

UNLOCK POTENTIAL

OPTIMIZE PRODUCTION



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Schlumberger



PRODUCTION
TECHNOLOGIES.
FULL SERVICE.

H₂S REMOVAL ADSORBENTS

Simple, effective and customized fixed bed purification solutions



Schlumberger

OUTSTANDING HYDROGEN SULFIDE REMOVAL

Schlumberger is a world-leader in providing cost-effective solutions for the removal of contaminants from gaseous and light liquid hydrocarbon streams using fixed bed technology. Schlumberger technology is used to treat nearly three trillion cubic feet of gas per year with in excess of 1,500 applications in more than 30 countries.

Schlumberger treatments remove the asset integrity, health, safety and environmental risks created by highly toxic and corrosive hydrogen sulfide (H₂S) fixed bed technology for the global energy, environmental and water treatment markets.

Setting the standard in H₂S removal

As part of the CURE portfolio of chemical-based technologies that react with and remove production impurities and risks, Schlumberger offers two primary product lines for removal of H₂S from gas: SULFATREAT* granular iron oxide-based H₂S adsorbents and SELECT* high-capacity H₂S and mercury adsorbents.

Both SULFATREAT and SELECT purification technologies are used in fixed bed processes that are cost-effective, easy to operate and require minimal operator attention.

Non-hazardous SULFATREAT adsorbents are the industry's leading adsorbents for treatment of water-saturated gas, and SELECT adsorbents are engineered using enhanced porosity control for improved activity. These SELECT products facilitate greater flexibility in system design and formulations are available for treatment of both dry and water-saturated gas.



While upstream natural gas processing is our primary market, the range of adsorbents works effectively in most gaseous streams. Diverse applications include early production systems; floating production, storage, and offloading (FPSO) facilities; gas processing plants; offshore platforms; petrochemical plants; refineries; odor control; vent gas treatment; wastewater treatment; gas storage; biogas; food-grade CO₂; and landfill gas.



CUSTOMIZED TREATMENTS. OPTIMIZED H₂S REMOVAL.

Using its unrivaled global expertise, Schlumberger designs treatment systems that address specific process conditions. Products are used in fixed bed processes. Gas or vapor moves through the bed in a downflow design and liquids are treated in an upflow configuration. The H₂S contaminants then chemically react with the adsorbent, forming a stable by-product. The flexibility of the treatment process allows the system to adapt to changes in operating conditions, often without additional capital equipment or retrofitting.

Tailored support ranges from basic media provision through to a fully-engineered technical solution comprising basic system design, media supply, detailed engineering, fabrication package, equipment supply and spent-media handling.

Single vessel configuration

The most basic system design includes a single vessel in which the inlet contaminant concentration at the beginning of bed life is reduced to non-detectable levels at the outlet. Over time, the outlet contaminant concentration gradually increases to a specified level that indicates the need for replacement. Temporary bypass of the vessel or interruption of gas flow is briefly necessary to replace the reactant media.

Lead-lag vessel configuration

This, the most cost-effective operating mode in a continuous H₂S removal process, provides the greatest operating flexibility and allows for full utilization of the media, improving overall removal efficiency by as much as 20%.

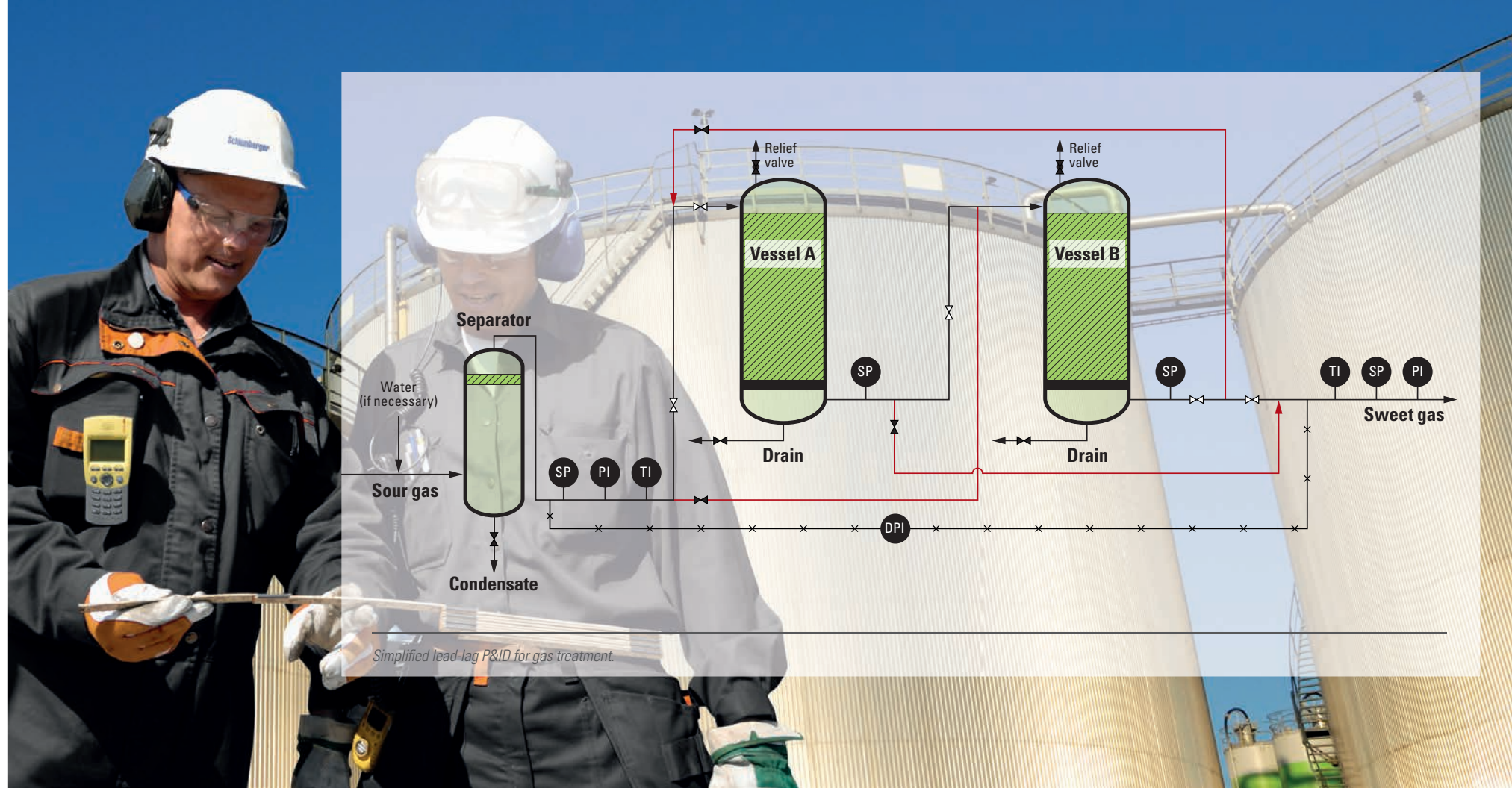
Gas flows through the lead bed, then through the lag bed. When the lead bed becomes spent, it is taken off line and changed. During the short time that this takes the online bed is treating the full gas flow.

When the new media has been installed, the vessels are switched. The lag bed now 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 H₂S ensuring optimum use of the absorbent.

Separator and water injection

Upstream of the vessels, the installation requires an inlet separator with a high efficiency demister to remove free liquids from the gas.

A water injection system upstream of the separator is highly recommended if the selected chemistry requires water vapor-saturated gas.



Simplified lead-lag P&ID for gas treatment.

FLEXIBLE, FULLY SUPPORTED SOLUTIONS

Years of experience across diverse applications and markets gives Schlumberger unrivaled resources and expertise to design a purification treatment solution to suit any operator's specific requirements.

Monitoring

Computer modeling provides information on predicted performance parameters, with bed loading determined by flow and contaminant levels.

Typically, outlet levels of H₂S rise gradually at the end of the bed's life, indicating the need for replacement.

Optional monitoring around the treatment system envelope can include gas temperature and pressure differential measurement. These measurements are used to confirm anticipated design operating conditions and the impact of changes over time.

Change-outs and disposal

Catalyst handling specialists are recommended for change-outs. Schlumberger experts will identify the best option for recycling or disposing of spent material and can provide support with this process as required. Disposal routes are well established, and personnel are available for onsite installation and removal support as needed.

Quality assurance and technical support

All products are manufactured to stringent quality specifications. Customized software modeling and performance predictability allows the development of best-fit system design and operation for each application supported by highly-trained personnel at every stage.

Schlumberger has dedicated specialist laboratories for the research, development, and testing of fixed bed absorbent media and alternative purification systems. As part of a global network of advanced oilfield research and development laboratories, these world-class facilities offer customers fast access to new product developments.



HIGH-PERFORMANCE ADSORBENTS FOR DRY AND WATER-SATURATED GAS

SULFATREAT adsorbents

Schlumberger highly effective and non-hazardous SULFATREAT granular adsorbents are the industry's leading adsorbents for the treatment of water-saturated gas with principal products including:

- SULFATREAT and SULFATREAT CHP oxide-based H₂S adsorbents
- SULFATREAT 410 CHP and SULFATREAT 2242 reduced-pressure-drop iron oxide-based H₂S adsorbents
- SULFATREAT XLP-EZ extended life, simplified change-out iron oxide-based H₂S adsorbent

SELECT high-capacity adsorbents

SELECT fast-reacting adsorbents are engineered using enhanced porosity control for optimized results and allow maximum flexibility in system design with formulations available for the treatment of dry and water-saturated gas. Principal products include:

- SELECT HP and SELECT PREMIUM mixed metal oxide-based H₂S adsorbents
- SELECT XLP extended life iron oxide-based H₂S adsorbent

Pioneering adsorbents for H₂S removal from liquids

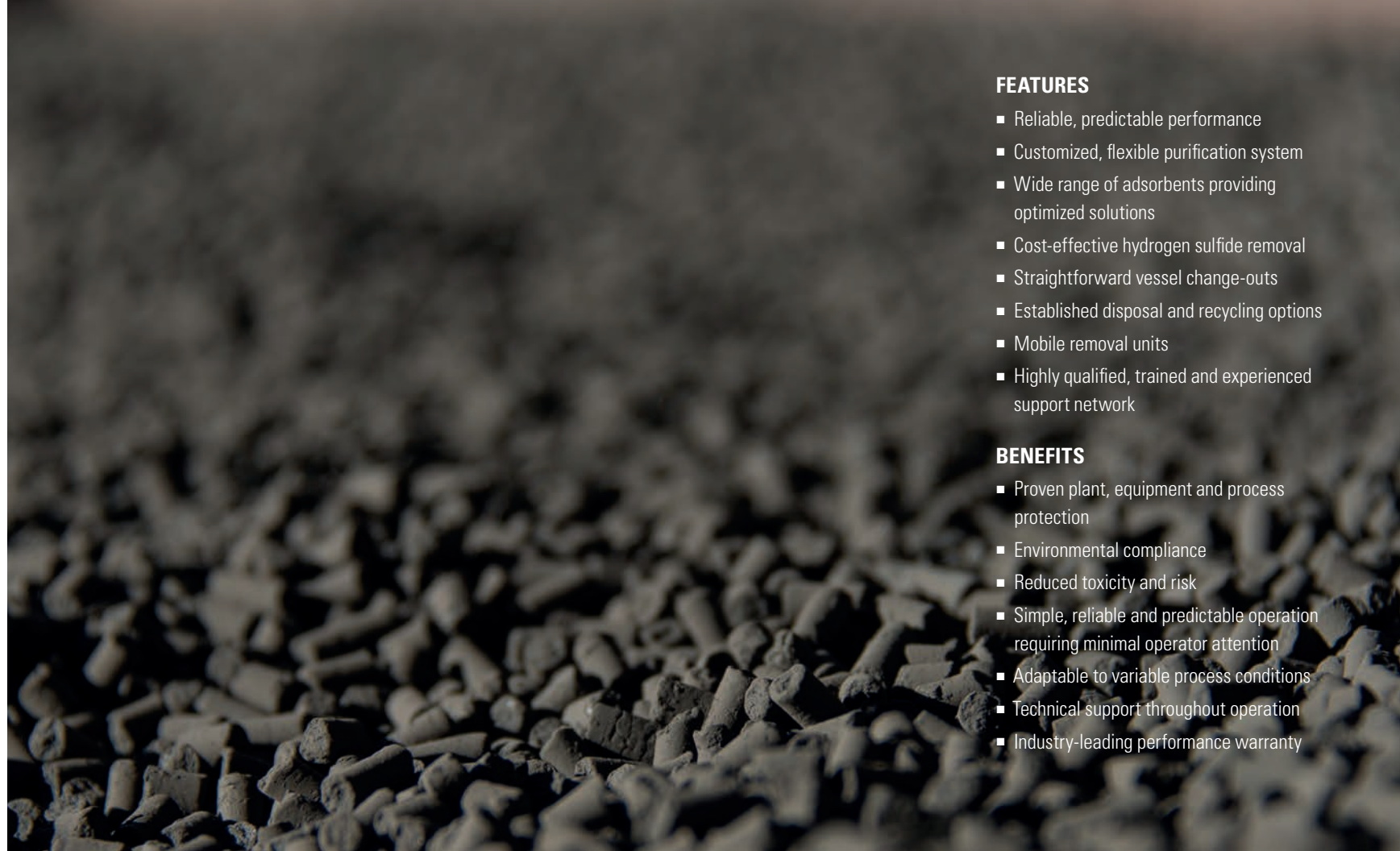
As global leaders with an established reputation for innovation in the oilfield, Schlumberger offers SULFATREAT HC and SELECT HC products for the cost-effective and efficient removal of H₂S from light liquid hydrocarbons: restoring and optimizing flow performance.

FEATURES

- Reliable, predictable performance
- Customized, flexible purification system
- Wide range of adsorbents providing optimized solutions
- Cost-effective hydrogen sulfide removal
- Straightforward vessel change-outs
- Established disposal and recycling options
- Mobile removal units
- Highly qualified, trained and experienced support network

BENEFITS

- Proven plant, equipment and process protection
- Environmental compliance
- Reduced toxicity and risk
- Simple, reliable and predictable operation requiring minimal operator attention
- Adaptable to variable process conditions
- Technical support throughout operation
- Industry-leading performance warranty





Case Study

OPTIMIZING PLANT PERFORMANCE WITH THE COST-EFFECTIVE REMOVAL OF H₂S FROM CO₂ OFF-GAS STREAM

THE SITUATION

Late on in construction of the world's largest renewable diesel plant, a HAZOP study revealed the H₂S load in the off-gas increased significantly during planned equipment maintenance. The operator had not accounted for this surge in the original plant design.

SULFATREAT iron oxide technology had been selected to remove trace amounts of H₂S from the CO₂ off-gas stream.

The surge necessitated a redesign of the H₂S removal system.

THE SOLUTION

Schlumberger determined an integrated media configuration comprising SULFATREAT iron oxide and SELECT mixed metal oxide technologies would be cost-effective, secure, flexible and practical.

It would also ensure maximum system protection from the increased H₂S load encountered during surge conditions.

THE RESULTS

Efficient bulk H₂S removal was achieved using SULFATREAT 410 CHP reduced-pressure-drop iron oxide-based H₂S adsorbents in the lead bed.

SELECT HP mixed metal oxide-based H₂S adsorbents were used in the lag and polishing reactors, optimizing plant reliability.

Schlumberger provided onsite assistance during the reactor loading. Regular contact and technical support have ensured optimal system performance.

UNLOCK POTENTIAL OPTIMIZE PRODUCTION

A full service offering to maintain and restore full production.

Schlumberger production technology specialists deliver targeted, integrated strategies that help to decisively remediate production issues such as deposit formation and naturally occurring gases, enabling customers to safely restore and improve flow performance and revenue while avoiding costly repairs and shutdowns.

Firmly established at the forefront of technology, Schlumberger has a full service offering that integrates pioneering chemical and process solutions, equipment, and software with unrivaled technical expertise.

Working with the world's largest oilfield services provider, customers benefit from a truly unique combination of outstanding technological capabilities and improve their understanding of how to successfully address production challenges in an increasingly competitive marketplace.

The team's global footprint and extensive suite of technologies helps customers to reliably, safely and efficiently maximize production—regardless of system complexities or geography.

MAXIMIZE PRODUCTION
FROM RESERVOIR TO REFINERY

