



THIOPAQ®

Biogas desulphurisation

Deep hydrogen sulfide removal
from biogas at high uptime
enables industries to meet
stringent gas quality requirements





Deep hydrogen sulfide removal

Biogas is an important renewable energy source. However, the gas originating from anaerobic digestion plants, anaerobic waste water treatment plants and landfills often contains hydrogen sulfide (H_2S). Removal of H_2S is required for reasons of health, safety, environment and corrosion of equipment such as gas engines, boilers and piping.

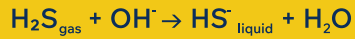
The THIOPAQ® was developed by Paques, in cooperation with universities, research institutes and customers. Fundamental and applied research into biological, physical and mechanical aspects of the system resulted in a cost-effective and reliable system. By continuous development Paques is able to provide every customer with a tailor made gas treatment that enables the customer to transport the gas into a local micro gas grid or to upgrade the gas to biomethane. The elemental sulphur, produced by the THIOPAQ® can be used as a high quality fertilizer.

About THIOPAQ®

- Proven technology, > 30 years operational experience
- > 350 THIOPAQ® references worldwide
- Continuous innovation
- In-house manufacturing and quality control
- Deep H_2S removal
- High uptime and reliable process
- Low total costs of ownership
- No air input in biogas
- Production of high quality fertilizer

Operation principle

The 'caustic' solution in the THIOPAQ® scrubber is continuously biologically regenerated. In the scrubber, the gas containing H₂S is brought into contact with the washing water in counter currently. Absorption of H₂S under slightly alkaline conditions (pH 8-9) enables a chemical reaction with hydroxide ions:



In the bioreactor the sulphide is oxidised into elemental sulphur by autotrophic colourless sulphur bacteria:



The hydroxide used in the scrubber is regenerated in the bioreactor. Since the washing water entering the scrubber at the top is sulphide-free, a high concentration difference between the liquid and gas phase makes it possible to obtain a very high H₂S removal efficiency, exceeding 99.5%. Both the small bleed stream (consisting of sodium salts) and the produced sulphur is free of sulphide, so discharge is no problem.

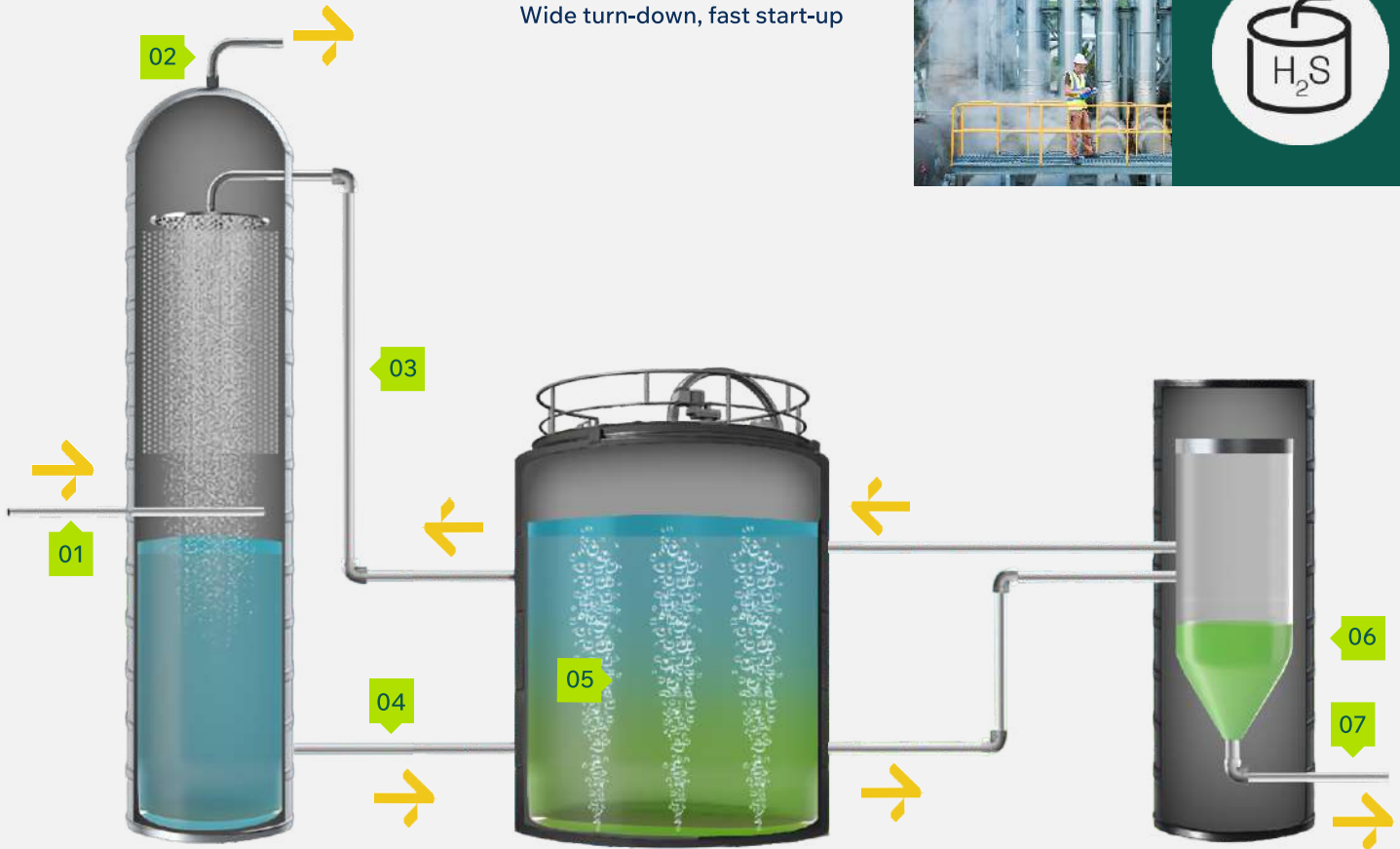
Application

The THIOPAQ® scrubber can be applied to a wide range of biogas streams containing H₂S and can be combined with all biological anaerobic systems.

After treatment in the THIOPAQ® scrubber, the biogas can be used in a gas engine or boiler or can be transported in a local micro gas grid. Upgrading to biomethane, which can be brought into the gas distribution network or use as fuel for vehicles is another possibility.

- Gas loads from 50 Nm³/h to 50,000 Nm³/h
- Sulphur loads from 10 kg/day to > 50 ton/day
- References for > 10,000 Nm³/h and sulphur loads > 5 ton S/day

THIOPAQ® Reactor
Wide turn-down, fast start-up



How THIOPAQ® works

- | | |
|--|--|
| 01 H ₂ S-rich gas in | 04 Sulfide rich solution from scrubber into bioreactor |
| 02 Purified gas out | 05 Air for sulphur oxidation reaction (sulfide to elemental sulphur) |
| 03 Alkaline wash solution, (absorbs H ₂ S from the gas) | 06 Sulphur separated |
| | 07 Elemental sulphur |



Together, we're leading the biotech revolution in wastewater and biogas

We are a leading force in biotech wastewater and biogas, driven by a community of scientists, problem solvers, application specialists and exceptional people who all believe in one thing: That protecting the world's water and resources is vital if we are to preserve our planet for generations to come.

Since we founded our company, we've pioneered and developed biotech solutions proven to help our customer effectively and sustainably treat wastewater and generate biofuel to power their operations.

It's safe to say we've grown from our humble beginnings in Balk—to an international powerhouse with more than 3,300 installs in over 60 countries. Our expertise and technologies are trusted by many of the world's most trusted companies.

Whether in brewing, pulp & paper, chemicals or food—we create partnerships that help businesses maximise their resources while reducing their impact.

Our unique blend of expertise, trusted technologies, and global network enables us to guide and empower our customers with solutions proven to help them meet their sustainability goals. By continuing to reinvent, refine, and innovate our technologies we can help protect the planet, communities and best serve our customers.

The world's resources are finite—but our potential is limitless. By working together—we can create a cleaner, more circular future that works for everyone.

Hampton

Balk

Dubai

Chennai

Shanghai

Bangkok

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