 33 |
| 101 | General Motors | Family car | Chevrolet Impala | Conv | Jan-04 | 2004 | LS sedan, 3.8-liter V6, 4-speed automatic | 3655 | 1095 | 20 | 30 | 20 | 13 | 31 | 24 |
| 102 | General Motors | Family car | Chevrolet Malibu | Conv | Jan-04 | 2004 | LS sedan, 3.5-liter V6, 4-speed automatic | 3290 | 915 | 23 | 32 | 23 | 15 | 36 | 29 |
| 103 | General Motors | Family car | Chevrolet Malibu | Conv | May-04 | 2004 | Base sedan, 2.2-liter Four, 4-speed automatic | 3135 | 915 | 24 | 34 | 24 | 16 | 38 | 29 |
| 104 | General Motors | Pickup truck | Chevrolet Silverado 1500 | Conv | Jul-04 | 2004 | Z71 crew cab 4WD, 5.3-liter V8, 4-speed automatic | 5300 | 1655 | 15 | 18 | 14 | 10 | 19 | 17 |
| 105 | General Motors | Family car | Pontiac Grand Prix | Conv | Jan-04 | 2004 | GT2 sedan, 3.8-liter V6, 4-speed automatic | 3630 | 915 | 20 | 30 | 20 | 13 | 31 | 25 |
| 106 | General Motors | Sports/sporty car | Pontiac GTO | Conv | Sep-04 | 2004 | coupe, 5.7-liter V8, 6-speed manual | 3770 | 740 | 17 | 29 | 17 | 11 | 27 | 21 |
| 107 | General Motors | Small sport-utility vehicle | Saturn VUE | Conv | Oct-04 | 2004 | V6 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 3740 | 1175 | 19 | 25 | 19 | 12 | 27 | 23 |
| 108 | General Motors | Large car | Buick LaCrosse | Conv | Mar-05 | 2005 | CXL sedan, 3.8-liter V6, 4-speed automatic | 3565 | 915 | 20 | 29 | 18 | 12 | 30 | 23 |
| 109 | General Motors | Luxury car | Cadillac STS | Conv | Sep-05 | 2005 | sedan , 3.6-liter V6, 5-speed automatic | 4030 | 890 | 17 | 24 | 18 | 12 | 26 | 22 |
| 110 | General Motors | Small car | Chevrolet Cobalt | Conv | May-05 | 2005 | LS sedan, 2.2-liter Four, 4-speed automatic | 2850 | 890 | 24 | 32 | 23 | 15 | 35 | 29 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | General Motors | Pickup truck | Chevrolet Colorado | Conv | Jul-05 | 2005 | LS crew cab, 3.5-liter Five, 4-speed automatic | 4270 | 1125 | 17 | 22 | 16 | 11 | 23 | 19 |
| 112 | General Motors | Small sport-utility vehicle | Chevrolet Equinox | Conv | Sep-04 | 2005 | LT 4-door SUV AWD, 3.4-liter V6, 5-speed automatic | 3845 | 1230 | 19 | 25 | 17 | 12 | 25 | 22 |
| 113 | General Motors | Family car | Chevrolet Malibu | Conv | Feb-05 | 2005 | Maxx LS 4-door hatchback, 3.5-liter V6, 4-speed automatic | 3535 | 915 | 22 | 30 | 21 | 14 | 31 | 26 |
| 114 | General Motors | Family car | Pontiac G6 | Conv | Feb-05 | 2005 | Base sedan, 3.5-liter V6, 4-speed automatic | 3475 | 890 | 22 | 32 | 21 | 13 | 34 | 27 |
| 115 | General Motors | Small car | Saturn Ion | Conv | May-05 | 2005 | 3 sedan, 2.2-liter Four, 4-speed automatic | 2865 | 900 | 24 | 32 | 25 | 17 | 35 | 30 |
| 116 | General Motors | Minivan | Saturn Relay | Conv | Mar-05 | 2005 | 3 minivan, 3.5-liter V6, 4-speed automatic | 4380 | 1290 | 18 | 24 | 17 | 12 | 25 | 21 |
| 117 | Honda/Acura | Luxury car | Acura RL | Conv | Nov-00 | 2000 | sedan, 3.5-liter V6, 4-speed automatic | 3860 | 850 | 18 | 24 | 21 | 14 | 28 | 25 |
| 118 | Honda/Acura | Family car | Honda Accord | Conv | Jul-00 | 2000 | EX sedan, 3.0-liter V6, 4-speed automatic | 3295 | 850 | 20 | 28 | 21 | 15 | 30 | 26 |
| 119 | Honda/Acura | Small sport-utility vehicle | Honda CR-V | Conv | Oct-00 | 2000 | EX 4-door SUV AWD, 2.0-liter Four, 4-speed automatic | 3210 | 850 | 22 | 25 | 22 | 16 | 27 | 27 |
| 120 | Honda/Acura | Small car | Honda Insight | Small Hybrid | Dec-00 | 2000 | 2-door hatchback, 1.0-liter Three, 5-speed manual | 1875 | 365 | 61 | 70 | 51 | 36 | 66 | 61 |
| 121 | Honda/Acura | Convertible | Honda S2000 | Conv | Aug-00 | 2000 | convertible, 2.0-liter Four, 6-speed manual | 2790 | 400 | 20 | 26 | 27 | 21 | 33 | 30 |
| 122 | Honda/Acura | Midsized sport-utility vehicle | Acura MDX | Conv | Jul-01 | 2001 | 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 4485 | 1265 | 17 | 23 | 18 | 12 | 27 | 22 |
| 123 | Honda/Acura | Small car | Honda Civic | Conv | Feb-01 | 2001 | EX sedan, 1.7-liter Four, 4-speed automatic | 2610 | 850 | 31 | 38 | 29 | 20 | 41 | 36 |
| 124 | Honda/Acura | Minivan | Honda Odyssey | Conv | Jan-01 | 2001 | EX minivan, 3.5-liter V6, 4-speed automatic | 4315 | 1250 | 18 | 25 | 19 | 12 | 30 | 24 |
| 125 | Honda/Acura | Sports/sporty car | Acura RSX | Conv | Dec-01 | 2002 | Type-S 2-door hatchback, 2.0-liter Four, 6-speed manual | 2780 | 700 | 24 | 31 | 26 | 18 | 37 | 31 |
| 126 | Honda/Acura | Upscale car | Acura TL | Conv | Mar-02 | 2002 | Type-S sedan, 3.2-liter V6, 5-speed automatic | 3520 | 850 | 19 | 29 | 22 | 14 | 34 | 27 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 127 | Honda/Acura | Family car | Honda Accord | Conv | Jan-02 | 2002 | EX sedan, 2.4-liter Four, 4-speed automatic | 3120 | 850 | 23 | 30 | 23 | 15 | 34 | 28 |
| 128 | Honda/Acura | Small car | Honda Civic | Conv | Oct-02 | 2002 | Si 2-door hatchback, 2.0-liter Four, 5-speed manual | 2755 | 850 | 26 | 30 | 26 | 19 | 33 | 30 |
| 129 | Honda/Acura | Small sport-utility vehicle | Honda CR-V | Conv | May-02 | 2002 | EX 4-door SUV AWD, 2.4-liter Four, 4-speed automatic | 3375 | 850 | 22 | 26 | 21 | 15 | 27 | 24 |
| 130 | Honda/Acura | Midsized sport-utility vehicle | Acura MDX | Conv | Sep-03 | 2003 | Touring 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 4555 | 1160 | 17 | 23 | 17 | 11 | 26 | 21 |
| 131 | Honda/Acura | Family car | Honda Accord | Conv | May-03 | 2003 | EX sedan, 3.0-liter V6, 5-speed automatic | 3390 | 850 | 21 | 30 | 23 | 15 | 34 | 26 |
| 132 | Honda/Acura | Family car | Honda Accord 4-cyl. | Conv | Jan-03 | 2003 | EX sedan, 2.4-liter Four, 5-speed automatic | 3195 | 850 | 24 | 33 | 24 | 16 | 38 | 28 |
| 133 | Honda/Acura | Small car | Honda Civic Hybrid | Small Hybrid | Dec-02 | 2003 | Hybrid sedan, 1.3-liter Four hybrid, CVT | 2730 | 850 | 48 | 47 | 36 | 26 | 45 | 44 |
| 134 | Honda/Acura | Small sport-utility vehicle | Honda Element | Conv | Jun-03 | 2003 | EX 4-door SUV AWD, 2.4-liter Four, 4-speed automatic | 3560 | 675 | 21 | 24 | 20 | 14 | 26 | 24 |
| 135 | Honda/Acura | Minivan | Honda Odyssey | Conv | Oct-03 | 2003 | EX minivan, 3.5-liter V6, 5-speed automatic | 4420 | 1160 | 18 | 25 | 18 | 11 | 28 | 23 |
| 136 | Honda/Acura | Midsized sport-utility vehicle | Honda Pilot | Conv | Nov-02 | 2003 | EX 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 4450 | 1320 | 17 | 22 | 19 | 13 | 27 | 23 |
| 137 | Honda/Acura | Upscale car | Acura TL | Conv | Feb-04 | 2004 | sedan, 3.2-liter V6, 5-speed automatic | 3565 | 850 | 20 | 28 | 23 | 16 | 35 | 27 |
| 138 | Honda/Acura | Upscale car | Acura TSX | Conv | Nov-04 | 2004 | sedan, 2.4-liter Four, 5-speed automatic | 3315 | 850 | 23 | 32 | 23 | 15 | 36 | 29 |
| 139 | Honda/Acura | Luxury car | Acura RL | Conv | Sep-05 | 2005 | sedan AWD, 3.5-liter V6, 5-speed automatic | 4035 | 850 | 18 | 26 | 18 | 12 | 29 | 22 |
| 140 | Honda/Acura | Family car | Honda Accord | Large Hybrid | May-05 | 2005 | Hybrid sedan, 3.0-liter V6 hybrid, 5-speed automatic | 3475 | 850 | 29 | 37 | 25 | 18 | 37 | 29 |
| 141 | Honda/Acura | Small car | Honda Civic | Conv | May-05 | 2005 | EX sedan, 1.7-liter Four, 4-speed automatic | 2645 | 850 | 31 | 38 | 29 | 21 | 40 | 35 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 142 | Honda/Acura | Small sport-utility vehicle | Honda CR-V | Conv | Aug-05 | 2005 | EX 4-door SUV AWD, 2.4-liter Four, 5-speed automatic | 3585 | 850 | 22 | 27 | 21 | 15 | 29 | 26 |
| 143 | Honda/Acura | Minivan | Honda Odyssey | Conv | Mar-05 | 2005 | EX minivan, 3.5-liter V6, 5-speed automatic | 4615 | 1320 | 20 | 28 | 19 | 12 | 28 | 23 |
| 144 | Honda/Acura | Midsized sport-utility vehicle | Honda Pilot | Conv | Apr-05 | 2005 | EX-L 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 4535 | 1320 | 17 | 22 | 17 | 12 | 25 | 20 |
| 145 | Honda/Acura | Pickup truck | Honda Ridgeline | Conv | Jul-05 | 2006 | RTS crew cab, 3.5-liter V6, 5-speed automatic | 4540 | 1530 | 16 | 21 | 15 | 10 | 23 | 19 |
| 146 | Hyundai | Small car | Hyundai Elantra | Conv | Feb-01 | 2001 | GLS sedan, 2.0-liter Four, 4-speed automatic | 2880 | 850 | 24 | 33 | 25 | 16 | 35 | 30 |
| 147 | Hyundai | Small sport-utility vehicle | Hyundai Santa Fe | Conv | Mar-01 | 2001 | GLS 4-door SUV AWD, 2.7-liter V6, 4-speed automatic | 3875 | 880 | 19 | 23 | 18 | 13 | 23 | 22 |
| 148 | Hyundai | Family car | Hyundai Sonata | Conv | Jun-01 | 2001 | GLS-L sedan, 2.5-liter V6, 4-speed automatic | 3280 | 860 | 20 | 27 | 21 | 14 | 30 | 27 |
| 149 | Hyundai | Small car | Hyundai Accent | Conv | Mar-03 | 2003 | GL sedan, 1.6-liter Four, 4-speed automatic | 2525 | 850 | 25 | 35 | 26 | 18 | 38 | 33 |
| 150 | Hyundai | Sports/sporty car | Hyundai Tiburon | Conv | Oct-02 | 2003 | GT V6 coupe, 2.7-liter V6, 6-speed manual | 3110 | 700 | 18 | 26 | 22 | 15 | 30 | 25 |
| 151 | Hyundai | Family car | Hyundai XG350 | Conv | May-03 | 2003 | L sedan, 3.5-liter V6, 5-speed automatic | 3750 | 860 | 17 | 26 | 19 | 13 | 30 | 23 |
| 152 | Hyundai | Small car | Hyundai Elantra | Conv | May-05 | 2005 | GT sedan, 2.0-liter Four, 4-speed automatic | 2980 | 850 | 24 | 32 | 24 | 16 | 33 | 28 |
| 153 | Hyundai | Small sport-utility vehicle | Hyundai Tucson | Conv | Aug-05 | 2005 | GLS 4-door SUV 4WD, 2.7-liter V6, 4-speed automatic | 3800 | 860 | 19 | 24 | 18 | 13 | 24 | 22 |
| 154 | Jaguar | Luxury car | Jaguar S-Type | Conv | Nov-01 | 2001 | sedan, 3.0-liter V6, 5-speed automatic | 3810 | 905 | 18 | 25 | 20 | 13 | 30 | 25 |
| 155 | Jaguar | Upscale car | Jaguar X-Type | Conv | Mar-02 | 2002 | 3.0 sedan AWD, 3.0-liter V6, 5-speed automatic | 3625 | 880 | 18 | 26 | 19 | 13 | 29 | 24 |
| 156 | Jaguar | Luxury car | Jaguar S-Type | Conv | Jun-04 | 2004 | 4.2 sedan, 4.2-liter V8, 6-speed automatic | 3880 | 905 | 18 | 28 | 19 | 12 | 29 | 24 |
| 157 | Jaguar | Luxury car | Jaguar XJ8 | Conv | Nov-03 | 2004 | Vanden Plas sedan, 4.2-liter V8, 6-speed automatic | 3860 | 880 | 18 | 28 | 19 | 12 | 30 | 23 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 158 | Kia | Minivan | Kia Sedona | Conv | Oct-03 | 2003 | EX minivan, 3.5-liter V6, 5-speed automatic | 4800 | 1160 | 15 | 20 | 16 | 10 | 25 | 20 |
| 159 | Kia | Small sport-utility vehicle | Kia Sorento | Conv | Jun-03 | 2003 | EX 4-door SUV 4WD, 3.5-liter V6, 4-speed automatic | 4500 | 1145 | 15 | 18 | 15 | 10 | 21 | 17 |
| 160 | Kia | Family car | Kia Optima | Conv | Jan-04 | 2004 | EX sedan, 2.7-liter V6, 4-speed automatic | 3410 | 860 | 20 | 27 | 20 | 13 | 29 | 23 |
| 161 | Kia | Small car | Kia Spectra | Conv | Aug-04 | 2004 | EX sedan, 2.0-liter Four, 4-speed automatic | 2875 | 850 | 24 | 34 | 25 | 18 | 36 | 30 |
| 162 | Kia | Small car | Kia Spectra | Conv | Aug-04 | 2004 | EX sedan, 2.0-liter Four, 5-speed manual | 2815 | 850 | 25 | 32 | 28 | 20 | 35 | 34 |
| 163 | Land Rover | Small sport-utility vehicle | Land Rover Freelander | Conv | May-02 | 2002 | SE 4-door SUV 4WD, 2.5-liter V6, 5-speed automatic | 3640 | 905 | 17 | 21 | 17 | 13 | 22 | 20 |
| 164 | Lincoln | Luxury car | Lincoln Continental | Conv | Nov-00 | 2000 | sedan, 4.6-liter V8, 4-speed automatic | 3895 | 1100 | 17 | 25 | 18 | 12 | 28 | 22 |
| 165 | Lincoln | Upscale car | Lincoln LS | Conv | Jul-03 | 2003 | Premium sedan, 3.0-liter V6, 5-speed automatic | 3700 | 900 | 20 | 26 | 19 | 13 | 29 | 23 |
| 166 | Lincoln | Large car | Lincoln Town Car | Conv | Feb-03 | 2003 | Signature sedan, 4.6-liter V8, 4-speed automatic | 4415 | 1100 | 17 | 25 | 17 | 11 | 27 | 22 |
| 167 | Mazda | Family car | Mazda 626 | Conv | Jul-00 | 2000 | LX sedan, 2.5-liter V6, 4-speed automatic | 3095 | 850 | 20 | 26 | 22 | 15 | 30 | 27 |
| 168 | Mazda | Minivan | Mazda MPV | Conv | Mar-00 | 2000 | LX minivan, 2.5-liter V6, 4-speed automatic | 3720 | 1190 | 18 | 23 | 18 | 13 | 25 | 21 |
| 169 | Mazda | Small sport-utility vehicle | Mazda Tribute | Conv | Mar-01 | 2001 | LX 4-door SUV AWD, 3.0-liter V6, 4-speed automatic | 3575 | 950 | 18 | 24 | 18 | 12 | 24 | 22 |
| 170 | Mazda | Small car | Mazda Protege | Conv | Jul-02 | 2002 | LX sedan, 2.0-liter Four, 4-speed automatic | 2715 | 850 | 25 | 30 | 26 | 19 | 34 | 30 |
| 171 | Mazda | Small car | Mazda Protege | Conv | Aug-02 | 2002 | Protege5 4-door hatchback, 2.0-liter Four, 4-speed automatic | 2800 | 850 | 25 | 30 | 25 | 18 | 34 | 30 |
| 172 | Mazda | Minivan | Mazda MPV | Conv | Oct-03 | 2003 | ES minivan, 3.0-liter V6, 5-speed automatic | 3925 | 1305 | 18 | 25 | 19 | 12 | 28 | 23 |
| 173 | Mazda | Family car | Mazda6 | Conv | May-03 | 2003 | s sedan, 3.0-liter V6, 5-speed automatic | 3355 | 850 | 19 | 27 | 20 | 14 | 30 | 23 |
| 174 | Mazda | Family car | Mazda6 | Conv | May-03 | 2003 | i sedan, 2.3-liter Four, 4-speed automatic | 3150 | 850 | 23 | 29 | 23 | 16 | 33 | 27 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 175 | Mazda | Sports/sporty car | Mazda RX-8 | Conv | Dec-03 | 2004 | coupe, 1.3-liter rotary, 6-speed manual | 3085 | 680 | 18 | 24 | 18 | 14 | 22 | 20 |
| 176 | Mazda | Small car | Mazda3 | Conv | Aug-04 | 2004 | i sedan, 2.0-liter Four, 4-speed automatic | 2830 | 850 | 26 | 34 | 30 | 23 | 38 | 32 |
| 177 | Mazda | Small car | Mazda3 | Conv | Aug-04 | 2004 | i sedan, 2.0-liter Four, 5-speed manual | 2815 | 850 | 28 | 35 | 33 | 24 | 42 | 36 |
| 178 | Mazda | Wagon | Mazda6 | Conv | Dec-04 | 2004 | s wagon, 3.0-liter V6, 5-speed automatic | 3510 | 850 | 19 | 26 | 19 | 13 | 30 | 23 |
| 179 | Mercedes-Benz | Midsized sport-utility vehicle | Mercedes-Benz M-Class | Conv | Jun-00 | 2000 | ML430 4-door SUV 4WD, 4.3-liter V8, 5-speed automatic | 4720 | 1340 | 15 | 19 | 15 | 11 | 20 | 18 |
| 180 | Mercedes-Benz | Upscale car | Mercedes-Benz C-Class | Conv | May-01 | 2001 | C320 sedan, 3.2-liter V6, 5-speed automatic | 3445 | 865 | 19 | 25 | 21 | 15 | 29 | 25 |
| 181 | Mercedes-Benz | Luxury car | Mercedes-Benz E-Class | Conv | Nov-01 | 2001 | E320 sedan, 3.2-liter V6, 5-speed automatic | 3530 | 965 | 20 | 28 | 22 | 15 | 32 | 27 |
| 182 | Mercedes-Benz | Convertible | Mercedes-Benz SLK | Conv | Jun-02 | 2002 | SLK320 convertible, 3.2-liter V6, 6-speed manual | 3075 | 395 | 17 | 26 | 23 | 17 | 31 | 26 |
| 183 | Mercedes-Benz | Luxury car | Mercedes-Benz S-Class | Conv | Nov-03 | 2003 | S430 sedan, 4.3-liter V8, 5-speed automatic | 4195 | 970 | 17 | 24 | 18 | 11 | 28 | 22 |
| 184 | Mercedes-Benz | Luxury car | Mercedes-Benz E-Class | Conv | Jun-04 | 2004 | E320 sedan, 3.2-liter V6, 5-speed automatic | 3745 | 965 | 19 | 27 | 20 | 14 | 28 | 25 |
| 185 | Mercury | Large car | Mercury Grand Marquis | Conv | Feb-03 | 2003 | LSE sedan, 4.6-liter V8, 4-speed automatic | 4180 | 1100 | 17 | 25 | 16 | 10 | 25 | 21 |
| 186 | Mini | Small car | Mini Cooper | Conv | Oct-02 | 2002 | Base 2-door hatchback, 1.6-liter Four, 5-speed manual | 2560 | 815 | 28 | 37 | 30 | 23 | 38 | 35 |
| 187 | Mini | Small car | Mini Cooper | Conv | Jun-05 | 2005 | S convertible, 1.6-liter Four supercharged, 6-speed manual | 2900 | 815 | 25 | 32 | 25 | 19 | 32 | 28 |
| 188 | Mitsubishi | Sports/sporty car | Mitsubishi Eclipse | Conv | Aug-00 | 2000 | GT 2-door hatchback, 3.0-liter V6, 5-speed manual | 3220 | 660 | 20 | 28 | 24 | 17 | 32 | 28 |
| 189 | Mitsubishi | Family car | Mitsubishi Galant | Conv | Jul-00 | 2000 | ES sedan, 3.0-liter V6, 4-speed automatic | 3285 | 825 | 20 | 27 | 22 | 15 | 30 | 27 |
| 190 | Mitsubishi | Small car | Mitsubishi Lancer | Conv | Jul-02 | 2002 | LS sedan, 2.0-liter Four, 4-speed automatic | 2765 | 825 | 24 | 30 | 26 | 19 | 35 | 31 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 191 | Mitsubishi | Small car | Mitsubishi Lancer | Conv | Dec-03 | 2003 | Evolution sedan AWD, 2.0-liter Four turbo, 5-speed manual | 3340 | 825 | 18 | 26 | 20 | 15 | 26 | 23 |
| 192 | Mitsubishi | Midsized sport-utility vehicle | Mitsubishi Montero | Conv | Aug-03 | 2003 | Limited 4-door SUV 4WD, 3.8-liter V6, 5-speed automatic | 4955 | 1180 | 15 | 19 | 14 | 10 | 19 | 17 |
| 193 | Mitsubishi | Small sport-utility vehicle | Mitsubishi Outlander | Conv | Jun-03 | 2003 | XLS 4-door SUV AWD, 2.4-liter Four, 4-speed automatic | 3525 | 825 | 20 | 25 | 20 | 14 | 26 | 23 |
| 194 | Mitsubishi | Midsized sport-utility vehicle | Mitsubishi Endeavor | Conv | Aug-03 | 2004 | XLS 4-door SUV AWD, 3.8-liter V6, 4-speed automatic | 4195 | 970 | 17 | 21 | 17 | 12 | 22 | 20 |
| 195 | Mitsubishi | Family car | Mitsubishi Galant | Conv | May-04 | 2004 | ES sedan, 2.4-liter Four, 4-speed automatic | 3430 | 825 | 23 | 30 | 23 | 16 | 32 | 26 |
| 196 | Mitsubishi | Family car | Mitsubishi Galant | Conv | Feb-05 | 2005 | GTS sedan, 3.8-liter V6, 4-speed automatic | 3715 | 825 | 19 | 27 | 20 | 14 | 28 | 24 |
| 197 | Nissan/Infiniti | Large car | Infiniti I30 | Conv | Feb-00 | 2000 | I30 sedan, 3.0-liter V6, 4-speed automatic | 3410 | 880 | 20 | 28 | 22 | 14 | 32 | 27 |
| 198 | Nissan/Infiniti | Family car | Nissan Altima | Conv | Jan-00 | 2000 | GXE sedan, 2.4-liter Four, 4-speed automatic | 3050 | 860 | 21 | 28 | 22 | 15 | 31 | 27 |
| 199 | Nissan/Infiniti | Family car | Nissan Maxima | Conv | May-00 | 2000 | GXE sedan, 3.0-liter V6, 4-speed automatic | 3315 | 880 | 20 | 28 | 21 | 14 | 31 | 27 |
| 200 | Nissan/Infiniti | Small car | Nissan Sentra | Conv | Sep-00 | 2000 | GXE sedan, 1.8-liter Four, 4-speed automatic | 2695 | 825 | 26 | 33 | 26 | 18 | 36 | 32 |
| 201 | Nissan/Infiniti | Small sport-utility vehicle | Nissan Xterra | Conv | Oct-00 | 2000 | SE 4-door SUV 4WD, 3.3-liter V6, 4-speed automatic | 4315 | 885 | 15 | 19 | 15 | 11 | 21 | 19 |
| 202 | Nissan/Infiniti | Pickup truck | Nissan Frontier | Conv | Aug-01 | 2001 | SC crew cab 4WD, 3.3-liter V6 supercharged, 4-speed automatic | 4285 | 915 | 15 | 18 | 14 | 9 | 19 | 17 |
| 203 | Nissan/Infiniti | Midsized sport-utility vehicle | Nissan Pathfinder | Conv | Sep-01 | 2001 | LE 4-door SUV 4WD, 3.5-liter V6, 4-speed automatic | 4270 | 1030 | 15 | 19 | 16 | 11 | 22 | 19 |
| 204 | Nissan/Infiniti | Upscale car | Infiniti I35 | Conv | Mar-02 | 2002 | sedan, 3.5-liter V6, 4-speed automatic | 3400 | 880 | 20 | 26 | 20 | 14 | 29 | 25 |
| 205 | Nissan/Infiniti | Family car | Nissan Altima | Conv | Jan-02 | 2002 | 2.5 S sedan, 2.5-liter Four, 4-speed automatic | 3235 | 860 | 23 | 29 | 22 | 15 | 32 | 28 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 206 | Nissan/Infiniti | Family car | Nissan Altima | Conv | Feb-02 | 2002 | 3.5 SE sedan, 3.5-liter V6, 4-speed automatic | 3300 | 860 | 19 | 26 | 20 | 14 | 30 | 25 |
| 207 | Nissan/Infiniti | Midsized sport-utility vehicle | Infiniti FX | Conv | Sep-03 | 2003 | FX35 4-door SUV AWD, 3.5-liter V6, 5-speed automatic | 4295 | 950 | 16 | 22 | 18 | 13 | 25 | 21 |
| 208 | Nissan/Infiniti | Upscale car | Infiniti G35 | Conv | Jul-03 | 2003 | sedan, 3.5-liter V6, 5-speed automatic | 3515 | 900 | 19 | 26 | 20 | 14 | 29 | 26 |
| 209 | Nissan/Infiniti | Sports/sporty car | Nissan 350Z | Conv | Dec-03 | 2003 | Touring coupe, 3.5-liter V6, 6-speed manual | 3345 | 450 | 20 | 26 | 22 | 16 | 30 | 24 |
| 210 | Nissan/Infiniti | Midsized sport-utility vehicle | Nissan Murano | Conv | Aug-03 | 2003 | SL 4-door SUV AWD, 3.5-liter V6, CVT | 4060 | 860 | 20 | 24 | 19 | 14 | 26 | 22 |
| 211 | Nissan/Infiniti | Large sport-utility vehicle | Nissan Armada | Conv | Mar-04 | 2004 | LE 4-door SUV 4WD, 5.6-liter V8, 5-speed automatic | 5715 | 1375 | 13 | 18 | 13 | 9 | 19 | 16 |
| 212 | Nissan/Infiniti | Family car | Nissan Maxima | Conv | Jul-03 | 2004 | 3.5 SE sedan, 3.5-liter V6, 5-speed automatic | 3545 | 860 | 20 | 28 | 21 | 14 | 32 | 26 |
| 213 | Nissan/Infiniti | Minivan | Nissan Quest | Conv | Oct-03 | 2004 | 3.5 SL minivan, 3.5-liter V6, 4-speed automatic | 4410 | 1205 | 19 | 26 | 18 | 12 | 28 | 21 |
| 214 | Nissan/Infiniti | Pickup truck | Nissan Titan | Conv | Jul-04 | 2004 | SE crew cab 4WD, 5.6-liter V8, 5-speed automatic | 5380 | 1105 | 14 | 18 | 13 | 9 | 18 | 16 |
| 215 | Nissan/Infiniti | Family car | Nissan Altima | Conv | Feb-05 | 2005 | 2.5 S sedan, 2.5-liter Four, 4-speed automatic | 3235 | 860 | 23 | 29 | 23 | 16 | 30 | 28 |
| 216 | Nissan/Infiniti | Pickup truck | Nissan Frontier | Conv | Jul-05 | 2005 | LE crew cab, 4.0-liter V6, 5-speed automatic | 4655 | 1160 | 15 | 20 | 15 | 11 | 21 | 18 |
| 217 | Nissan/Infiniti | Midsized sport-utility vehicle | Nissan Murano | Conv | Apr-05 | 2005 | SL 4-door SUV AWD, 3.5-liter V6, CVT | 4090 | 860 | 20 | 24 | 19 | 14 | 26 | 22 |
| 218 | Nissan/Infiniti | Small sport-utility vehicle | Nissan Xterra | Conv | Aug-05 | 2005 | S 4-door SUV 4WD, 4.0-liter V6, 5-speed automatic | 4480 | 920 | 16 | 21 | 17 | 12 | 23 | 20 |
| 219 | Nissan/Infiniti | Luxury car | Infiniti M35/M45 | Conv | Sep-05 | 2006 | M35 X, sedan AWD, 3.5-liter V6, 5-speed automatic | 4095 | 860 | 17 | 24 | 18 | 12 | 25 | 22 |
| 220 | Porsche | Convertible | Porsche Boxster | Conv | Jun-02 | 2002 | Base convertible, 2.7-liter Six, 5-speed manual | 2960 | 505 | 19 | 27 | 22 | 17 | 28 | 25 |
| 221 | Saab | Upscale car | Saab 9-3 | Conv | Jul-03 | 2003 | Vector sedan, 2.0-liter Four turbo, 5-speed automatic | 3420 | 920 | 21 | 30 | 21 | 14 | 32 | 25 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222 | Saab | Upscale car | Saab 9-5 | Conv | Feb-04 | 2004 | Arc sedan, 2.3-liter Four turbo, 5-speed automatic | 3540 | 930 | 19 | 28 | 21 | 14 | 33 | 26 |
| 223 | Scion | Small car | Scion xA | Conv | Aug-04 | 2004 | 4-door hatchback, 1.5-liter Four, 4-speed automatic | 2400 | 825 | 32 | 38 | 30 | 20 | 40 | 37 |
| 224 | Scion | Small car | Scion xA | Conv | Aug-04 | 2004 | 4-door hatchback, 1.5-liter Four, 5-speed manual | 2355 | 825 | 32 | 38 | 31 | 22 | 38 | 39 |
| 225 | Scion | Small car | Scion xB | Conv | Aug-04 | 2004 | wagon, 1.5-liter Four, 4-speed automatic | 2485 | 825 | 30 | 34 | 30 | 23 | 37 | 35 |
| 226 | Scion | Small car | Scion xB | Conv | Aug-04 | 2004 | wagon, 1.5-liter Four, 5-speed manual | 2450 | 825 | 31 | 35 | 32 | 25 | 36 | 37 |
| 227 | Subaru | Family car | Subaru Legacy | Conv | Jan-00 | 2000 | L sedan AWD, 2.5-liter Four, 4-speed automatic | 3300 | 850 | 22 | 27 | 22 | 15 | 32 | 28 |
| 228 | Subaru | Family car | Subaru Legacy | Conv | Mar-00 | 2000 | Outback Ltd. wagon AWD, 2.5-liter Four, 4-speed automatic | 3610 | 900 | 22 | 27 | 20 | 14 | 28 | 24 |
| 229 | Subaru | Small wagon | Subaru Forester | Conv | Oct-00 | 2001 | S 4-door SUV AWD, 2.5-liter Four, 4-speed automatic | 3225 | 900 | 22 | 26 | 20 | 15 | 26 | 25 |
| 230 | Subaru | Family car | Subaru Legacy/Outback | Conv | Oct-01 | 2001 | H6 VDC wagon AWD, 3.0-liter Six, 4-speed automatic | 3790 | 900 | 20 | 27 | 20 | 13 | 28 | 25 |
| 231 | Subaru | Small car | Subaru Impreza | Conv | Jul-02 | 2002 | 2.5 RS sedan AWD, 2.5-liter Four, 4-speed automatic | 3065 | 830 | 22 | 27 | 22 | 16 | 27 | 25 |
| 232 | Subaru | Small car | Subaru Impreza | Conv | Aug-02 | 2002 | Outback Sport wagon AWD, 2.5-liter Four, 4-speed automatic | 3110 | 900 | 22 | 27 | 22 | 15 | 29 | 26 |
| 233 | Subaru | Small car | Subaru Impreza | Conv | Dec-01 | 2002 | WRX sedan AWD, 2.0-liter Four turbo, 5-speed manual | 3110 | 830 | 20 | 27 | 21 | 15 | 28 | 25 |
| 234 | Subaru | Pickup truck | Subaru Baja | Conv | Jun-03 | 2003 | Base crew cab AWD, 2.5-liter Four, 4-speed automatic | 3575 | 800 | 21 | 26 | 20 | 14 | 28 | 24 |
| 235 | Subaru | Small sport-utility vehicle | Subaru Forester | Conv | Jun-03 | 2003 | 2.5 X 4-door SUV AWD, 2.5-liter Four, 4-speed automatic | 3215 | 900 | 21 | 26 | 21 | 15 | 28 | 25 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 236 | Subaru | Family car | Subaru Legacy/Outback | Conv | Jan-03 | 2003 | L Special Edition sedan AWD, 2.5-liter Four, 4-speed automatic | 3360 | 850 | 22 | 29 | 21 | 14 | 30 | 26 |
| 237 | Subaru | Small car | Subaru Impreza | Conv | Dec-03 | 2004 | WRX STi sedan AWD, 2.5-liter Four turbo, 6-speed manual | 3290 | 830 | 18 | 24 | 20 | 15 | 26 | 22 |
| 238 | Subaru | Family car | Subaru Legacy | Conv | Nov-04 | 2005 | 2.5 GT Limited sedan AWD, 2.5-liter Four turbo, 5-speed automatic | 3540 | 850 | 19 | 25 | 18 | 11 | 27 | 22 |
| 239 | Subaru | Family car | Subaru Outback | Conv | Dec-04 | 2005 | 2.5i wagon AWD, 2.5-liter Four, 4-speed automatic | 3545 | 900 | 22 | 28 | 21 | 14 | 31 | 26 |
| 240 | Suzuki | Small sport-utility vehicle | Suzuki Vitara/XL-7 | Conv | May-02 | 2002 | Touring extended SUV 4WD, 2.7-liter V6, 4-speed automatic | 3590 | 1170 | 17 | 20 | 17 | 12 | 22 | 21 |
| 241 | Suzuki | Small car | Suzuki Aerio | Conv | Mar-03 | 2003 | GS sedan, 2.0-liter Four, 4-speed automatic | 2715 | 895 | 26 | 31 | 25 | 18 | 32 | 29 |
| 242 | Suzuki | Small car | Suzuki Forenza | Conv | Aug-04 | 2004 | S sedan, 2.0-liter Four, 4-speed automatic | 2840 | 875 | 22 | 30 | 24 | 16 | 35 | 29 |
| 243 | Suzuki | Small car | Suzuki Forenza | Conv | Aug-04 | 2004 | S sedan, 2.0-liter Four, 5-speed manual | 2815 | 875 | 22 | 30 | 27 | 19 | 36 | 32 |
| 244 | Suzuki | Family car | Suzuki Verona | Conv | May-04 | 2004 | LX sedan, 2.5-liter Six, 4-speed automatic | 3370 | 900 | 20 | 27 | 20 | 14 | 30 | 23 |
| 245 | Toyota/Lexus | Large car | Toyota Avalon | Conv | Feb-00 | 2000 | XLS sedan, 3.0-liter V6, 4-speed automatic | 3455 | 900 | 21 | 29 | 21 | 13 | 33 | 27 |
| 246 | Toyota/Lexus | Family car | Toyota Camry | Conv | May-00 | 2000 | LE sedan, 3.0-liter V6, 4-speed automatic | 3285 | 900 | 19 | 27 | 21 | 14 | 31 | 27 |
| 247 | Toyota/Lexus | Sports/sporty car | Toyota Celica | Conv | Aug-00 | 2000 | GT-S 2-door hatchback, 1.8-liter Four, 6-speed manual | 2570 | 725 | 23 | 32 | 28 | 21 | 36 | 32 |
| 248 | Toyota/Lexus | Small car | Toyota Echo | Conv | Dec-00 | 2000 | sedan, 1.5-liter Four, 5-speed manual | 2150 | 775 | 34 | 41 | 38 | 29 | 46 | 44 |
| 249 | Toyota/Lexus | Convertible | Toyota MR2 | Conv | Aug-00 | 2000 | convertible, 1.8-liter Four, 5-speed manual | 2235 | 425 | 25 | 30 | 31 | 25 | 36 | 34 |
| 250 | Toyota/Lexus | Upscale car | Lexus IS300 | Conv | May-01 | 2001 | sedan, 3.0-liter Six, 5-speed automatic | 3390 | 860 | 18 | 23 | 21 | 15 | 28 | 25 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 251 | Toyota/Lexus | Midsized sport-utility vehicle | Lexus RX300 | Conv | Jul-01 | 2001 | 4-door SUV AWD, 3.0-liter V6, 4-speed automatic | 4065 | 840 | 18 | 22 | 19 | 13 | 23 | 22 |
| 252 | Toyota/Lexus | Midsized sport-utility vehicle | Toyota 4Runner | Conv | Sep-01 | 2001 | SR5 4-door SUV 4WD, 3.4-liter V6, 4-speed automatic | 4135 | 1115 | 16 | 19 | 16 | 11 | 22 | 19 |
| 253 | Toyota/Lexus | Small car | Toyota Corolla | Conv | Feb-01 | 2001 | LE sedan, 1.8-liter Four, 4-speed automatic | 2510 | 850 | 30 | 39 | 29 | 20 | 41 | 35 |
| 254 | Toyota/Lexus | Midsized sport-utility vehicle | Toyota Highlander | Conv | Oct-01 | 2001 | Limited 4-door SUV AWD, 3.0-liter V6, 4-speed automatic | 3915 | 925 | 18 | 22 | 18 | 12 | 24 | 22 |
| 255 | Toyota/Lexus | Large sport-utility vehicle | Toyota Land Cruiser | Conv | Mar-01 | 2001 | 4-door SUV 4WD, 4.7-liter V8, 4-speed automatic | 5435 | 1240 | 13 | 16 | 14 | 9 | 20 | 18 |
| 256 | Toyota/Lexus | Small car | Toyota Prius | Small Hybrid | Dec-00 | 2001 | sedan, 1.5-liter Four hybrid, CVT | 2750 | 800 | 52 | 45 | 41 | 30 | 49 | 49 |
| 257 | Toyota/Lexus | Small sport-utility vehicle | Toyota RAV4 | Conv | Mar-01 | 2001 | 4-door SUV AWD, 2.0-liter Four, 4-speed automatic | 3070 | 760 | 23 | 27 | 22 | 16 | 27 | 26 |
| 258 | Toyota/Lexus | Minivan | Toyota Sienna | Conv | Jan-01 | 2001 | LE minivan, 3.0-liter V6, 4-speed automatic | 4060 | 1160 | 19 | 24 | 18 | 12 | 26 | 24 |
| 259 | Toyota/Lexus | Pickup truck | Toyota Tacoma | Conv | Aug-01 | 2001 | TRD crew cab 4WD, 3.4-liter V6, 4-speed automatic | 3875 | 1225 | 17 | 19 | 16 | 12 | 22 | 19 |
| 260 | Toyota/Lexus | Upscale car | Lexus ES300 | Conv | Mar-02 | 2002 | sedan, 3.0-liter V6, 5-speed automatic | 3540 | 900 | 21 | 29 | 21 | 14 | 34 | 26 |
| 261 | Toyota/Lexus | Family car | Toyota Camry | Conv | Jan-02 | 2002 | LE sedan, 2.4-liter Four, 4-speed automatic | 3240 | 900 | 23 | 32 | 24 | 16 | 35 | 29 |
| 262 | Toyota/Lexus | Family car | Toyota Camry | Conv | Feb-02 | 2002 | XLE sedan, 3.0-liter V6, 4-speed automatic | 3430 | 900 | 20 | 28 | 20 | 13 | 29 | 25 |
| 263 | Toyota/Lexus | Large sport-utility vehicle | Toyota Sequoia | Conv | Nov-02 | 2002 | Limited 4-door SUV 4WD, 4.7-liter V8, 4-speed automatic | 5280 | 1320 | 14 | 17 | 15 | 11 | 20 | 19 |
| 264 | Toyota/Lexus | Luxury car | Lexus LS430 | Conv | Nov-03 | 2003 | sedan, 4.3-liter V8, 5-speed automatic | 4205 | 900 | 19 | 25 | 19 | 12 | 29 | 23 |
| 265 | Toyota/Lexus | Midsized sport-utility vehicle | Toyota 4Runner | Conv | Aug-03 | 2003 | SR5 4-door SUV 4WD, 4.0-liter V6, 4-speed automatic | 4345 | 1035 | 17 | 21 | 16 | 11 | 22 | 19 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 266 | Toyota/Lexus | Large car | Toyota Avalon | Conv | Feb-03 | 2003 | XLS sedan, 3.0-liter V6, 4-speed automatic | 3500 | 900 | 21 | 29 | 21 | 13 | 31 | 26 |
| 267 | Toyota/Lexus | Small car | Toyota Corolla | Conv | Jul-02 | 2003 | LE sedan, 1.8-liter Four, 4-speed automatic | 2595 | 860 | 29 | 38 | 29 | 20 | 39 | 35 |
| 268 | Toyota/Lexus | Small wagon | Toyota Matrix | Conv | Aug-02 | 2003 | XR wagon AWD, 1.8-liter Four, 4-speed automatic | 2985 | 860 | 26 | 31 | 24 | 17 | 33 | 29 |
| 269 | Toyota/Lexus | Upscale car | Lexus ES330 | Conv | Feb-04 | 2004 | sedan, 3.3-liter V6, 5-speed automatic | 3525 | 900 | 20 | 29 | 22 | 14 | 33 | 26 |
| 270 | Toyota/Lexus | Midsized sport-utility vehicle | Lexus GX470 | Conv | Mar-04 | 2004 | 4-door SUV 4WD, 4.7-liter V8, 5-speed automatic | 4825 | 1225 | 15 | 19 | 15 | 11 | 21 | 18 |
| 271 | Toyota/Lexus | Midsized sport-utility vehicle | Lexus RX330 | Conv | Sep-03 | 2004 | 4-door SUV AWD, 3.3-liter V6, 5-speed automatic | 4200 | 925 | 18 | 24 | 18 | 12 | 26 | 21 |
| 272 | Toyota/Lexus | Midsized sport-utility vehicle | Toyota Highlander | Conv | Dec-04 | 2004 | Limited 4-door SUV AWD, 3.3-liter V6, 5-speed automatic | 4035 | 1160 | 18 | 24 | 19 | 13 | 25 | 22 |
| 273 | Toyota/Lexus | Family car | Toyota Prius | Small Hybrid | May-04 | 2004 | 4-door hatchback, 1.5-liter Four hybrid, CVT | 2950 | 825 | 60 | 51 | 44 | 35 | 50 | 48 |
| 274 | Toyota/Lexus | Small sport-utility vehicle | Toyota RAV4 | Conv | Oct-04 | 2004 | 4-door SUV AWD, 2.4-liter Four, 4-speed automatic | 3135 | 760 | 22 | 27 | 21 | 15 | 28 | 24 |
| 275 | Toyota/Lexus | Minivan | Toyota Sienna | Conv | Oct-03 | 2004 | LE minivan, 3.3-liter V6, 5-speed automatic | 4205 | 1160 | 19 | 27 | 21 | 14 | 30 | 25 |
| 276 | Toyota/Lexus | Pickup truck | Toyota Tundra | Conv | Jul-04 | 2004 | SR5 crew cab 4WD, 4.7-liter V8, 4-speed automatic | 5095 | 1505 | 14 | 17 | 14 | 10 | 18 | 17 |
| 277 | Toyota/Lexus | Luxury car | Toyota Avalon | Conv | Sep-05 | 2005 | XLS sedan, 3.5-liter V6, 5-speed automatic | 3600 | 875 | 22 | 31 | 22 | 15 | 33 | 26 |
| 278 | Toyota/Lexus | Family car | Toyota Camry | Conv | Feb-05 | 2005 | LE sedan, 2.4-liter Four, 5-speed automatic | 3285 | 900 | 24 | 34 | 24 | 16 | 34 | 28 |
| 279 | Toyota/Lexus | Coupe | Toyota Camry Solara | Conv | Jun-05 | 2005 | SLE convertible, 3.3-liter V6, 5-speed automatic | 3620 | 755 | 20 | 29 | 21 | 14 | 31 | 25 |
| 280 | Toyota/Lexus | Minivan | Toyota Sienna | Conv | Mar-05 | 2005 | XLE minivan, 3.3-liter V6, 5-speed automatic | 4365 | 1280 | 19 | 26 | 19 | 13 | 27 | 23 |
| 281 | Toyota/Lexus | Pickup truck | Toyota Tacoma | Conv | Jul-05 | 2005 | Base crew cab, 4.0-liter V6, 5-speed automatic | 4115 | 1100 | 17 | 21 | 17 | 13 | 21 | 20 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 282 | Toyota/Lexus | Luxury car | Lexus GS300/GS430 | Conv | Sep-05 | 2006 | GS300 sedan AWD, 3.0-liter V6, 6-speed automatic | 3915 | 815 | 21 | 27 | 20 | 14 | 29 | 23 |
| 283 | Volkswagen | Small car | Volkswagen Golf | Diesel | Dec-00 | 2000 | GLS TDI 4-door hatchback, 1.9-liter Four turbodiesel, 5-speed manual | 2935 | 935 | 42 | 49 | 41 | 29 | 54 | 50 |
| 284 | Volkswagen | Family car | Volkswagen Passat | Conv | Jul-00 | 2000 | GLS sedan, 2.8-liter V6, 5-speed automatic | 3350 | 1000 | 18 | 26 | 22 | 15 | 30 | 27 |
| 285 | Volkswagen | Family car | Volkswagen Passat | Conv | Mar-00 | 2000 | GLS wagon, 1.8-liter Four turbo, 5-speed automatic | 3330 | 1000 | 20 | 29 | 21 | 14 | 31 | 26 |
| 286 | Volkswagen | Family car | Volkswagen Passat | Conv | Oct-01 | 2001 | GLX wagon AWD, 2.8-liter V6, 5-speed automatic | 3825 | 1070 | 17 | 24 | 18 | 12 | 27 | 23 |
| 287 | Volkswagen | Small car | Volkswagen Jetta | Diesel | Dec-02 | 2002 | GLS sedan, 1.9-liter Four turbodiesel, 4-speed automatic | 3045 | 885 | 34 | 45 | 32 | 22 | 46 | 41 |
| 288 | Volkswagen | Small car | Volkswagen Jetta | Conv | Aug-02 | 2002 | GLS wagon, 1.8-liter Four turbo, 5-speed automatic | 3155 | 1000 | 22 | 29 | 23 | 16 | 32 | 29 |
| 289 | Volkswagen | Small car | Volkswagen New Beetle | Conv | Oct-02 | 2002 | Turbo S 2-door hatchback, 1.8-liter Four turbo, 6-speed manual | 3005 | 750 | 23 | 30 | 25 | 18 | 32 | 29 |
| 290 | Volkswagen | Family car | Volkswagen Passat | Conv | Jan-02 | 2002 | GLS sedan, 1.8-liter Four turbo, 5-speed automatic | 3335 | 1060 | 21 | 30 | 23 | 15 | 35 | 28 |
| 291 | Volkswagen | Family car | Volkswagen Passat | Conv | May-03 | 2003 | GLX sedan, 2.8-liter V6, 5-speed automatic | 3530 | 1060 | 19 | 27 | 21 | 14 | 30 | 25 |
| 292 | Volkswagen | Upscale car | Volkswagen Passat | Diesel | Nov-04 | 2004 | GLS TDI sedan, 2.0-liter Four turbodiesel, 5-speed automatic | 3450 | 1065 | 27 | 38 | 28 | 18 | 42 | 37 |
| 293 | Volkswagen | Midsized sport-utility vehicle | Volkswagen Touareg | Conv | Sep-03 | 2004 | V6 4-door SUV AWD, 3.2-liter V6, 6-speed automatic | 5210 | 1280 | 15 | 20 | 15 | 10 | 20 | 18 |
| 294 | Volkswagen | Small car | Volkswagen New Beetle | Conv | Jun-05 | 2005 | GLS convertible, 1.8-liter Four turbo, 5-speed manual | 3280 | 770 | 25 | 30 | 24 | 18 | 29 | 28 |
| 295 | Volvo | Family car | Volvo S40/V40 | Conv | Jan-00 | 2000 | sedan, 1.9-liter Four turbo, 4-speed automatic | 2960 | 825 | 21 | 28 | 22 | 14 | 31 | 27 |
| 296 | Volvo | Family car | Volvo S40/V40 | Conv | Mar-00 | 2000 | wagon, 1.9-liter Four turbo, 4-speed automatic | 3075 | 825 | 21 | 28 | 21 | 13 | 32 | 26 |

| Veh | Mfr | Vehicle Type | Make & model | Fuel Type | Pub date | Mod Year | Tested version | Curb wt. (lbs.) | Max Load (lbs.) | EPA City | EPA High way | CR Over all | CR City | CR High way | CR 150-mile trip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297 | Volvo | Upscale car | Volvo S60 | Conv | May-01 | 2001 | 2.4T sedan, 2.4-liter Five turbo, 5-speed automatic | 3425 | 890 | 21 | 28 | 21 | 14 | 31 | 25 |
| 298 | Volvo | Upscale wagon | Volvo V70/Cross Country | Conv | Jul-01 | 2001 | XC wagon AWD, 2.4-liter Five turbo, 5-speed automatic | 3815 | 1075 | 17 | 22 | 18 | 12 | 26 | 22 |
| 299 | Volvo | Midsized sport-utility vehicle | Volvo XC90 | Conv | Sep-03 | 2003 | T6 4-door SUV AWD, 2.9-liter Six twin-turbo, 4-speed automatic | 4795 | 1285 | 15 | 20 | 15 | 9 | 25 | 18 |
| 300 | Volvo | Upscale car | Volvo S60 | Conv | Feb-04 | 2004 | 2.5T sedan, 2.5-liter Five turbo, 5-speed automatic | 3465 | 890 | 22 | 30 | 22 | 14 | 35 | 26 |
| 301 | Volvo | Upscale car | Volvo S80 | Conv | Jun-04 | 2004 | T6 sedan, 2.9-liter Six twin-turbo, 4-speed automatic | 3630 | 890 | 19 | 26 | 19 | 12 | 29 | 23 |
| 302 | Volvo | Family car | Volvo S40 | Conv | Nov-04 | 2005 | 2.4i sedan, 2.4-liter Five, 5-speed automatic | 3245 | 950 | 22 | 30 | 23 | 14 | 36 | 29 |
| 303 | Volvo | Family car | Volvo V50 | Conv | Dec-04 | 2005 | T5 wagon AWD, 2.5-liter Five turbo, 5-speed automatic | 3555 | 800 | 19 | 26 | 20 | 13 | 32 | 26 |

## APPENDIX B

To show that $1.11 \times EPA_{FleetAvgMPG} \le CAFE_{FleetAvgMPG} \le 1.28 \times EPA_{FleetAvgMPG}$, consider the following bounds for the overall MPG estimates:

$$EPA_{Overall} = \frac{1}{\frac{0.55}{EPA_{City}} + \frac{0.45}{EPA_{Highway}}} = \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}}$$

$$> \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.78 \times CAFE_{Highway}}}$$

$$= 0.78 \times \frac{1}{\frac{0.55}{CAFE_{City}} + \frac{0.45}{CAFE_{Highway}}} = 0.78 \times CAFE_{Overall}$$

Likewise,

$$EPA_{Overall} = \frac{1}{\frac{0.55}{EPA_{City}} + \frac{0.45}{EPA_{Highway}}} = \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}}$$

$$< \frac{1}{\frac{0.55}{0.90 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}}$$

$$= 0.90 \times \frac{1}{\frac{0.55}{CAFE_{City}} + \frac{0.45}{CAFE_{Highway}}} = 0.90 \times CAFE_{Overall}$$

Hence,

$$1.11 \times EPA_{Overall} = \frac{1}{0.90} \times EPA_{Overall} < CAFE_{Overall} < \frac{1}{0.78} \times EPA_{Overall} = 1.28 \times EPA_{Overall}.$$

Now, substituting the bounds for the overall MPG estimates yields,

$$EPA_{FleetMPG} = \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{EPA_{Overall,1}} + \frac{Sales_2}{EPA_{Overall,2}} + \ldots + \frac{Sales_n}{EPA_{Overall,n}}}$$

$$< \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{0.90 \times CAFE_{Overall,1}} + \frac{Sales_2}{0.90 \times CAFE_{Overall,2}} + \ldots + \frac{Sales_n}{0.90 \times CAFE_{Overall,n}}}$$

$$= 0.90 \times \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{CAFE_{Overall,1}} + \frac{Sales_2}{CAFE_{Overall,2}} + \ldots + \frac{Sales_n}{CAFE_{Overall,n}}}$$

$$= 0.90 \times CAFE_{FleetMPG}$$

Likewise,

$$EPA_{FleetMPG} = \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{EPA_{Overall,1}} + \frac{Sales_2}{EPA_{Overall,2}} + \ldots + \frac{Sales_n}{EPA_{Overall,n}}}$$

$$> \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{0.78 \times CAFE_{Overall,1}} + \frac{Sales_2}{0.78 \times CAFE_{Overall,2}} + \ldots + \frac{Sales_n}{0.78 \times CAFE_{Overall,n}}}$$

$$= 0.78 \times \frac{Sales_1 + Sales_2 + \ldots + Sales_n}{\frac{Sales_1}{CAFE_{Overall,1}} + \frac{Sales_2}{CAFE_{Overall,2}} + \ldots + \frac{Sales_n}{CAFE_{Overall,n}}}$$

$$= 0.78 \times CAFE_{FleetMPG}$$

Hence,

$$1.11 \times EPA_{FleetMPG} = \frac{1}{0.90} \times EPA_{FleetMPG} < CAFE_{FleetMPG} < \frac{1}{0.78} \times EPA_{FleetMPG} = 1.28 \times EPA_{FleetMPG}.$$

ATTACHMENT 2

# Fuel economy

## WHY YOU'RE NOT GETTING THE MPG YOU EXPECT

**For years, automakers have been criticized for producing vehicles that get so-so gas mileage. But as gas prices climb and consumers seek more miles per gallon, it turns out that fuel economy is much worse than it appears—50 percent less on some models, a new Consumer Reports analysis reveals.**

Drivers who track their own fuel economy have long known that their results seldom match the gas mileage claimed by the Environmental Protection Agency on new-car stickers. Our study, based on years of real-world road tests over thousands of miles, quantifies the problem across a wide swath of makes and models.

We compared the claimed EPA fuel economy with the mileage per gallon we measured for 303 cars and trucks for model-years 2000 to 2006. Our selection represents a good cross-section of mainstream, high-volume vehicles. We looked at city, highway, and overall mpg.

Highlights of our study:

- Shortfalls in mpg occurred in 90 percent of vehicles we tested and included most makes and models.
- The largest discrepancy between claimed and actual mpg involved city driving. Some models we tested fell short of claimed city mpg by 35 to 50 percent.
- Hybrids, whose selling point is fuel thriftiness, had some of the biggest disparities, with fuel economy averaging 19 mpg below the EPA city rating.
- The EPA ratings are the result of 1970s-era test assumptions that don't account for how people drive today. Automakers also test prototype vehicles that can yield better mileage than a consumer could get.
- Despite federal certification, it appears that U.S. vehicle fleets, all cars and light trucks produced in one model year, don't meet government fuel-economy standards. For example, fleet mpg for 2003-model-year vehicles we studied was overstated by 30 percent.

For consumers, the news means that their vehicles typically cost hundreds more per year to operate than they were led to believe. Put another way, when gas in August hit $2.37 per gallon, the mpg shortchange effectively boosted the price for some motorists to $3.13 per gallon.

For the nation, where the fleet average fuel economy is near its lowest point in 17 years, the findings suggest that the country is far short of its energy goals.

"We are concerned about the differences," Margo Oge, director of the EPA's Office of Transportation and Air Quality, said of our study. "I think we can do a better job to help consumers assess actual fuel economy."

### HOW THEY TEST, HOW WE TEST

Almost from the dawn of EPA testing in 1975, automobile buyers have com-

## closeup

### FOR CITY DRIVING, CLAIMED MPG IS WAY OFF

**The biggest gaps between claimed and actual miles per gallon are in city driving. That's because the federal test protocol is far afield of how people really drive. For the vehicles listed below, the shortfall was 35 to 50 percent of claimed mpg.**

| VEHICLE TYPE | MAKE & MODEL | CITY MPG | | |
|---|---|---|---|---|
| | | EPA mpg | CR mpg | EPA shortfall |
| SMALL SUV | Jeep Liberty Diesel Ltd. 4WD | 22 | 11 | 50% |
| HYBRID | Honda Civic sedan | 48 | 26 | 46 |
| LARGE SEDAN | Chrysler 300 C | 17 | 10 | 41 |
| MIDSIZED SUV | Chevrolet TrailBlazer EXT LT 4WD | 15 | 9 | 40 |
| MINIVAN | Honda Odyssey EX | 20 | 12 | 40 |
| LUXURY SEDAN | BMW 7 Series 745Li | 18 | 11 | 39 |
| PICKUP | Dodge Ram 1500 SLT crew cab 4WD | 13 | 8 | 38 |
| FAMILY SEDAN | Oldsmobile Alero GL | 21 | 13 | 38 |
| LARGE SUV | Dodge Durango Limited 4WD | 13 | 8 | 38 |
| SMALL SEDAN | Ford Focus ZX4 SES | 26 | 17 | 35 |

plained that the government rating was impossible to achieve. In 1984, a rising clamor from consumers prompted the EPA to shave its test results by 10 percent for city mpg and 22 percent for highway mpg. But the agency did not change its test protocols and rules, which the Government Accountability Office had criticized in 1981. This "adjusted mpg" is what you find on a new car's window sticker today.

In the two decades since, the driving world continued to change, and the EPA rating again drifted from real-world mpg.

For one thing, Americans drive more miles in dense traffic. "Idle times are longer in real life than in the EPA test cycle; you're stopped at traffic lights longer," says Mike Duoba, who is an engineer at the Department of Energy's Argonne National Laboratory near Chicago and has studied the EPA test.

Many automobiles today spend 62 percent of their annual miles in city stop-and-go traffic, where fuel economy is the lowest. The EPA formula still uses a 55/45 percent city/highway ratio to calculate combined fuel economy.

Vehicles have also changed. Computerized engine systems have improved efficiency, but the potential fuel savings has been traded for increased engine horsepower. Since 1981, horsepower is up 89 percent for cars and 99 percent for trucks. Automatic transmissions, air conditioning, four-wheel drive, and bigger and heavier vehicles are also more common, all of which burn more gas. Moreover, vehicles burn up to 10 percent more fuel per mile simply by traveling at today's faster highway speeds.

Automakers conduct the government fuel-economy tests on a laboratory dynamometer. They can use hand-built prototype vehicles, within the EPA rules, to maximize miles per gallon in simulated city and highway driving. "Anybody taking a test, you're going to figure out what the rules are and figure how to optimize your chances of passing that test," says Reg Modlin, director of environmental affairs for Daimler-Chrysler. "So in that sense, yes, everyone attempts to put their best face on for the test."

By contrast, Consumer Reports testers check fuel economy on roads and on our test track. We buy models anonymously from dealers, as consumers do.

We gauge overall fuel economy from our city, highway, and mixed-driving tests. Overall, the gas-powered vehicles we studied delivered 9 percent fewer mpg on average than their EPA stickers claimed; diesels and hybrids, 18 percent fewer mpg than claimed. The numbers ranged from 21 percent better than the EPA sticker to 28 percent worse.

The discrepancy between our numbers and the EPA's is increasing. For gas-powered vehicles, the shortfall was 6 percent for 2000-model-year cars that we tested, but about 12 percent for 2005- and 2006-model-year cars.

**HYBRID HYPE** **Our road tests show that hybrid vehicles, especially, get fewer miles per gallon than claimed. We checked mpg for the Honda Accord Hybrid, at right, using a fuel meter attached to a readout, like the one below.**

Big differences between claimed and actual city mpg were the main reason for the discrepancy in overall mpg. Our city mpg figures ranged from 13 percent better than the EPA sticker to 50 percent worse. On average, our highway mpg more closely reflected the EPA rating.

Ironically, six fuel-thrifty hybrids we tested had some of the largest discrepancies, mostly on city mpg, where real fuel economy ranged from 11 to 25 mpg below EPA ratings. City traffic is supposed to be the hybrids' strong suit, but their shortfall amounted to a 40 percent deficit, on average. Still, hybrids won three of the best five spots in our tests for overall mpg, along with the diesel Volkswagen Golf and the all-gas Toyota Echo.

## HOW YOU'RE SHORTCHANGED

The EPA ratings do allow comparisons among models, so that consumers can trust that the fuel economy of the Honda Civic EX (33 claimed mpg, 29 actual) is considerably better overall than that of the BMW X5 (18 claimed mpg, 17 actual). But as a predictor of real miles per gallon, if the EPA ratings are exaggerated, they are a deceptive sales tool.

Consumers are clearly frustrated. "According to Honda, the Element gets 21 mpg," says Tom Mannino, a retired firefighter from Staten Island, N.Y., one of many readers who have complained to Consumer Reports about being short-changed. "My Element, however, gets 14 mpg. Isn't this false advertising?"

Our study found that only 10 percent of vehicles achieved fuel economies as good as or better than EPA estimates, including the 2003 Infiniti FX35, the 2004 Chrysler Crossfire, and the 2000 Honda S2000 convertible.

The EPA's estimates can cause real pain at the pump over the five years you're likely to own the vehicle. The extra fuel cost depends on make and model: $1,316 more for a Nissan Quest, an extra $1,742 for a Mercury Grand Marquis LSE, and $2,558 more for a Dodge Ram 1500. That assumes driving 12,000 miles per year and no further rise in gas prices.

## WHO BENEFITS

Bigger problems emerge when incorrect fuel-economy numbers are used by Congress and the National Highway Traffic Safety Administration to set U.S. energy policy and enforce fuel-economy standards. Here, the distortion is magnified to the benefit of three groups:

- Automakers, who get false passing grades on fuel-economy standards.
- Government, including lawmakers, who can point voters to their "successful" standards, and regulators, who can appear to crack the whip while actually going easy on a powerful industry lobby.
- Oil interests, which benefit from the seeming energy efficiency of what appears to be a responsible national energy policy.

Federal fuel-economy requirements were enacted in 1975 in response to the 1973 Arab oil embargo, which sparked fuel shortages and sent gas prices skyrocketing. The requirements, known as Corporate Average Fuel Economy (CAFE, pronounced café) standards, are national goals designed to prod automakers to produce more fuel-thrifty vehicles.

In 1975, passenger cars got only 14 mpg on average, light trucks just 10.5. By 1985, CAFE required the fleet of passenger cars to average 27.5 mpg and light trucks, 19.5. The different standards for cars and trucks can be traced back to the late 1970s, when the auto industry pressured Congress to cut the mileage requirements for light trucks, which included mainly pickup trucks and cargo vans used commercially.

That move had unanticipated consequences when light trucks, including pickups, SUVs, and minivans, began to take off in sales as passenger vehicles. Today, that segment accounts for about half of all new vehicles sold. In addition, CAFE standards don't apply to vehicles that exceed 8,500 pounds when fully loaded, such as GM's Hummer H2 and the Ford Excursion.

NHTSA uses the EPA ratings, automobile manufacturing data, and a set of formulas to calculate the average fuel consumption for the entire fleet of cars and trucks sold each model year. By doing so, NHTSA ensures that automakers meet CAFE standards.

Automakers that don't comply are subject to fines; since 1983, they've paid more than $625 million. But CAFE credits and loopholes allow many automakers to reduce or avoid payments. For example, Subaru raised the ground clearance of its 2005 Outback sedan and wagon by about an inch. That change qualified the vehicles as light trucks as defined by CAFE, meaning they could meet that category's lower fuel economy standards.

Because EPA ratings are inaccurate, resulting national fleet estimates are wrong, too. In fact, NHTSA's national estimate is farther off-base than the EPA sticker mpg. That's because Congress requires NHTSA to use the unadjusted EPA test results. They are higher than the adjusted mpg and thus more inaccurate.

Why the congressional mandate? Automakers argued that if the lower, adjusted EPA ratings represented real-world fuel economy, then the CAFE standards should have been relaxed accordingly to reflect the new reality. "Nobody wanted to go to that trouble," says Michael Love, national regulatory affairs manager for Toyota. But Russell Long, founder of Bluewater Network, a San Francisco-based environmental group that has petitioned the government for more accurate new-car fuel-economy stickers, has a different explanation. "Automakers give terrific amounts of money to members of Congress," he says. NHTSA officials declined to be interviewed for this report.

If more-accurate mpg figures were used to rate CAFE compliance, most automakers would fail to meet the standards, our study shows. For example, the fleet fuel economy for the 2003 model year was off by 30 percent when calculated using our road tests. By NHTSA's reckoning, the fleet of 2003-model-year passenger cars we tested averaged 29.7 mpg. We got no better than 22.7, below the federal target of 27.5 mpg. NHTSA says the fleet of light trucks in our tests averaged 21.4 mpg; we got only 16, below the 20.7 mpg target.

The mpg inflation has allowed automakers to trade fuel economy for per-

## whatyoucando

### BUY A FUEL-EFFICIENT VEHICLE

**Look for a vehicle that gets good fuel economy for its class. The vehicles at right have provided the best and worst overall fuel economy within their class in our recent tests, and they are still sold. Some appear in more than one category, if appropriate.**

**Toyota Scion xB**

**SMALL CARS**

| Best | Overall mpg |
|---|---|
| *(manual transmission)* | |
| Honda Insight | 51 |
| Toyota Echo | 38 |
| Toyota Scion xB | 32 |
| Toyota Scion xA | 31 |
| *(automatic transmission)* | |
| Toyota Prius | 44 |
| Honda Civic Hybrid | 36 |
| Toyota Scion xA | 30 |
| Toyota Scion xB | 30 |
| **Worst** | |
| *(automatic transmission)* | |
| Subaru Impreza 2.5 RS | 22 |
| Chevrolet Cobalt LS | 23 |

### OTHER WAYS TO SAVE MONEY ON AUTO TRAVEL

›››**Be skeptical of EPA ratings.** The EPA sticker can help you evaluate relative gas mileage among vehicles, but not absolute mpg. Until the EPA ratings are made more realistic, discount the EPA sticker numbers for city travel as follows: conventional cars and trucks, 30 percent; larger hybrids, 35 percent; diesels, 36 percent; smaller hybrids, 42 percent.

›››**Buy regular.** If your car owner's manual doesn't recommend a particular grade of gasoline, fill 'er up with regular. And don't waste money on so-called gas-saving devices; our tests have shown that they don't work.

›››**Walk, bike, or "chain."** Fuel economy is worst on short trips. These trips also create the most exhaust emissions and

formance features that draw buyers. Between 1987 and 2005, car and light-truck manufacturers slashed 0-60 acceleration time by 24 percent and bulked up average vehicle weight by 27 percent. Consequently, these vehicles got 1.1 fewer miles per gallon in 2005 than they did in 1987.

Automakers have lobbied against tougher standards, saying that higher mpg is technologically difficult to achieve and that they're making vehicles the public wants. If consumer demand were not a consideration, light trucks could be getting 28 mpg and cars, 38, says John German, manager of Honda's environmental and energy analysis. "The role of government is to create mandates or incentives so some of the ongoing engine-technology-efficiency gains go to fuel economy and not just more horsepower," he says.

Automakers have also stirred fears that to achieve greater fuel economy, vehicles would have to shed weight, which would lead to more traffic deaths because occupants in lighter vehicles have a lower survival rate in crashes. Some of the horsepower gains, however, could be traded for improved fuel economy without lightening the vehicles, German says.

Inflation of mpg has also let Congress stave off public pressure for better fuel economy. More than 80 percent of 1,221 adults, in a nationally representative sample surveyed by Consumer Reports in May 2004, said the government should raise fuel-efficiency standards. Congress, however, has kept CAFE standards at the 1990 level of 27.5 mpg for cars. For light trucks, the standard was frozen at 20.7 mpg from 1996 through 2004 and will be raised to 22.2 mpg by 2007.

Finally, mpg inflation has helped energy policies. The exaggerated EPA and NHTSA estimates forestall demand for more fuel-efficient cars and alternative fuels. And the country gets a distorted view of U.S. energy needs.

### REGAINING LOST GROUND

Consumers Union, publisher of Consumer Reports, supports raising CAFE standards and revising EPA's test.

The EPA says it will propose changes in how it reports fuel economy to the public. But Congress voted to cut back on tax breaks for motorists who buy fuel-efficient hybrids. For more about fuel-economy claims, see Viewpoint on page 65.

**Free at ConsumerReports.org**

Learn more about our fuel-economy tests vs. government tests, and see results for 303 vehicles, available free from Sept. 7 through Nov. 2. Click on Autos, then select "Fuel economy."

**FAMILY SEDANS**

| Best | Overall mpg |
|---|---|
| Toyota Prius | 44 |
| Volkswagen Passat GLS TDI | 28 |
| Honda Accord Hybrid | 25 |
| **Worst** | |
| Subaru Legacy GT | 18 |
| Hyundai XG350 | 19 |

**LARGE SEDANS**

| Best | Overall mpg |
|---|---|
| Toyota Avalon | 22 |
| Mercury Montego FWD | 21 |
| Ford Five Hundred | 21 |
| **Worst** | |
| Mercury Grand Marquis LSE | 16 |
| Ford Crown Victoria LX | 16 |
| Chrysler 300 C | 16 |

**THREE-ROW SUVs**

| Best | Overall mpg |
|---|---|
| Toyota Highlander Ltd. (V6) | 19 |
| Acura MDX | 17 |
| Honda Pilot | 17 |
| **Worst** | |
| Ford Expedition Eddie Bauer | 12 |
| Dodge Durango Limited 5.7 | 12 |

**TWO-ROW SUVs**

| Best | Overall mpg |
|---|---|
| Toyota Highlander Ltd. (V6) | 19 |
| Nissan Murano | 19 |
| **Worst** | |
| GMC Envoy SLT | 15 |
| Chevrolet TrailBlazer LT | 15 |
| Volkswagen Touareg | 15 |

**PICKUPS (4-DOOR CREW CAB, 4WD)**

| Best | Overall mpg |
|---|---|
| Subaru Baja | 20 |
| Toyota Tacoma | 17 |
| **Worst** | |
| Dodge Ram SLT 5.7L | 11 |
| Dodge Ram SLT 4.7L | 12 |

**SMALL SUVs**

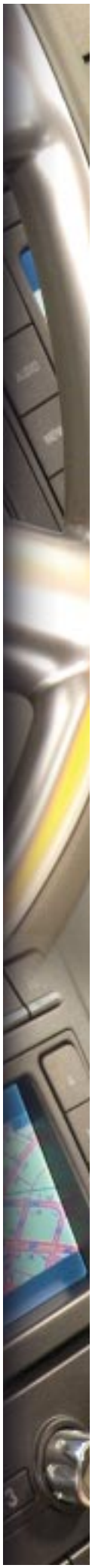
| Best | Overall mpg |
|---|---|
| Ford Escape Hybrid | 26 |
| Honda CR-V EX | 21 |
| Subaru Forester 2.5 X | 21 |
| Toyota RAV4 | 21 |
| **Worst** | |
| Jeep Wrangler Unltd. (6-cyl.) | 14 |
| Jeep Liberty Sport (V6) | 15 |
| Kia Sorento LX | 15 |

cause the most engine wear. Half of all car trips are under six miles, within walking or biking distance. If you must drive, "chain" several errands into a single trip on a warm engine instead of making separate short trips throughout the day.

**Avoid highway drag.** At highway speeds, where fuel economy is best, more than 50 percent of engine power goes to overcoming aerodynamic drag. Try not to add to that drag by carrying things on top of your vehicle. A loaded roof rack can decrease a car's fuel economy by 5 percent. Even empty ski racks waste gas.

**Keep your vehicle in top shape.** A poorly maintained engine can cut gas mileage by 10 to 20 percent. A clogged air filter can cause up to a 10 percent increase in fuel consumption. Underinflated tires require more energy to roll and can reduce fuel economy by 5 percent. Follow the maintenance schedule in your owner's manual, and keep the tires properly inflated.

**Drive smart.** As much as possible, avoid hard acceleration and braking. Once up to speed, maintain a steady pace in top gear; varying your speed a lot wastes fuel. A vehicle's gas mileage decreases rapidly at speeds above 60 mph. With most gasoline engines, it's more efficient to turn off the engine than to idle for any longer than 30 seconds. If you have air conditioning, use it sparingly.



**NOTE: The box below will go on CRO ONLY.**

## OUR TESTS VS. GOVERNMENT TESTS

### THE VEHICLES

**Our tests.** We anonymously buy production models at retail. All vehicles are preconditioned for about 2,000 miles. Tire pressures are set to manufacturer specifications.

**Government tests.** Automakers are allowed to use hand-built prototypes.

### DRIVING CONDITIONS

**Our tests.** All testing is done outdoors year-round, never during precipitation, with all results adjusted to a standard temperature of 60° F. For gasoline-electric hybrids, we start our tests with the battery at the charge level you normally find—about half. A calibrated fuel-flow meter is used to measure gas consumption.

**Government tests.** EPA fuel-economy tests are done in a laboratory with the test vehicle's drive wheels resting on a dynamometer, which has a roller that allows the automobile to simulate driving while remaining stationary. Gasoline consumption is calculated based on the amount of carbon emitted from the vehicle's tailpipe, which the EPA says is more accurate than a fuel gauge.

To test all-wheel-drive vehicles, automakers and the EPA remove the front prop shaft and adjust the inertia weight on the dynamometer to account for four-wheel-drive factors. To test hybrid fuel economy, the EPA method allows automakers to start with a fully charged battery.

The EPA tests represent driving in southern California at 75° F on a road with no curves or grades, which is ideal for optimizing fuel economy.

### CITY MPG

**Our tests.** These tests are stop-and-go city-driving simulations on our test track, which has a total of 18 stops and 4 minutes of total idle time. Top speed is 40 mph. Two different testers each drive three runs for a total of six 2-minute, 40-second trials on every test vehicle. Total test time is approximately 16 minutes.

**Government tests.** The city test simulates stop-and-go city driving with 23 stops and includes 5 minutes and 35 seconds of total idle time. Top speed is 56 mph. A professional driver manipulates the gas and brake pedals to follow a prescribed schedule of acceleration and braking while monitoring progress on a real-time graph on a computer display. The test runs for 31 minutes.

### HIGHWAY MPG

**Our tests.** The highway tests are run on a specific section of state Route 2 near our test facility in central Connecticut. Two testers make eight 5-mile runs at a constant 65 mph. The tests are run in both directions to limit the effects of wind and grade differences. Each run is timed and limited to 4 minutes, 38 seconds. Total test time is approximately 37 minutes.

**Government tests.** These tests simulate free-flow rural and interstate-highway driving. The professional driver starts from zero, maintains a fairly smooth speed averaging 48 mph, then slows to zero over a prescribed 12-minute, 30-second schedule. While under way, speeds range from 30 to 60 mph.

### OTHER DIFFERENCES

**Our tests.** We run a test that the government doesn't require: a one-day trip test, which reflects a mixed driving cycle. Five different engineers drive back-to-back on the same day over a 31-mile route that includes 26 percent (8.2 miles) freeway, 11 percent (3.6 miles) highway, and 63 percent (19.2 miles) stop-and-go driving conditions.

**Government tests.** Automakers conduct the fuel-economy tests and submit their results to the EPA for certification. The EPA retests 10 to 15 percent of the vehicles. The EPA says that less than 10 percent of the retests are significantly different than the original automaker tests.

### THE MATH

**Our tests.** Trials within each type of test are averaged and corrected for ambient temperature to produce our published city and highway mpg ratings and our one-day trip rating. Our published overall mpg estimate is calculated as an equally weighted harmonic average of the city, highway, and one-day-trip results.

**Government tests.** The raw test results are adjusted downward by 10 percent for city mpg and 22 percent for highway mpg, and a combined mpg is calculated as a weighted harmonic average using the two in a 55/45 city/highway ratio. Those adjusted figures are the ones published on vehicle fuel-economy stickers.