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## Sulfur Dioxide Basics

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### What is SO<sub>2</sub> and how does it get in the air?

#### What is SO<sub>2</sub>?

EPA's national ambient air quality standards for SO<sub>2</sub> are designed to protect against exposure to the entire group of sulfur oxides (SO<sub>x</sub>). SO<sub>2</sub> is the component of greatest concern and is used as the indicator for the larger group of gaseous sulfur oxides (SO<sub>x</sub>). Other gaseous SO<sub>x</sub> (such as SO<sub>3</sub>) are found in the atmosphere at concentrations much lower than SO<sub>2</sub>.

Control measures that reduce SO<sub>2</sub> can generally be expected to reduce people's exposures to all gaseous SO<sub>x</sub>. This may have the important co-benefit of reducing the formation of particulate sulfur pollutants, such as fine sulfate particles.

Emissions that lead to high concentrations of SO<sub>2</sub> generally also lead to the formation of other SO<sub>x</sub>. The largest sources of SO<sub>2</sub> emissions are from fossil fuel combustion at power plants and other industrial facilities.

#### How does SO<sub>2</sub> get in the air?

The largest source of SO<sub>2</sub> in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities. Smaller sources of SO<sub>2</sub> emissions include: industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicles and heavy equipment that burn fuel with a high sulfur content.

## What are the harmful effects of SO<sub>2</sub>?

SO<sub>2</sub> can affect both health and the environment.

### What are the health effects of SO<sub>2</sub>?

Short-term exposures to SO<sub>2</sub> can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO<sub>2</sub>.

SO<sub>2</sub> emissions that lead to high concentrations of SO<sub>2</sub> in the air generally also lead to the formation of other sulfur oxides (SO<sub>x</sub>). SO<sub>x</sub> can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution. Small particles may penetrate deeply into the lungs and in sufficient quantity can contribute to health problems.

- [Learn more about particulate matter](#)

### What are the environmental effects of SO<sub>2</sub> and other sulfur oxides?

At high concentrations, gaseous SO<sub>x</sub> can harm trees and plants by damaging foliage and decreasing growth.

SO<sub>2</sub> and other sulfur oxides can contribute to acid rain which can harm sensitive ecosystems.

- [Learn more about acid rain](#)

### Visibility

SO<sub>2</sub> and other sulfur oxides can react with other compounds in the atmosphere to form fine particles that reduce visibility (haze) in parts of the United States, including many of our treasured national parks and wilderness areas.

- [Learn more about visibility and regional haze](#)

Deposition of particles can also stain and damage stone and other materials, including culturally important objects such as statues and monuments.

## What is being done to reduce SO<sub>2</sub> pollution?

EPA's national and regional rules to reduce emissions of SO<sub>2</sub> and pollutants that form sulfur oxides (SO<sub>x</sub>) will help state and local governments meet the Agency's national air quality standards.

- [Learn about how air quality standards help reduce SO<sub>2</sub>](#)

EPA identifies areas where the air quality does not meet EPA SO<sub>2</sub> standards. For these areas, state, local, and tribal governments develop plans to reduce the amount of SO<sub>2</sub> in the air.

- [Learn more about SO<sub>2</sub> air quality designations and state implementation plans \(SIPs\).](#)

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