

The Motorists' Guide To Clean Unleaded Gasoline

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Introduction

Over the past several years China has been developing a national strategy to address its motor vehicle pollution problems. Even with the relatively small vehicle population today, serious motor vehicle related air pollution problems already exist. However, these problems are expected to get much worse in coming years without an aggressive pollution control strategy.

It is obvious that a cornerstone of this effort must be the introduction of catalyst technology to reduce CO, HC and NOX from gasoline fueled cars. However, numerous studies have shown that these catalysts can only be used with unleaded gasoline; otherwise they are poisoned rapidly and lose their emissions reduction effectiveness.

Lead in gasoline also contributes to increased atmospheric lead, especially in urban areas and has been linked at very low levels with extremely serious adverse health effects, especially in children. For example, a recent study concluded that nearly 70% of the children in Beijing suffer from lead poisoning because of polluted air and other causes. The Beijing Children's Hospital has started lead poisoning tests for children and will soon establish a special lead poisoning treatment center. Lead can affect children's nervous and digestive systems, and even small amounts can stunt a child's intelligence. At higher levels, lead causes anemia in children. Some studies suggest lower levels may cause aggressive behavior.

To address both these concerns, China has embarked on a national strategy to eliminate leaded gasoline entirely before the year 2000. As a first step, lead was eliminated in all gasoline sold in Beijing as of July 1; on October 1, this ban was extended to Shanghai, Guangzhou and some other major cities.

By using lead-free gasoline we can do something to improve our air and our health.

What Is Clean Unleaded Gasoline?

This gasoline is just normal gasoline that is blended to burn more cleanly without lead. Lead has been added to gasoline as a low cost way to boost its octane rating. High octane enables the use of efficient, high performance engines. Other means to raise octane such as better refining of crude oil and the use of oxygen compounds will be used in place of lead to achieve the same high octane.

How Will Unleaded Gasoline Differ from Typical Gasoline Presently Sold?

It will only have trace amounts of lead but will have more non-hazardous high octane blending components.

Why Does China Need Unleaded Gasoline?

Lead is a poison that causes especially severe damage to the intellectual development of young children. It also increases strokes in adults. Further, the use of lead prevents the use of catalytic converters to reduce carbon monoxide, hydrocarbons and nitrogen oxides that are other hazardous pollutants emitted by vehicles. Therefore, unleaded gasoline will lower the health risks from air pollution.

This is especially important in China because nearly 70% of the children in Beijing suffer from lead poisoning because of polluted air and other causes according to a recent study. The Beijing Children's Hospital has started lead poisoning tests for children and will soon establish a special lead poisoning treatment center.

Does Unleaded Gasoline Contain More Toxic Compounds than Leaded Gasoline?

The toxicity of gasoline depends on how it is formulated. Some toxic compounds such as benzene can be used in place of lead to boost octane value but the benzene content of unleaded gasoline need not be higher than with leaded gasoline if it is carefully controlled.

When and Where Will Unleaded Gasoline be Available in China?

Since 1 July 1997, cleaner lead-free gasoline replaced leaded gasoline in Beijing. In October 1997, only lead free gasoline was available in Shanghai, Guangzhou and several other major cities. Before the year 2000, only unleaded gasoline will be sold throughout all of China. Every time you fill up your gasoline tank with unleaded gasoline, you will help protect the quality of the air you and China's children breathe. By doing so, you become a part of one of our nation's most important strategies to reduce pollution from vehicle exhaust emissions.

What Will Happen To Leaded Gasoline?

Gradually over the next two years leaded gasoline will disappear in China. As a result lead in the air will be reduced and children will be healthier.

How Much Will Unleaded Gasoline Cost?

The price of the new gasoline will be slightly more than the leaded fuel. However, the increase will be more than offset by the lower maintenance costs associated with unleaded compared to leaded.

Can My Old Vehicle Use Unleaded Gasoline?

Yes! Much testing has been performed to determine whether older engines without hardened valve seats would be harmed by burning lead-free gasoline. Older gasoline tractors, farm combines, trucks, cars, motorcycles, lawnmowers and marine engines which did not have hardened valve seats were operated for hundreds of hours under high loads using lead-free gasoline. No problems were found using this gasoline compared to using gasoline with lead.

Do Cars Have to be Modified to Use Unleaded Gasoline?

No! As long as the unleaded gasoline has the same octane level as leaded gasoline, it will not require any change to the vehicle. If a slight “pinging” sound is heard on your vehicle when the switch to unleaded takes place, your mechanic can easily adjust the ignition spark to eliminate this problem. This is very unlikely to occur for most vehicles however as the octane levels of gasoline are generally being increased in China at the same time that lead is being eliminated.

The National Environmental Protection Agency (NEPA) has been working cooperatively with the petroleum and vehicle industries to make sure this cleaner gasoline fully meets the needs of China’s cars and trucks. There is nothing that a driver or owner has to do to a vehicle to assure it performs well on this gasoline.

Why Should I Use Unleaded Gasoline?

Removing lead from gasoline will eliminate the threat of lead poisoning by the fumes that come from automobile tailpipes. Lead can injure many organs in the human body particularly the brain, kidney, and reproductive system producing problems in learning among children, kidney damage, infertility, miscarriage and high blood pressure. Of particular concern are exposure to the fetus and young infant.

In addition, once lead is eliminated from gasoline, new cars will be able to have much lower emissions of other harmful gases such as carbon monoxide, hydrocarbons and nitrogen oxides.

Finally, the use of clean lead-free gasoline can save money for vehicle owners by reducing the need for frequent replacements of spark plugs, mufflers and other engine parts exposed to exhaust gas containing lead. A major reason is that the chemicals added to gasoline with lead, known as “scavengers, which prevent heavy lead deposits in the engine, are highly corrosive to engine parts. The life of a spark plug is roughly doubled by

lead-free gasoline. The replacement of the exhaust system and of the exhaust silencer (muffler) is less frequent with lead-free fuel.

Another significant advantage of using lead-free gasoline is the longer time a car can run between oil changes. Gasoline without lead reduces engine rusting and oil ring wear. Because of this, the time between oil changes for cars using lead-free gasoline is twice as long as for cars using leaded gasoline. These less frequent oil changes are primarily due to the use of lead-free gasoline. Therefore, considerable money can be saved by car owners using lead-free gasoline due to less spark plug, exhaust system and oil change maintenance.

Will Unleaded Gasoline Cause a Loss of Power or Fuel Economy?

No! When lead is not added to gasoline, refiners will use other methods to achieve the needed octane such as further processing of the gasoline to increase its energy or adding alcohol or ether compounds. These additions raise octane without harming the health of children and adults and without fouling spark plugs or corroding the exhaust system as lead does. Depending on the method a refiner uses to raise octane, fuel economy (kilometers per liter) should be approximately the same as with leaded gasoline.

What are the Adverse Health Effects of Lead on Children?

Children are particularly vulnerable to injury from lead because of their smaller body size. Low levels of exposure harms the development of the central nervous system leading to behavioral problems such as the inability to follow simple directions and lower scores on intelligence tests. Young people, who had been exposed to high levels of lead as children, have a higher risk of having difficulties reading and learning vocabulary and grammar.

What are the Adverse Health Effects of Lead on Adults?

Most of the lead in the air of a city comes from the lead in gasoline that enters the air through vehicle exhaust emissions. When air containing lead is inhaled, the lead is absorbed by the body and is deposited in the bloodstream. Adults with high lead blood levels show an increase in blood pressure. This high blood pressure causes heart attacks and strokes, some of which are fatal.