# Safeguarding Workers Against H 2 S Gas with Detection Monitoring Systems

**The rotten-egg smell of hydrogen sulfide gas should never be underestimated. Here's advice on dealing with conditions that can lead to dangerous exposure as well as a review of features offered by today's gas detection devices**

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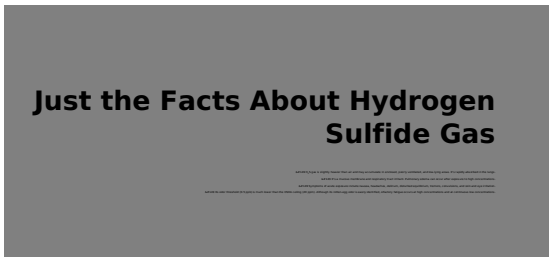


Almost everyone has experienced that unpleasant rotten egg smell that comes from hydrogen sulfide ($H_2S$) gas, but it is generally not a serious health problem when we're traveling past a dairy, poultry farm, or wastewater treatment plant. The exposure level is low and brief, but it should never be ignored because it can be fatal.

The same cannot always be said about $H_2S$ gas accidents within the workplace. Exposure to high levels of $H_2S$ gas for even a brief time can be fatal. And most people don't realize that $H_2S$ is also combustible, capable of causing major explosions and fires. It is never to be underestimated in its potential for harm in the workplace.

$H_2S$ is produced naturally by decaying organic matter and is released from sewage sludge, liquid manure, sulfur hot springs, and natural gas. It is a byproduct of many industrial processes including petroleum refining, tanning, mining, wood pulp processing, rayon manufacturing, sugar beet processing, and hot asphalt paving. It's also used to produce elemental sulfur, sulfuric acid, and heavy water for nuclear reactors.

$H_2S$ is a colorless, flammable, highly toxic gas. It is shipped as a liquefied compressed gas. It has a very noticeable rotten-egg odor. Inhalation is the major route of $H_2S$ exposure and can be deadly in high concentrations.

Various agencies of the U.S. government have set the following $H_2S$ exposure standards:

OSHA Permissible Exposure Limit or PEL = 20 ppm if no other exposure occurs in an eight-hour work shift

NIOSH Recommended Exposure Limit or REL = 10 ppm for 10 minutes

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$H_2S$ is a mucous membrane and respiratory tract irritant; pulmonary edema, which may be immediate or delayed, can occur after exposure to high concentrations. Symptoms of acute exposure include nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation. Persons exposed to $H_2S$ pose no serious risks of secondary contamination to personnel outside the exposed area.

In petrochemical plants, oil/gas production, and wastewater treatment facilities, there is the potential for $H_2S$ accidents. Some common problem areas and gas monitoring applications include the following:

**$H_2S$ Sludge De-Watering:** Sludge from waste treatment facilities may contain $H_2S$ and methane gas. The sludge is transported through a spiral conveyor into the dewatering system, where water is removed.

**Crude Oil Tank Storage:** Storage tank farms for crude oil and $H_2S$ require continuous monitoring for gas leaks. In addition to the tanks, common leak sources include pipes and valves, which require monitoring sensors.

**Remote Oil/Gas Well Sites:** Remote automated oil/gas well production sites require protection against $H_2S$ gas leaks in and around the site. Common monitoring locations include the well heads, flare stacks, and storage tanks.

**Oil/Gas Drilling Sites:** Leaks, such as blowouts in oil drilling applications, release large quantities of $H_2S$ gas into areas around the site. Typical gas monitoring locations include the driller stand, bell nipple, shale shaker, and mud tank.