

## Hydrogen Sulfide Chemical Information Sheet

Hydrogen sulfide is a colorless gas with a rotten-egg odor. Some people can smell hydrogen sulfide at very low levels, as low as 0.5 parts per billion (ppb) in air. Most hydrogen sulfide in the air comes from natural sources. It is produced when bacteria break down plant and animal material, often in stagnant waters with low oxygen content such as bogs and swamps. Volcanoes, hot springs and underwater thermal vents also release hydrogen sulfide. Industrial sources of hydrogen sulfide include petroleum and natural gas extraction and refining, pulp and paper manufacturing, rayon textile production, chemical manufacturing and waste disposal. Some bacteria change calcium sulfate, the major component of wallboard, into hydrogen sulfide. If construction and demolition debris contain large quantities of wallboard, large amounts of hydrogen sulfide can be formed. Production is greatest when the wallboard is finely crushed and when there is little oxygen, such as when the debris is buried and soaked with water.

Most of the information on human health effects from hydrogen sulfide exposure comes from accidental and industrial exposures to high levels. Exposure to high levels can cause muscle cramps, low blood pressure, slow respiration and loss of consciousness. Short-term exposure to moderate amounts of hydrogen sulfide in the workplace produces eye, nose and throat irritation, nausea, dizziness, breathing difficulties, headaches and loss of appetite and sleep. Continued exposure can irritate the respiratory passages and can lead to a buildup of fluid in the lungs.

Human volunteers have been exposed to hydrogen sulfide for up to thirty minutes during moderate exercise at levels equal to or half the Occupational Safety and Health Administration (OSHA) 8-hour standard (10,000 ppb). Chemical changes in blood and muscle were observed, but no volunteer experienced adverse symptoms and no changes were seen in lung function measurements.

There is limited information on the effects of long-term exposure to low levels of hydrogen sulfide. People working in industries where hydrogen sulfide exposure is common, but is usually below the OSHA 8-hour standard (10,000 ppb), may have decreased lung function and increased risk of spontaneous abortion and impaired neurological functions (including reaction time, balance, color discrimination, short-term memory and mood) compared to unexposed workers. People living near industries that emit hydrogen sulfide have an increased risk of eye irritation, cough, headache, nasal blockage and impaired neurological function (same measures as above) compared to unexposed residents. Limited information is available about exposure levels in studies of people working in or living near industries emitting hydrogen sulfide. Hydrogen sulfide exposure is assumed in these studies based on job title, work history or living near facilities emitting hydrogen sulfide. In all cases, the people with presumed hydrogen sulfide exposure had or likely had exposures to other chemicals that could have contributed to some health effects.

Foul odors and health effects were investigated in an Indiana community near a waste disposal lagoon and in five New York State communities near landfills containing construction and demolition debris. Hydrogen sulfide levels in the Indiana community ranged up to 300 ppb during a two-month period. Levels in two of the New York communities ranged up to 4000 ppb for periods of several months. During these episodes there were frequent health complaints including eye, throat and lung irritation, nausea, headache, nasal blockage, sleeping difficulties, weight loss, chest pain, and asthma attacks. Although other chemicals may have been present in the air, these effects are consistent with those of hydrogen sulfide.

The main effects of short-term and long-term hydrogen sulfide exposure in laboratory animals are nasal and lung irritation and damage and effects on the brain. These effects are consistent with effects seen in people exposed to hydrogen sulfide.

The effects of exposure to any chemical depend on the amount of the chemical to which a person is exposed and the length of exposure. The effects may also be influenced by a person's age, sex and general health. The figures (Portable Document Format (PDF) file - help for PDF) summarize the relationship between exposure to hydrogen sulfide and known health effects, including those at very high levels of exposure. The information comes from exposure of people as well as laboratory animals. Effects in humans are shown on the right side and effects in animals on the left side of each line in the diagrams. Federal workplace standards and state ambient air standards are also shown on the diagrams.

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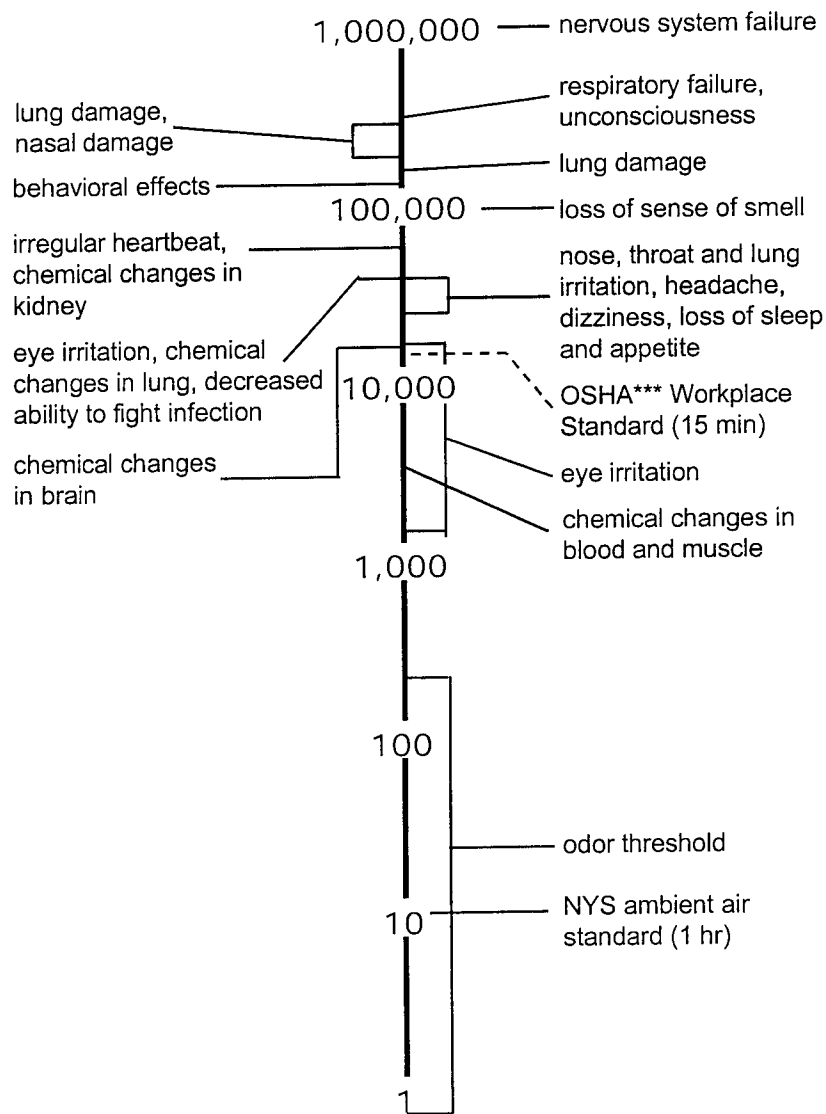
# Health Effects\* from Inhalation of Hydrogen Sulfide

## Short-term Exposure (less than 14 days)

Effects in  
Animals

Effects in  
Humans

Approximate Air Level\*\*  
(parts per billion)



\* Effects are listed at the lowest level with a significant increase in those effects. They are likely to occur at higher levels.

\*\* Length of exposure varies for different studies

\*\*\* Occupational Safety and Health Administration