

## 1. Origins of sulfur

Mercedes-Benz diesel engines are designed for gasoline fuels which comply with respective national/international specifications (EN 228 in Europe).

These requirement standards normally contain a threshold for the maximum permissible sulfur content, they do not mention the necessary minimum sulfur content. This is unnecessary because sulfur does not serve any function as part of the gasoline fuel; its presence is primarily down to specific refinery processes ("cracking process"). The level of the sulfur content in gasoline is therefore essentially dependent upon the refinery's equipment and operating characteristics which are governed by standards and/or regulations.

---

## 3. Effect of sulfur

### 3.1 "Conventional" emission-control technology

By this we are referring to the three-way catalytic converter.

Sulfur dioxide is given off during the combustion process which together with water then forms sulfurous acid, this in turn can lead to corrosive wear, in particular when running a cold engine. Although because of the generally low sulfur content, this does not have the same significance compared to diesel fuel.

The three-way catalytic converter is affected by the sulfur dioxide in the exhaust gas in that its effectiveness is reduced and the light-off temperature is increased. As a result the environment is subjected to greater pollution because of the reduction in the conversion rate.

## 2. Sulfur content regulation

### 2.1 In the EU

For this reason there are no technical objections to operating a gasoline engine with a low sulfur content. This is called for to a greater extent by environmental reasons. Mandatory within the EU as of 1.1.2000 is a max. 0.015 (150 ppm) and as of 1.1.2005 a max. of 50 ppm. As "sulfur-free" we describe a gasoline with max. 10 ppm or 5 ppm sulfur.

In the Federal Republic of Germany, changes to the mineral oil tax regulations for low-sulfur fuel (max. 50 ppm) that came into effect on November 1, 2001, made low-sulfur fuel the fuel of choice; for the same reason, only sulfur-free gasoline fuels with max. 10 ppm sulfur has been available on the German market since January 1, 2003. In other EU states comparable regulations have likewise led to a lowering of the sulfur content in the fuel.

### 2.2 In other countries

Particularly low levels of sulfur in gasoline are found in Japan, where the "premium" grade < 10 ppm, has on average approx. 6 ppm sulfur content. Many countries today still have values which lie at 0.03 percent by weight, some countries have sulfur levels of 0.1 percent by weight and higher. In the USA (exception: California, max. 80 ppm) max. 0.05% by weight applies across the country.

---

### 3.2 "Advanced" emission-control technology

These should be understood, for example, to include NOx storage catalysts on an alkaline earth/rare metals basis.

**These systems require sulfur-free gasoline (< 10 ppm) for their trouble-free operation (< 10 ppm).** The sulfur trioxide formed from the fuel sulfur interferes with the catalytic conversion of pollutants, the NOx storage catalyst being blocked by the formation of alkaline earth sulfates. To what extent practicable desulfonation strategies can contribute to a restoration of this function remains to be seen and will require further investigation.

**Mercedes-Benz vehicles should be operated where possible with sulfur-free gasoline fuels.**

## 4. Supporting measures

Generally, care should be taken to ensure that low sulfur or sulfur-free gasoline fuels comply with the requirements as under **EN 228**.