MI SWACO
A Schlumberger Company

SulfaTreat

Setting the standard in H_2S removal

Features

- Customized treatment systems
- Wide range of scavengers and reactant products
- Single or lead/lag vessels configuration
- Mobile H_2S removal units
- Highly qualified, experienced and trained support network

Benefits

- Cost-effective option for large-volume H_2S removal
- HSE-acceptable reactant products
- Established disposal and recycling options
- Minimizes environmental risks
- Capable of adapting to variable process conditions
- Ability to set up and scrub H_2S at any location
- Economical capital expense required
- Simple, reliable and predictable operation requiring only minimal human oversight

Landfill gas processing

Our services and people make the difference

The SULFATREAT team specializes in the removal of hydrogen sulfide (H_2S) gas from both gases and liquids. There are two primary product types, SULFATREAT, a blend of iron oxides and SULFATREAT SELECT based on mixed metal oxides. Both use fixed bed technology. SULFATREAT systems treat nearly 3 trillion ft^3 of gas annually from more than 1,000 applications in more than 20 countries. We serve the global energy, environmental and water treatment markets where we have built a reputation that make us a widely recognized and trusted leader in the gas treatment industry.

Customer service is our top priority. All of our products, systems and specialized equipment are backed by our comprehensive support network that includes our technical services and engineering organizations, as well as experienced field personnel who are trained to deliver fast, effective and safe onsite services.

No matter what services our customers require—from the first loading of media to change outs of spent media and reloading of new media—we will deliver our expertise around the world.

APPLICATIONS

The global upstream and downstream energy, environmental and water treatment markets where removing concentrations of H_2S as low as 1 ppm is a top priority.

PROBLEMS

Many upstream and downstream gas gathering and production operations, as well as environmental and water treatment sites, generate high concentrations of H_2S that cannot be economically treated using liquid chemicals alone.

SOLUTIONS

SULFATREAT from M-I SWACO employs industry-leading H_2S scavengers and customized treatment systems to treat large volumes of sour gas. The SULFATREAT or SULFATREAT SELECT products selectively remove H_2S and specially formulated products can be selected to be equally effective in either dry or wet, saturated gas. Mobile units provide flexibility to expedite the removal process on smaller or isolated locations.

ECONOMICS

SULFATREAT is a cost-effective solution to removing H_2S concentrations less expensively than other industry scavengers. Single-vessel units can reduce costs even further.

ENVIRONMENTAL

The SULFATREAT products are safe in both their initial and ready for disposal forms. They begin as a safe and stable compound and when reacted with H_2S form another safe and stable compound. Disposal and metal recovery routes are well established.

A fully engineered chemical and mechanical process second to none

Process

The SULFATREAT process is a fixed bed system for treating gas or vapor streams. The most suitable SULFATREAT or SULFATREAT SELECT product is selected dependent upon the process conditions and operational parameters specified by the customer.

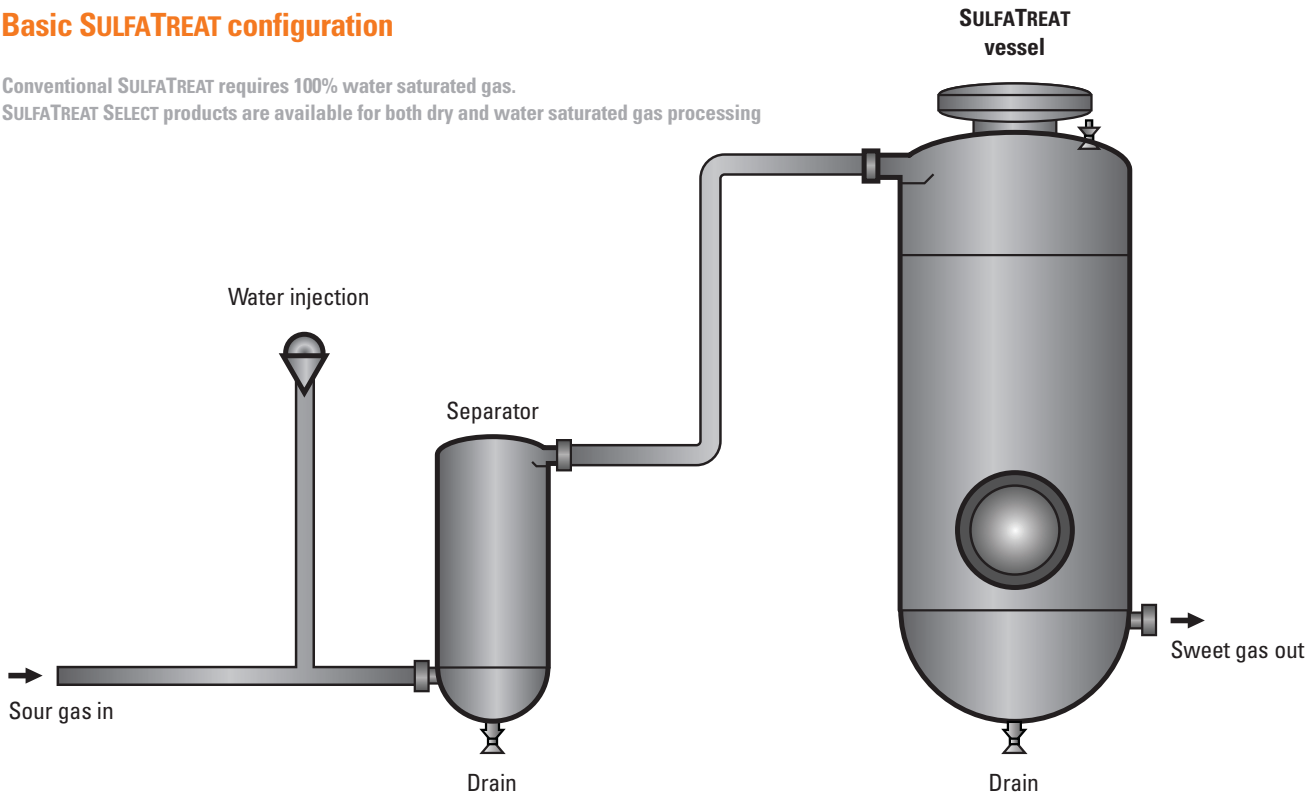
During the process, sour gas or vapor flows through the bed in a down flow design. The hydrogen sulphide chemically reacts with the SULFATREAT media to form a safe and stable by-product.

The advantage of the SULFATREAT process is that product consumption is dependent only on the amount of H_2S that passes through the bed. This economically matches the need for H_2S removal with variations in system flow conditions and outlet specifications, regardless of the total volume or other common components of the gas.

The flexibility of the SULFATREAT process allows the system to adapt to changes in operating preferences or tighter regulations, often without additional capital equipment or system retrofitting. Predictable pressure drops, long bed life, easy and safe handling, and a simple, reliable operation are a few of the features of the SULFATREAT process that make it the H_2S treatment system of choice.

Basic SULFATREAT configuration

Conventional SULFATREAT requires 100% water saturated gas.
SULFATREAT SELECT products are available for both dry and water saturated gas processing



Equipment customized for specific site conditions

Equipment

Our extensive experience in H_2S removal has given us the expertise to design systems that address your unique conditions.

We offer a wide variety of vessel designs customized to specific site requirements, taking into consideration inlet gas flow, operating pressure, desired pressure drop, and the days-to-outlet-H_2S specification. Highly predictable low pressure drops allow for a wide range of reliable applications and equipment configurations.

The pressure vessel can be obtained from a variety of sources including the customer's inventory, as long as it is engineered to treatment specifications.

Properly designed and constructed SULFATREAT systems can remain fully functional for 20 years or more.

Site facilities should include the appropriate piping to and from the SULFATREAT vessel and vessel support. Insulation of the piping and vessel may be required, depending upon the degree of atmospheric cooling anticipated. Optional equipment may include a water-spray system to saturate the inlet gas.

Site specific system and internal vessel design specifications, as well as vessel fabrication and installation assistance is available from your SULFATREAT representative.

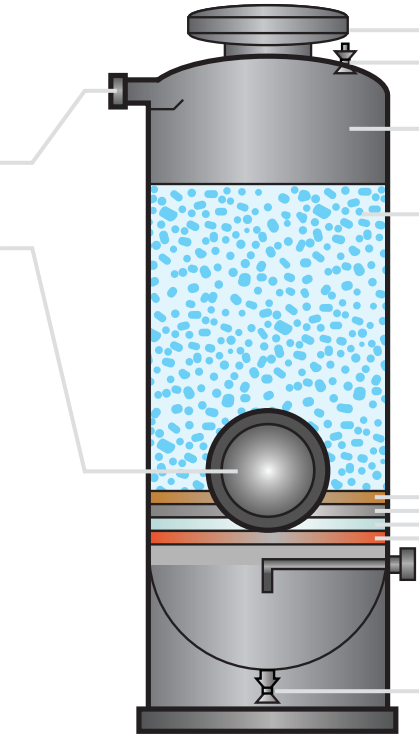
Equipment configuration options

Single vessel

The most basic design is a single vessel where initially the inlet H_2S concentration is reduced at the outlet to "non-detectable" levels at the beginning of the bed life. Over time, the outlet H_2S concentration gradually increases to an outlet specification level, indicating that the SULFATREAT media needs to be replaced. Temporary bypass of the vessel or interruption of gas flow is necessary for the short time it takes to replace the SULFATREAT reactant media, usually no more than a day.

The main advantage of this type of system is that the capital costs are minimized.

Standard SULFATREAT vessel components



Sour gas inlet
with deflector plate

Cleanout manway
(24 in. or larger for 60 in. + I.D.)

Short throat, bottom of manway
2 in. above bed support

Loading manway
(18 in. or larger for 60 in.+ I.D.)

Relief valve

Approx. 2 ft disengaging space

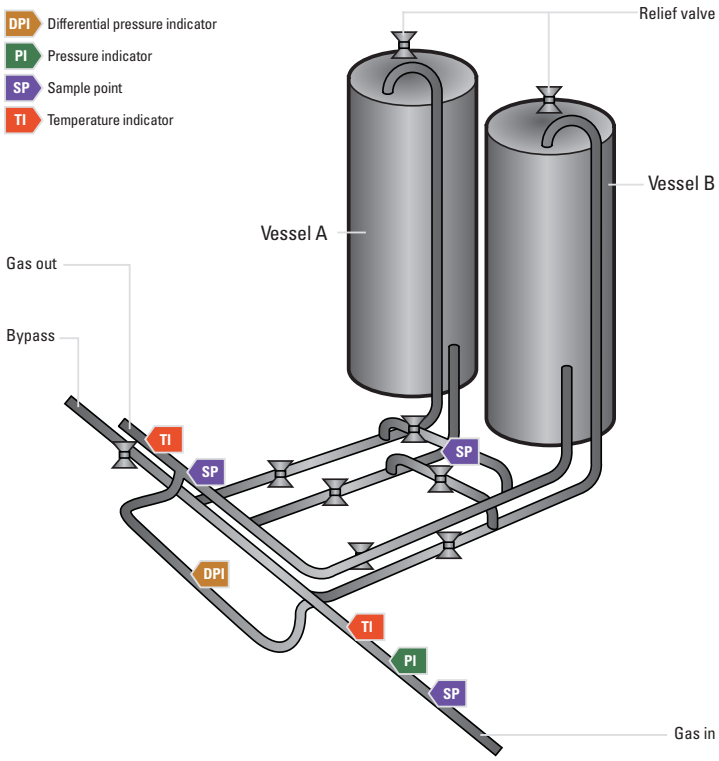
SULFATREAT product
(Supplied by SULFATREAT)

Bed support (top-down)
1. Foam filter
2. 40-mesh 316 SS screen
3. 4-mesh 316 SS screen
4. Bed support suitable for product weight and ΔP

Sweet gas outlet with piping extended to the center of the vessel, then 90° down

4-in. liquid drain
(Flange connect preferred)

Schematic diagram of SULFATREAT vessels in Lead/Lag configuration



Lead/Lag vessels

This vessel configuration offers two benefits. First, it permits change-outs of the spent media without interrupting the processing of the gas stream. Secondly, this option improves the overall removal efficiency of the system as much as 20%.

Two vessels are arranged in series, flowing gas through the first bed into the second. The lead vessel acts as the "working" unit to remove all of the H_2S at the beginning of a treatment period with its outlet H_2S increasing over time. The gas can go to the second or "lag" vessel for further polishing. The operation of the lead bed is similar to the single-vessel arrangement.

The second vessel can be placed in operation at start up, or it can be used to polish the H_2S remaining in the gas from the lead vessel when the level of outlet H_2S reaches the maximum specification.

Once the lead vessel inlet and outlet concentration are equal, the SULFATREAT material is considered spent or exhausted. The gas flow is then directed to the second vessel, while the spent material is removed from the lead unit. The second vessel becomes the working unit with the new SULFATREAT bed in the lead unit operating as the lag or polishing unit — all without gas-flow interruption. The lead/lag arrangement allows more efficient use of the SULFATREAT material with no interruption in unit service and greater process reliability.

Mobile units

With the patented SULFATREAT MOBILE SCRUBBER* unit, we can provide a mobile solution for applications that only require periodic attention. The mobile unit is designed for use on locations where the required service and environment prohibits any H_2S from being emitted into the atmosphere, including:

- Servicing 400 bbl tanks
- Venting manholes
- Plant turnaround
- Gas flaring – well testing

Quality assurance and technical support to ensure the utmost in performance

All SULFATREAT and SULFATREAT SELECT products are formulated to stringent quality specifications. A unique software model is developed for each application and a computer generated Estimated Performance Sheet (EPS) is produced for the customer that clearly specifies the system design, individual process conditions and critical operating and performance features, such as run time, anticipated pressure drop and treatment cost. Our highly-trained technical sales, quality assurance representatives and experience field personnel support the application through every step of the design, build and setup process to ensure a successful H_2S treatment program. Even with over a thousand applications on stream at any one time, SULFATREAT consistently meets customer expectations.

Success story

SULFATREAT technology helps renewable diesel plant remove H_2S from CO_2 off-gas stream

The situation

Recently, a major refining company successfully commissioned the world's largest renewable diesel plant. The plant uses SULFATREAT technology, including the SULFATREAT 410 HP system and the SELECT product for the removal of trace amounts of H_2S from a CO_2 off-gas stream.

A "surge" event was identified that would occur during planned maintenance activities on a critical piece of equipment. During this maintenance period, the sulphur load increased significantly and the original design basis for the H_2S removal system was no longer valid.

The solution

SULFATREAT examined various system media options and it was clear that an integrated configuration provided a cost effective, secure, flexible and practical means of removing H_2S from the off-gas while providing maximum system protection during the surge conditions.

Bulk removal was provided by the SULFATREAT 410 HP product in the lead bed. Using the SELECT HP product in the lag and polishing reactors ensured plant reliability was not compromised. This configuration was accepted by the refining company.

The result

The reactors were loaded in July with SULFATREAT support at site and the plant started up in November. With the system successfully commissioned, regular contact is maintained and technical support provided to ensure system performance is optimized...a customer-focused approach to our business activities that is industry leading.

If you want to know more about how SULFATREAT can remove your H_2S concentrations regardless of the volume contact us on-line at www.sulfatreat.com, info@sulfatreat.com or call 636 532 2189.

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