PRODUCTION
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HIGH-PERFORMANCE H_2S ADSORBENTS

For biogas, landfill gas, and odor control

PREVENT – PERFORM – CURE

Schlumberger

OPTIMAL SOLUTIONS FOR REMOVING HYDROGEN SULFIDE FROM GAS STREAMS USING FIXED-BED TECHNOLOGY

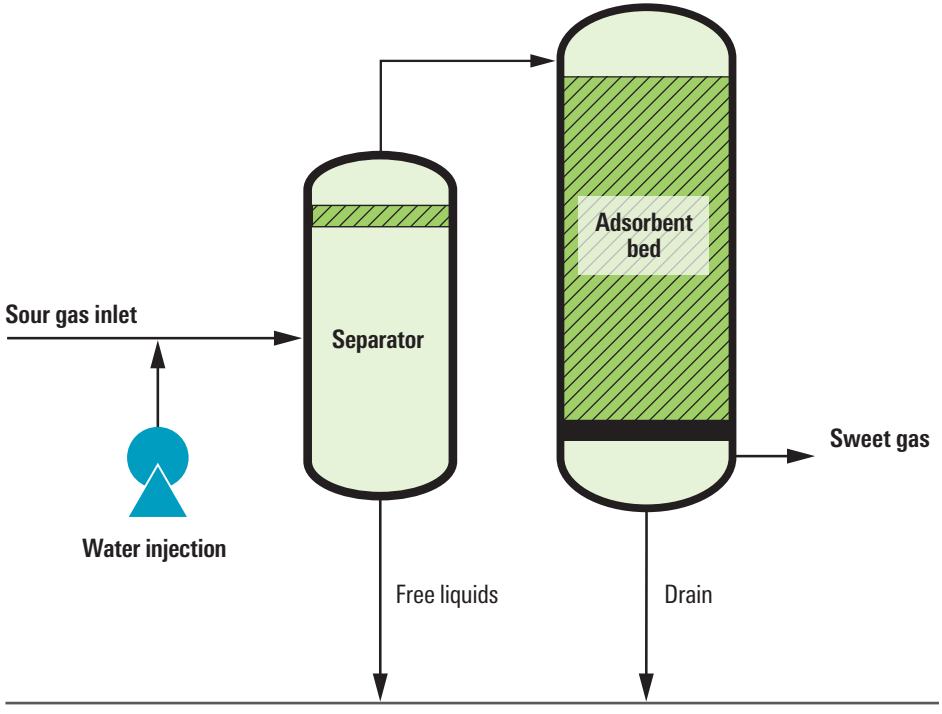
SULFATREAT* hydrogen sulfide removal adsorbents are a highly effective means of hydrogen sulfide (H_2S) removal for biogas, landfill gas, and odor control applications. These cost-effective, easy-to-operate purification adsorbents are used in fixed-bed processes and require minimal operator attention.

Advantages

- Full service availability—system design, product supply, media changeouts, and disposal
- Effective operation in the presence or absence of oxygen
- Tailored system designs that align with individual operating conditions
- Reliable and predictable performance that enables remote operation
- Technical support throughout the operation

Process flow

Gas or vapor moves through a fixed bed containing the SULFATREAT adsorbent. The H_2S contaminants chemically react with the adsorbent, forming a stable by-product. The treatment process is flexible, enabling the system to adapt to changes in operating conditions, often without additional capital equipment or retrofitting. Tailored support ranges from basic media provisioning to fully engineered technical solutions comprising basic system design, media supply, detailed engineering, a fabrication package, equipment supply, and spent-media handling.



Each application follows the same process flow—saturation, separation, and then use of SULFATREAT adsorbent.

Single vessel configuration

The most basic system design includes a single vessel that reduces the inlet contaminant concentration at the beginning of bed life to nondetectable levels at the outlet. Over time, the outlet contaminant concentration gradually increases to a specified level that triggers replacement. Temporary bypass of the vessel or interruption of gas flow is briefly necessary to replace the reactant media.

Lead-lag vessel configuration

This is the most cost-effective operating mode in a continuous H_2S removal process. It provides the greatest operating flexibility and enables full utilization of the media, improving overall removal efficiency by as much as 20%. Gas flows through the lead bed and then through the lag bed. When spent, the lead bed is taken offline and the media changed. In the interim, the online bed treats the full gas flow.

When the new media has been installed, the vessels are switched—the lag bed becomes the lead bed, and the lead bed is put into the lag position. Operators are able to maximize the capacity of the beds to remove the H_2S, ensuring optimal use of the adsorbent.

SULFATREAT adsorbent vs. carbon

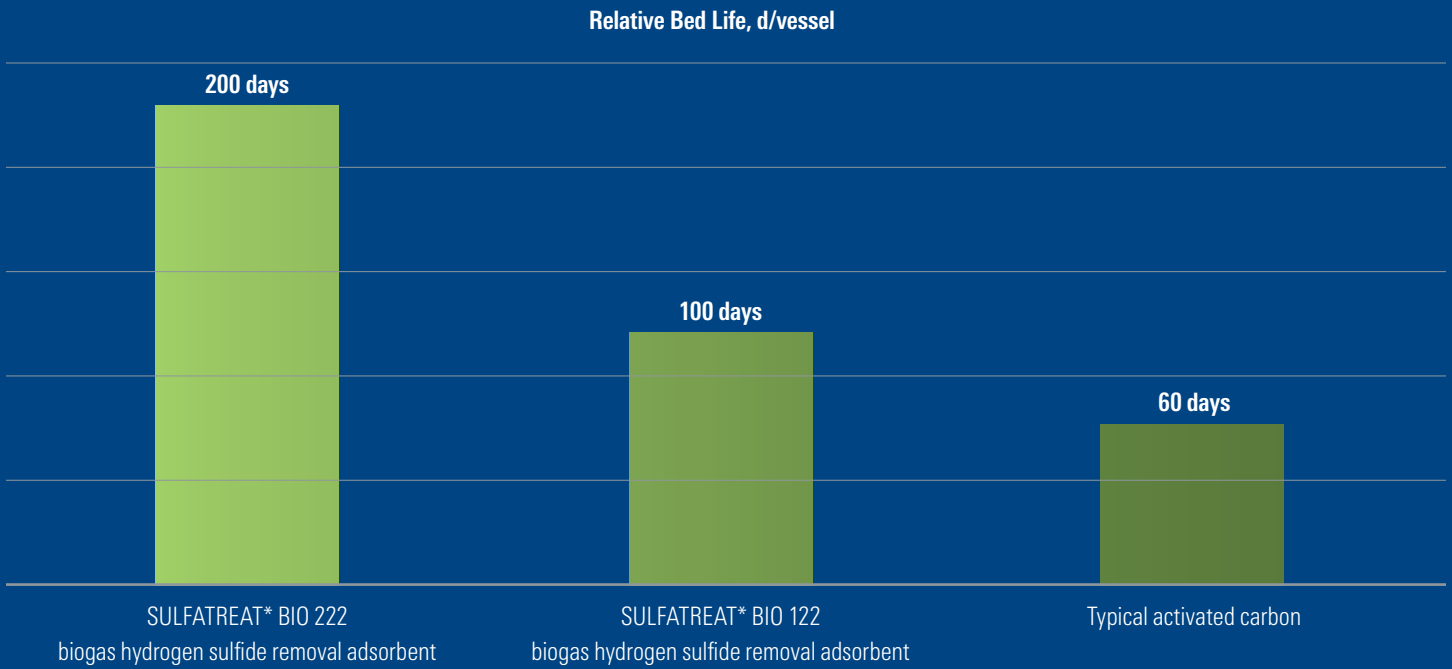
Hundreds of biogas and odor control applications worldwide use the SULFATREAT adsorbent. The proprietary iron oxide chemistry is robust and provides numerous benefits, making it a cost-efficient alternative to activated carbon.

	SULFATREAT Adsorbent	Carbon
Overview	▪ Highly selective in removal of H_2S. ▪ Adsorbent selected based on conditions and parameters specified by customer. ▪ Systems designed using proprietary software modeling.	▪ Universal adsorbent used for removing many contaminants from gas or vapor streams. ▪ Removal of volatile organic compounds (VOCs), heavy metals, and other components, which lead to disposal issues and also impact capacity. ▪ System designs typically based on rules of thumb.
Economics	▪ Consistent performance and predictable unit cost of removal. ▪ Product consumption in direct relation to H_2S loading (lb/d). ▪ High density, maximizing removal capacity per cubic foot.	▪ Unpredictable operating costs where feedstock is variable. ▪ Ratio of product consumption to quantity of all species absorbed by the bed. ▪ Low density, minimizing removal capacity of the media per cubic foot.
Environmental	▪ Nonpyrophoric in both the initial and ready-for-disposal forms. ▪ Commonly disposed at a nonhazardous landfill.	▪ Unpredictable hazard classification of spent media. ▪ Commonly disposed via incineration. ▪ Absorption heat presenting a fire hazard.[†,‡]
Process	▪ H_2S removed by chemical reaction. ▪ Functions optimally in high-humidity gas. ▪ Works effectively both with and without oxygen.	▪ Limited by high linear gas velocity to enable absorption to take place. ▪ Negatively impacted by high humidity. ▪ Typically requires oxygen.
Monitoring	▪ Highly predictable bed life as a function of the gas flow rate and inlet H_2S.	▪ Bed life unpredictable and complicated depending on variable containments in treated gas.
Performance warranty	▪ Comprehensive warranty from single-source manufacturer and supplier.	▪ Typically no warranty provided. ▪ Typically sold via third parties as a commodity chemical.

[†] https://www.epa.gov/sites/default/files/2013-11/documents/carb-ads.pdf

[‡] http://www.organics-recycling.org.uk/uploads/article3288/Tech%20Guide%2012%20Fire%20risk%20of%20activated%20carbon.pdf

Application performance with the SULFATREAT adsorbent is verified using field data. Data based on lab studies and ASTM standards are limited in their proficiency to replicate field conditions. Field data has proved the SULFATREAT adsorbent capacity is significantly better than that typically achieved by activated carbon.



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