

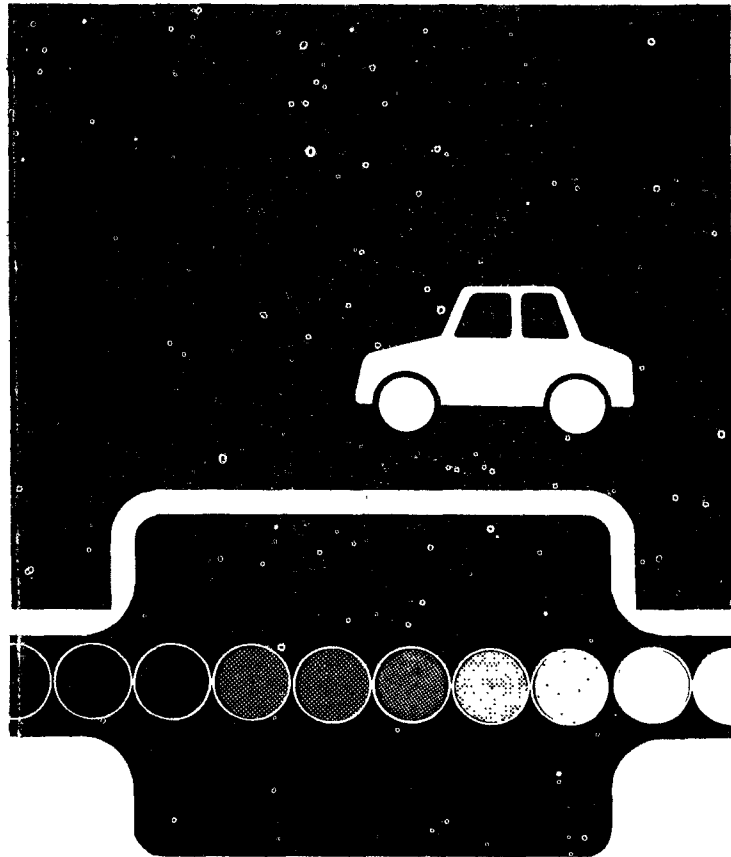
The Catalyst and Clean Air

To meet the tougher auto exhaust limits that went into effect with the production of 1975 model automobiles, U.S. manufacturers are using a catalytic converter system, usually just called a "catalyst," on most of their new cars. In this system, the exhaust passes through catalytic material in a stainless steel container so that much of the unburned hydrocarbons coming from the engine are converted into harmless carbon dioxide and water, and carbon monoxide is changed into carbon dioxide. The cleaned exhaust is expelled through a conventional muffler.

The U.S. Environmental Protection Agency has received many inquiries about the catalyst. This leaflet has been prepared to answer the questions most frequently asked.

How much does a catalyst cost?

Catalyst installed in 1975 model cars cost the purchaser about \$60 to \$100. Since there is no change in emission control requirements for 1976 model cars, the cost of the catalyst is expected to be about the same as in the 1975 models. Properly maintained and not abused, most catalysts are designed to operate for 50,000 miles. Replacement cost is expected to range from \$40 to \$100 or so; in some cars it is possible to replace only the catalytic materials, while in others the entire unit must be replaced.



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Does the catalyst increase gasoline consumption?

No. In fact most vehicles equipped with catalysts show a marked improvement in gasoline mileage over the 1974 models. Many of the measures used by manufacturers to meet emission control standards from 1968 through 1974 involved engine adjustments which resulted in lower fuel economy. With the catalyst these adjustments often are not necessary and fuel economy is approximately what it was for uncontrolled cars.

Don't catalysts require special, expensive gasolines?

All cars equipped with catalysts require unleaded gas. Most cars manufactured since 1971 are designed so that they can run on unleaded gas. Currently, unleaded regular gasoline is priced at about one cent more per gallon than the leaded regular grade. This additional cost is more than offset in most catalyst-equipped cars by the improved fuel economy and the longer life of components, such as spark plugs and exhaust systems, resulting from use of unleaded gasoline.

What happens to my car if the catalyst fails?

There would be no change in engine performance from a malfunctioning catalyst but there would be a substantial increase in the amounts of hydrocarbons and carbon monoxide in the exhaust.

Is the catalyst a fire hazard?

A catalyst-equipped vehicle with an engine operating properly is no more of a fire hazard than vehicles without catalysts. But when an engine has defective ignition, i.e. one or more spark plugs not firing, it is possible for the catalyst to get hotter than an ordinary muffler. To avoid any such problem you should make sure that your engine is always properly maintained. EPA has asked the industry to add catalyst over-temperature warning systems to their cars, and that suggestion is being considered.

Why does EPA require catalysts?

EPA does not require catalysts. The Clean Air Act puts a limit on how much pollution there can be in auto exhaust. The law leaves it up to the individual auto manufacturer to decide how to make cars that won't exceed those limits. EPA tests vehicles to be certain that whatever system is used, pollution levels are at or below what the law requires.

Does the catalyst produce more sulfuric acid mist?

In some cases, yes. Gasoline usually contains some sulfur, either as a natural impurity or as a sulfur compound additive. When gasoline is burned this sulfur is oxidized into sulfur dioxide gas. In cars without catalysts most of this sulfur dioxide passes through the exhaust system into the air where it quickly disperses and, in a span of several days, reacts to form various sulfates including perhaps sulfuric acid. Some catalyst emission control systems, however, change some of the sulfur dioxide into sulfuric acid within the exhaust system.

How serious is this problem?

Present indications are that automotive sulfuric acid is not an immediate major health problem. But as more and more catalyst-equipped cars come into use, it may become necessary to limit the amount of sulfuric acid in auto exhausts. Research is underway to determine the exact quantities of sulfuric acid being emitted by catalyst-equipped cars and to learn how these emissions accumulate or disperse in the atmosphere.

What is EPA doing to avoid adverse health effects from catalysts?

EPA will adopt a sulfuric acid emission standard for new automobiles at a level which will avoid any significant increase in health risk from automotive sulfate emissions. That standard is expected to take effect with the 1979 model year, the earliest date at which manufacturers can be expected to have developed and tested low sulfate automotive systems. EPA has postponed

for a year the stronger hydrocarbon and carbon monoxide control requirements scheduled for 1977 model cars. The stricter standards would lead auto makers to install a more effective catalyst which in turn might produce more sulfuric acid. EPA also suggested that Congress consider further delays in the emission standards to provide time for the auto industry to develop sulfuric acid emission control technology.

Using leaded gasoline will "kill" the catalyst. Wouldn't this solve the sulfuric acid problem?

Such action would also increase the amounts of hydrocarbons and carbon monoxide in the exhaust by anywhere from 100 to 300 percent. The amount of sulfuric acid now in the exhaust is not judged to be harmful to human health. EPA believes that a 1979 sulfuric acid emission standard will protect public health from this pollutant while preserving the benefits of controlling hydrocarbons and carbon monoxide.

Some catalysts have at times produced a "rotten egg" smell. Why?

Catalysts burn pollutants in the presence of excess air. If, for some reason, there is not as much air available as is needed some of the sulfur dioxide in the exhaust stream can be converted into hydrogen sulfide, which has that particularly objectionable odor. This odor usually indicates that engine maintenance is needed.

Is hydrogen sulfide a health problem?

Like any toxic chemical, hydrogen sulfide becomes increasingly toxic as exposure increases. It is very doubtful, however, that automotive exhausts could form enough hydrogen sulfide to create a health risk. The presence of a strong odor does not by itself indicate a high concentration of the gas. The odor of hydrogen sulfide is so pungent that it can be smelled in minute concentrations far below any danger level.