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DON'T KNOCK THE OCTANE

Gasoline comes in different grades or octane levels. Most places that sell gasoline offer three octane grades of unleaded gasoline. Regular is indexed at 87, mid-grade at 89, and premium at 93. One is best for your car and driving habits, but which one? Here is some information about octane to help you answer that question.

Q. What is octane?

Octane is a measure of a gasoline's ability to resist knock or pinging noise from an engine. In older vehicles, knock may be accompanied by engine run-on. Knock is the sharp, metallic-sounding engine noise that results from uncontrolled combustion. Severe knocking over an extended time may damage pistons and other engine parts. If you can hear knocking, first you should have your engine checked to make sure it is calibrated correctly and does not have a mechanical or electrical problem. If your engine is in good condition and well-tuned, try a different brand of gasoline. Even though the pump octane ratings are the same, fuel parameters, such as octane distribution, are slightly different because of different additives and oxygenates.

In most vehicles no benefit is gained from using gasoline that has a higher octane number. However, in some vehicles equipped with a knock sensor (an electronic device installed in many modern engines that allows the engine management system to detect and reduce knock), a higher-octane gasoline may improve performance only slightly.

Q. What determines my car's octane requirements?

Your car's octane requirements are mainly determined by its basic design. In addition, variations in engines due to manufacturing tolerances can cause cars of the same model to require a different octane of several numbers. Also, as a new car is driven, its octane requirement can increase because of carbon build-up in the combustion chamber. This continues until a stable level is reached, typically after about 25,000 kilometres. The stabilized octane requirement may be 3-6 numbers higher than when the car was new. Premium or midgrade fuel may be advisable to prevent knock.

Q. If I use higher- octane fuel, will it help my vehicle pass an emissions test?

No, due to the slower burn of a high-octane fuel, causing incomplete combustion, the hydrocarbon reading may actually increase. Use the recommendation in your vehicle owner's manual.

Q. What other factors influence your vehicle's knocking characteristics?

Temperature: Generally, the hotter the ambient air and engine coolant, the greater the octane requirement.

Altitude: The higher the altitude above sea level, the lower the octane requirement.

Humidity: The drier the air, the greater the octane requirement.

Your engine's ignition timing: The octane requirement increases as the ignition timing is advanced. The knock sensor signal is, processed by the computer, to adjust ignition timing based on engine load conditions and octane of the gasoline. This reduces the octane requirement and may also reduce vehicle performance.

Method of driving: Rapid acceleration and heavy loading, such as pulling a trailer or climbing a hill, may result in a greater octane requirement. Stop-and-go driving and excessive idling can increase octane requirements by causing the build-up of combustion chamber deposits.

Malfunctions of emission control systems: An improperly functioning emissions control system can affect the octane requirement by changing the air-fuel mixture or by not providing dilution gases through the exhaust gas recirculation (EGR) system. If a malfunction occurs, your vehicle should be taken to a qualified service technician. Warning lights on the driver's instrument panel indicate some problems.

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