



FUEL ECONOMY AND FACTORS THAT INFLUENCE FUEL ECONOMY

CHEVROLET MAKES SENSE FOR AMERICA



THE FUEL ECONOMY LABELING PROGRAM IS ENTERED INTO VOLUNTARILY BY GENERAL MOTORS CORPORATION IN COOPERATION WITH THE U.S. ENVIRONMENTAL PROTECTION AGENCY TO ACQUAINT OUR CUSTOMERS WITH FACTORS THAT INFLUENCE FUEL CONSUMPTION.

AN EPA LABEL IS DISPLAYED ON THE WINDOW OF ALL GENERAL MOTORS CORPORATION PASSENGER CARS AND SMALL TRUCKS WHICH IS INTENDED TO GIVE SOME RELATIVE RATING OF FUEL ECONOMY. AS STATED ON THE EPA LABEL, IT IS NOT INTENDED TO PREDICT WHAT YOU WILL OBTAIN WITH A PARTICULAR CAR BECAUSE MANY FACTORS ARE INVOLVED IN DETERMINING WHAT FUEL ECONOMY YOU WILL ACHIEVE WITH YOUR OWN GENERAL MOTORS CORPORATION CAR.

THE FUEL ECONOMY NUMBERS APPEARING ON THE EPA LABEL ARE BASED UPON AN EPA EMISSION CERTIFICATION TEST CALCULATION AND DO NOT NECESSARILY REFLECT THE ACTUAL FUEL USED IN TYPICAL CAR OPERATION.

THIS BOOKLET EXPLAINS SOME OF THE FACTORS THAT CAN INFLUENCE THE EFFICIENT USE OF THE GASOLINE YOU PURCHASE.

What is fuel economy?

The energy required to drive a car comes from gasoline. The more energy required, the more gasoline consumed. The more gasoline consumed, the more cost to the vehicle owner. The miles driven per gallon of gasoline consumed is fuel economy.

What are the factors that affect fuel economy?

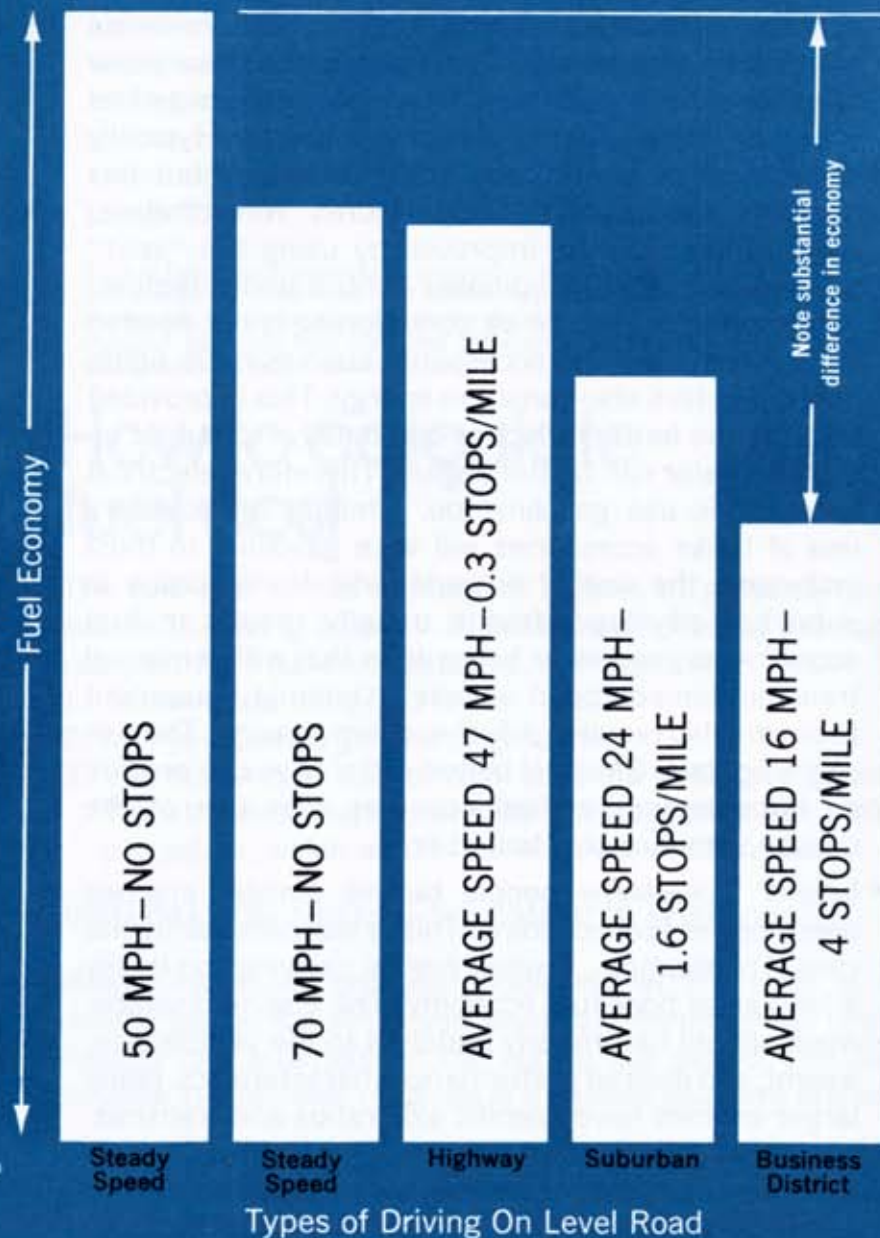
- **Type of Driving**—Fuel economy is different for highway driving, mountain or hilly driving and city stop-and-go driving. The amount of gasoline required to drive your car depends heavily upon the type of driving as well as your own driving habits. The type of driving used by EPA in calculating their fuel economy numbers is a heavy city traffic, commuter-type of driving with 2.4 stops per mile. General Motors uses several different types of driving to measure fuel economy including business district driving (4 stops per mile, this gives fuel economy measurements similar to the EPA test), suburban city driving (1.6 stops per mile), highway driving (0.3 stops per mile) and various constant speed conditions with no stops. Your driving habits and the number of accelerations from a stop back to cruising speed, are probably the most important factors affecting fuel economy. The chart on page 3 shows how these different types of driving can substantially affect fuel economy.
- **Individual Driving Habits**—The rate of acceleration and the car speed greatly affect fuel economy. For example, jack rabbit starts take more gasoline than gradual

acceleration. Gasoline can be conserved (and engine and tire life prolonged) by avoiding unnecessarily rapid acceleration away from traffic lights and stop signs. Frequent stops and starts during a trip really cut down on your miles per gallon as shown in the chart on page 3. Plan even your short shopping trips to take advantage of through streets to avoid traffic lights. Pace your driving like the professional drivers to avoid unnecessary stops. It's a bad habit to pump the accelerator after starting the engine or while waiting for a traffic light to change. Every "pump" of the accelerator pedal means extra gasoline going through the carburetor. Also, high speeds substantially decrease fuel economy. Tests on various cars show that driving at 50 mph versus 70 mph on level roads can result in an average fuel saving of about 20%.

- Maintenance Condition of the Vehicle**—Keeping the engine in proper running order with periodic tune-ups is an important fuel economy factor. Ignition problems (spark plugs, timing, etc.), air cleaner and carburetion problems, if encountered, could decrease fuel economy greatly. More gasoline is normally required when your engine is not running right. One spark plug misfiring on a full-size car, for instance, can decrease fuel economy about 8%. Also, keep your tires inflated to the pressures shown in the owners' manual since under inflated tires waste gasoline. Be sure your parking brake is properly adjusted to avoid drag, and that it is fully released before driving away.
- Weather and Altitude Conditions**—Both cold weather driving and high altitude driving require more gasoline than operation in moderate climates or at low altitudes. In cold weather, short trip cold engine operation can double fuel consumption over similar warmed-up operation.

EFFECT OF TYPE OF DRIVING ON FUEL ECONOMY

No MPG figures are used in this chart. It is intended to illustrate the relative effect of various types of driving on fuel economy.



- **Optional Equipment**—Optional equipment has varying effects on fuel economy. The power steering and power brake systems use very small amounts of energy and have almost no measurable effect on fuel economy. However, air conditioning does have an effect on fuel economy. Therefore, unnecessary use of air conditioning should be avoided to minimize fuel economy losses. Test results on full-size cars typically show about a 1 MPG loss in fuel economy but this depends upon outside temperatures. Nevertheless, fuel economy can be improved by using the “vent” position on the air conditioner control under temperature conditions where air conditioning is not needed for comfort. Electrical accessories such as radio, lights and defrosters also consume energy. This is provided through the battery which is continually recharged by the alternator run by the engine. Therefore, electrical accessories use gasoline too. Limiting unnecessary use of these accessories will save gasoline. In most instances, the use of an automatic transmission in suburban-city type driving usually results in fuel economy as good as or better than that with a manual transmission-equipped vehicle*. Optional equipment tires can also result in a fuel economy saving. The use of the optional GM steel belted radial tires can provide an improvement in fuel economy over use of the usually standard bias belted tires.
- **Engine Size**—Many people believe smaller engines mean better fuel economy. This is not necessarily the case. For example, a small engine carrying too heavy a load gives poor fuel economy. The engine displacement should be properly matched to the vehicle size, weight, and desired performance characteristics. Many larger engines have specific axle ratios and transmission modifications that offer better economy. Be sure to review the choice of engines with the dealer in order to satisfy your particular needs.

- **Vehicle Weight**—Weight as such has an important effect on fuel economy. However, it is of secondary importance as compared to type of driving and driver habits. As an example, if the weight of a typical full-size car is reduced by 1,000# but its size and performance level is maintained, fuel economy under city driving conditions may improve 1.5 to 2.5 miles per gallon. However, it should be noted that at highway speeds this improvement may be less than one mile per gallon.

* This is because the energy consumption, when shifting the manual transmission, balances out efficiency differences between the automatic transmission converter gear set and the manual transmission gear set and because different axle ratios are generally used with the two transmissions.

How to calculate fuel cost

The fuel cost is the number of gallons of gasoline consumed in driving a certain distance multiplied by the cost you paid for a gallon of gasoline. For example:

1. Assume you drive 250 miles
2. and you use 16 gallons of gasoline
3. and the amount you paid for gasoline is 40¢ per gallon.
Then the fuel cost to you is 16 gallons multiplied by 40¢ per gallon, which equals \$6.40 to travel 250 miles.

INFORMATION NEEDED TO COMPUTE FUEL COST.

Miles Driven—Record your odometer at the start of a driving period for which you want to determine fuel cost. Record your odometer at the end of this period. The difference in odometer readings is the miles you have driven.

Gasoline Consumed—Fill your gas tank at the start of the driving period (at the same time you record your initial odometer reading). Keep track of the gallons of gasoline

you buy during the driving period. Fill your gas tank at the end of the driving period. Add all the numbers of gallons you had put into the car during the driving period **including** the last fill-up. The sum total is the number of gallons you have used to travel the distance in miles determined by the difference in start and end of driving period odometer readings.

Fuel Cost—You can determine this by multiplying the cost per gallon of gasoline by the total number of gallons used during the driving period. If the cost varies, or if you wish, the total cost could be determined by keeping track of the amount paid each time gasoline is put into your tank. The amounts are added together to determine the sum total amount paid for gasoline during the driving period. You then have dollars and cents paid to travel a known distance in miles.

The EPA window sticker shows some comparative fuel cost information.

Fuel economy test procedures

Fuel economy can be measured either by operation on the road or in the laboratory. In either case, some driving pattern must be chosen which can be repeated with a number of cars. Usually, the driving pattern is chosen to be representative of a specific kind of customer driving—highway, city, etc. Fuel economy tests are run to provide some indication of the comparative fuel economy which might be obtained with various cars running on the specific type of driving pattern chosen. Examples of the relative test results are shown earlier in this booklet. However, it is important to note, actual customer fuel economy may vary widely. Significant values can be determined only by measuring the fuel used and the miles driven over relatively long periods of time.

Considerations when buying a car

- Where is most of my driving done? City, Highway, Freeway?
- What is the car going to be used for? Work, Shopping, Recreation, Vacation Trips, Weekends? Or all of these?
- What loads? Passenger(s), Baggage, Trailer?
- What accessories will I need for safe, comfortable driving?

Consult with your GM dealer salesman.

Fuel economy considerations when driving

- Keep your engine in proper running order with periodic tune-ups and maintain your vehicle.
- Drive at constant speeds whenever possible.
- Drive at lower highway speeds.
- Avoid unnecessary stops and starts, plan your driving.
- Avoid unnecessary rapid acceleration and jack rabbit starts.
- Use recommended fuels.
- Don't pump the accelerator.
- Plan trips to avoid unnecessary driving.
- Keep tires inflated to recommended pressure.
- Don't "ride the brakes."
- Be sure the parking brake is fully released.
- Turn engine off if idling more than a few minutes.
- Use air conditioning only when necessary.

Additional information

For additional, more detailed publications on this subject, contact the Society of Automotive Engineers, Two Pennsylvania Plaza, New York, New York 10001; The American Petroleum Institute, 18th & K Street, NW, Washington, D.C. 20006; and the American Society of Mechanical Engineers, 345 E. 47th Street, New York, New York 10017.

VEHICLE FUEL ECONOMY RECORD

Beginning Odometer	Finish Odometer	Miles Driven	Gallons of Fuel	Cost of Fuel	Calculations