



**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

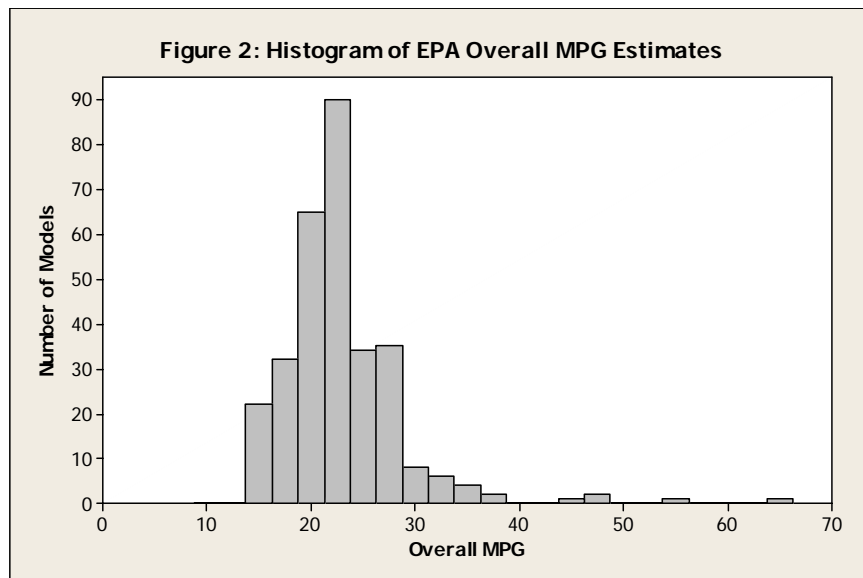
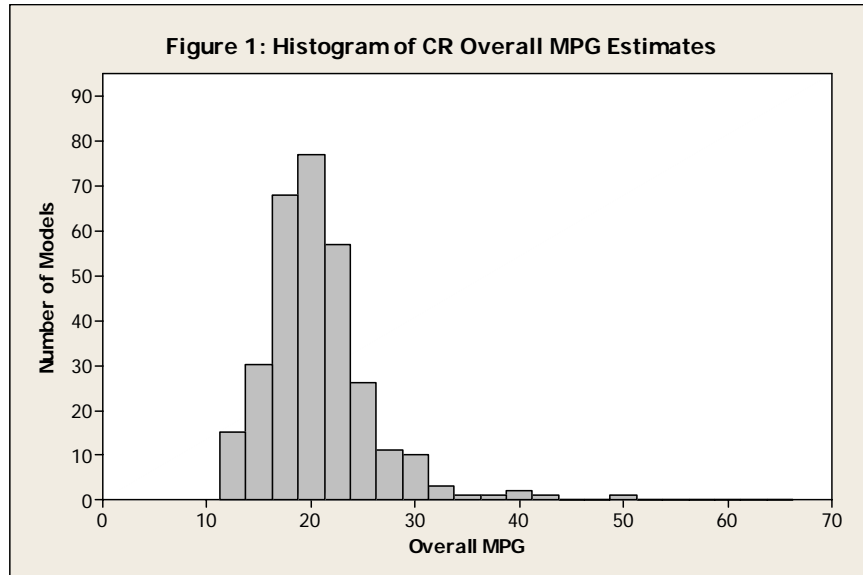
The following figures display histograms of the individual MPG data. Figures 1 and 2 show the distribution of the CR Overall MPG and EPA Overall MPG estimates for the 303 new vehicles from model year 2000 to model year 2006. With the exception of the Toyota Echo, the observations with the highest overall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

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

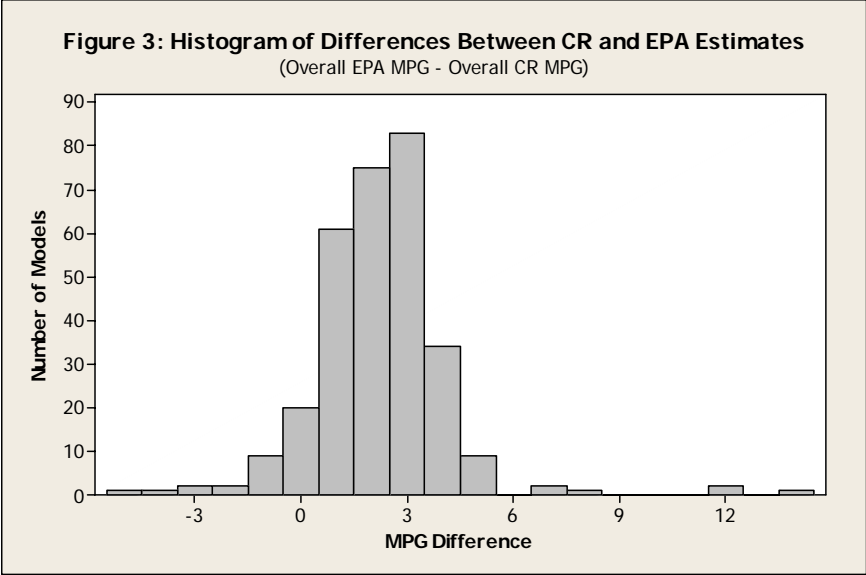
Likewise, the EPA Overall MPG estimates were calculated as a harmonic average of the EPA City and EPA Highway MPG estimates in accordance with the definition used by EPA:

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



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.

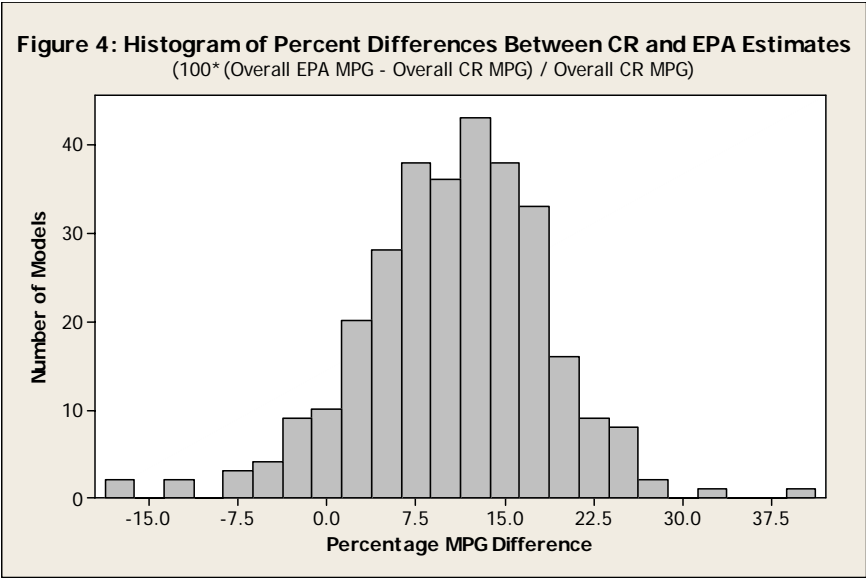
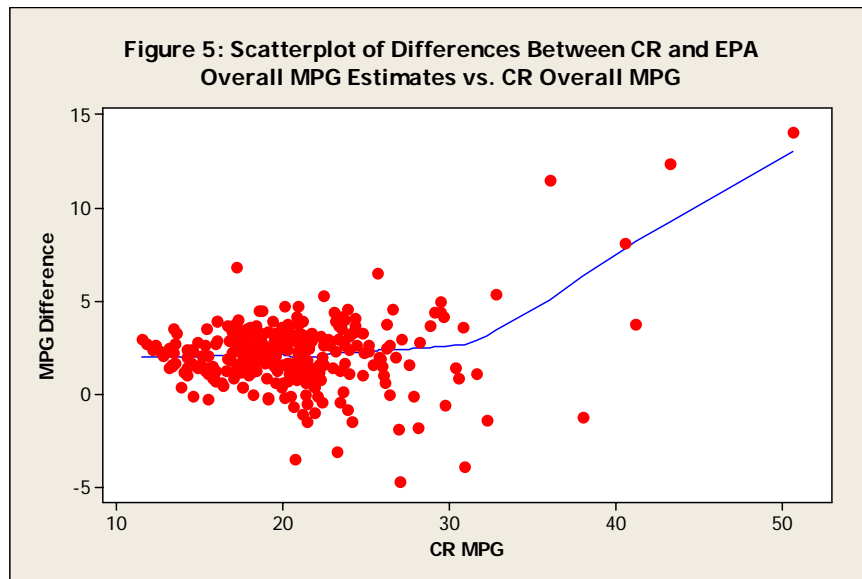


Figure 5 is a scatterplot of the differences between the CR and EPA MPG estimates plotted against the CR Overall MPG estimates. The smooth line is a lowess curve (locally weighed scatterplot smoothing) which shows the trend in the relationship

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

Category	# Models	MPG Difference			Percent MPG Difference		
		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 Category

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
	Expected					

* 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:

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

In this equation, $Sales_i$, $i=1,2, \dots, n$, 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)

Vehicle Category	# Matched Models	Sales of Tested Models	Estimated Model Year 2003 Fleet Average MPG								
			CR			EPA			CAFE		
			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)

Vehicle Category	# Matched	Sales of	Percent Differences in Estimated Fleet Averages		
			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.,

$$1.11 \times EPA_{FleetAvgMPG} \leq CAFE_{FleetAvgMPG} \leq 1.28 \times EPA_{FleetAvgMPG}$$

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)

Vehicle Category	# Matched Models	Sales of Tested Models	Estimated Model Year 2003 Fleet Average MPG								
			CR			EPA			CAFE		
			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)

Vehicle Category	# Matched Models	Sales of Tested Models	Percent Differences in Estimated Fleet Averages		
			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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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

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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

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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

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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

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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

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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

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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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 Highway	CR Overall	CR City	CR Highway	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 $1.11 \times EPA_{FleetAvgMPG} \leq CAFE_{FleetAvgMPG} \leq 1.28 \times EPA_{FleetAvgMPG}$, consider the following bounds for the overall MPG estimates:

$$\begin{aligned}
 EPA_{Overall} &= \frac{1}{\frac{0.55}{EPA_{City}} + \frac{0.45}{EPA_{Highway}}} = \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}} \\
 &> \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.78 \times CAFE_{Highway}}} \\
 &= 0.78 \times \frac{1}{\frac{0.55}{CAFE_{City}} + \frac{0.45}{CAFE_{Highway}}} = 0.78 \times CAFE_{Overall}
 \end{aligned}$$

Likewise,

$$\begin{aligned}
 EPA_{Overall} &= \frac{1}{\frac{0.55}{EPA_{City}} + \frac{0.45}{EPA_{Highway}}} = \frac{1}{\frac{0.55}{0.78 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}} \\
 &< \frac{1}{\frac{0.55}{0.90 \times CAFE_{City}} + \frac{0.45}{0.90 \times CAFE_{Highway}}} \\
 &= 0.90 \times \frac{1}{\frac{0.55}{CAFE_{City}} + \frac{0.45}{CAFE_{Highway}}} = 0.90 \times CAFE_{Overall}
 \end{aligned}$$

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,

$$\begin{aligned}
 EPA_{FleetMPG} &= \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{EPA_{Overall,1}} + \frac{Sales_2}{EPA_{Overall,2}} + \dots + \frac{Sales_n}{EPA_{Overall,n}}} \\
 &< \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{0.90 \times CAFE_{Overall,1}} + \frac{Sales_2}{0.90 \times CAFE_{Overall,2}} + \dots + \frac{Sales_n}{0.90 \times CAFE_{Overall,n}}} \\
 &= 0.90 \times \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{CAFE_{Overall,1}} + \frac{Sales_2}{CAFE_{Overall,2}} + \dots + \frac{Sales_n}{CAFE_{Overall,n}}} \\
 &= 0.90 \times CAFE_{FleetMPG}
 \end{aligned}$$

Likewise,

$$\begin{aligned}
 EPA_{FleetMPG} &= \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{EPA_{Overall,1}} + \frac{Sales_2}{EPA_{Overall,2}} + \dots + \frac{Sales_n}{EPA_{Overall,n}}} \\
 &> \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{0.78 \times CAFE_{Overall,1}} + \frac{Sales_2}{0.78 \times CAFE_{Overall,2}} + \dots + \frac{Sales_n}{0.78 \times CAFE_{Overall,n}}} \\
 &= 0.78 \times \frac{Sales_1 + Sales_2 + \dots + Sales_n}{\frac{Sales_1}{CAFE_{Overall,1}} + \frac{Sales_2}{CAFE_{Overall,2}} + \dots + \frac{Sales_n}{CAFE_{Overall,n}}} \\
 &= 0.78 \times CAFE_{FleetMPG}
 \end{aligned}$$

Hence,

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