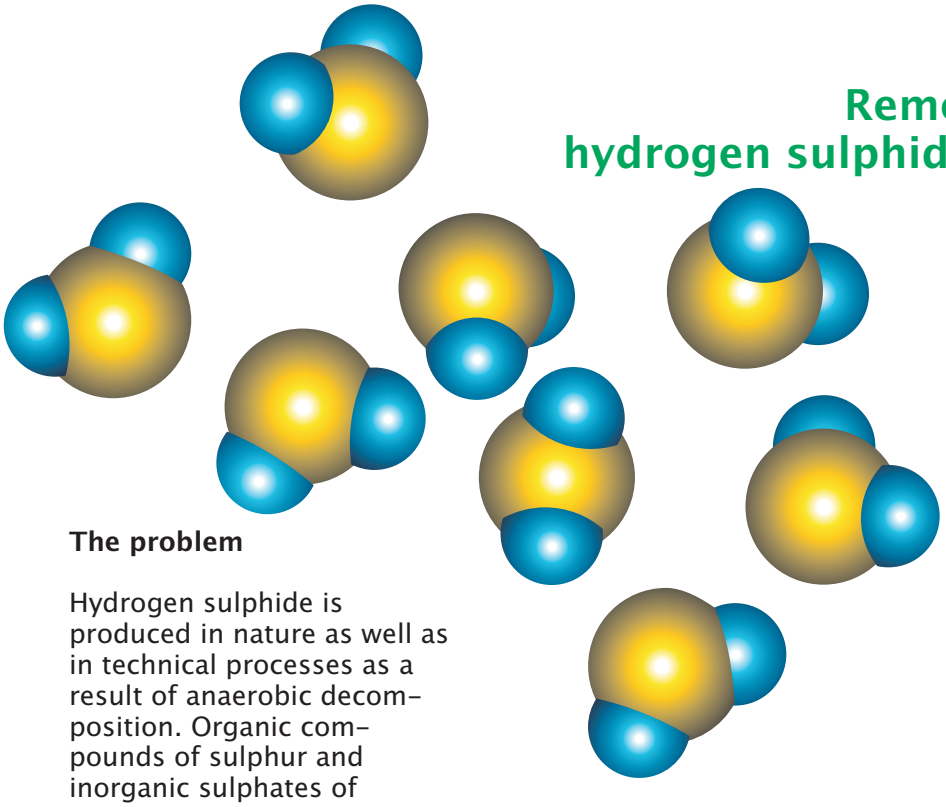
# GAS PURIFICATION

## Removal of hydrogen sulphide ($H_2S$)



**Molecules of hydrogen sulphide**
**This very odorous gas is similar to hydrogen cyanide in terms of its toxic effect.**

**Sulphur**
**Hydrogen**

### The problem

Hydrogen sulphide is produced in nature as well as in technical processes as a result of anaerobic decomposition. Organic compounds of sulphur and inorganic sulphates of desulphuricants are reduced to $H_2S$ in waste lines or digestion towers. The highly toxic and odorous gas causes metal and concrete corrosion and inhibits methane formation during the process of obtaining biogas.
The burning of $H_2S$ causes the production of sulphur dioxide, which causes increased corrosion in gas engines and block-type thermal power stations.
In addition, portions of the sulphur dioxide become detached in engine oil and frequent changes of oil are required as a result of acidification and the formation of oil sludge.
Both sulphur dioxide and products of reactions with water vapour such as sulphurous acid pollute the air for humans and nature and, among other things, cause acid rain.

### The solution

Depending on the technical process or the nature of the problem, HERBST UMWELTTECHNIK is able to offer three different processes for the removal of $H_2S$.

### The processes

- The HERBST Biofilter is used in purification plants or with large amounts of waste air.
- The HERBST Absorber is used to purify digester gases or fairly small amounts of waste gas.
- When obtaining biogas, HERBST Biosan is used directly in the digestion tower as an $H_2S$-absorbing powder.

HERBST UMWELT TECHNIK

## We provide the quality solution

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# THE PROCESSES IN DETAIL

## Removal of $H_2S$ in purification plants using the HERBST Filter

In the inlet area of the purification plant, the odour of the $H_2S$ released often poses considerable problems. HERBST UMWELTTECHNIK can provide a biological gas purification process which is able to deal with this. The $H_2S$ is broken down in the HERBST Filter using "triobacillus" micro-organisms. This results in the production of sulphurous acid and water. The inorganic bed or the medium in which the micro-organisms live is constantly neutralised using lye of soda.
The desired stability of the process is achieved in this way. The components of the HERBST Filter are non-wearing and should never be replaced.

**Benefits**

- Very effective
- Durable
- Low operating costs
- No change of bed necessary

## Removal of $H_2S$ in digestion tower

Methane bacteria are sensitive to $H_2S$, which means that biogas formation is hindered.
The use of our HERBST Biosan means that gaseous and dissolved $H_2S$ is adsorbed in the digestion tower, which means that they can no longer have a detrimental effect on methane production. HERBST Biosan is a neutral, iron-containing powdered product which is either added directly in the digestion tower or is mixed with the organic waste prior to fermentation.
The loaded HERBST Biosan is withdrawn with the digested sludge/liquid fertiliser. In the presence of atmospheric oxygen, the $H_2S$ is converted into water and sulphur, so that the quality of the liquid fertiliser is improved.

**Benefits**

- No change in the pH level in the digestion tower
- A high level of operational safety
- A higher yield of methane
- A simple process
- Low operating costs

## Removal of $H_2S$ from biogas/ digester gas

As it is obtained in anaerobic conditions, biogas has a high concentration of $H_2S$. We offer HERBST Adsorber for the separation of the $H_2S$ concentrations. The iron-containing adsorbing agent adsorbs $H_2S$. As a result of the addition of atmospheric oxygen, the bed is regenerated until the sulphur concentration has reached its maximum level. There is a constant outflow of the loaded adsorbing agent and a constant inflow of the unloaded adsorbing agent.

**Benefits**

- A simple process
- Very effective
- Low operating costs
- A long life

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