ENVIRONTEC
BIOGAS SOLUTIONS

> (BIO) GASDESULPHURISATION

Standard system for removal of H_2S out of biogas

Caustic saving and thus cost effective through continuous H_2S-out controlled caustic dosing.

Why Sulfurex®?

- **Reliable and compact unit**
- **High efficiency on H_2S**
- **Low caustic consumption**
- **Easy implementation of gas drying and conditioning**

Basic Process Description

The biogas is brought into intense contact with a circulating alkali liquid over an exchanger in a single stage counter current process (gas scrubber}. The H_2S in the gas is absorbed by the alkali liquid through various chemical reactions. Ultimately the H,S in the gas is almost totally converted into NaHS and sodium bicarbonate using sodium hydroxide. The process is controlled by a sophisticated H_2S-detection and sampling system for very efficient operations and low chemical consumption.

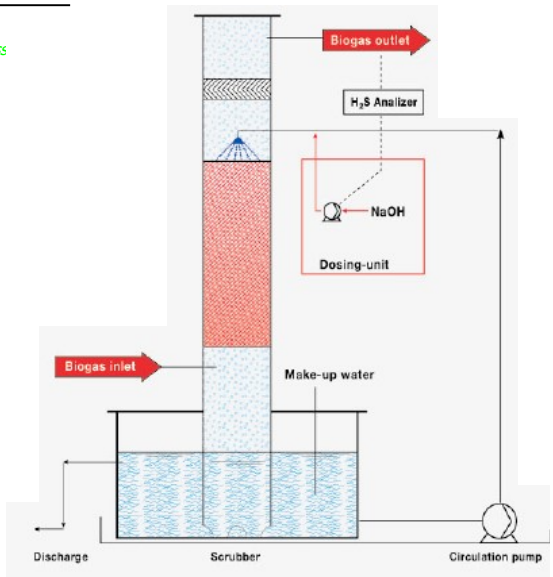
Selective desulphurisation is possible due to the differences in the physical and chemical properties of H_2S and CO_2. The course of this chemical process is further determined by chemical concentrations, pH values and the temperature and pressure of the system.

Caustic consumption savings up to 60% can be achieved in comparison with conventional caustic scrubber-technologies!

Caustic savings up to 60 %

Sulfurex® multiple stage desolphurisation process

Sulfurex® basic process



- **Gas drying and conditioning**
- **Single or double stage**
- **Make-up water unit**
- **Redundancy**
- **Additional measurements (C114/C°2)**

EnvironTec, your partner and specialist

SELECTION TABLE

SULFUREX®	100 Nm³/h	250 Nm³/h	500 Nm³/h	1000 Nm³/h	2500 Nm³/h
1.000 ppm H_2S	CGSC 100-01d	CGSC 250-01d	CGSC 500-01d	CGSC 1000-01d	CGSC 2503-01d
2.000 ppm H_2S	CGSC 100-02d	CGSC 250-02d	CGSC 500-02d	CGSC 1000-02d	CGSC 2500-02d
5.000 ppm H_2S	CGSC 100-05d	CGSC 250-05d	CGSC 500-05d	CGSC 1000-05d	CGSC 2500-05d
10.000 ppm H_2S	CGSC 100-10d	CGSC 250-10d	CGSC 500-10d	CGSC 1000-10d	CGSC 2500-10d
40.000 ppm H_2S	CGSC 100-40d	CGSC 250-40d	CGSC 500-40d	CGSC 1000-40d	CGSC 2500-40d

Based on 35% CO_2 and (H_2S out)= 200 ppm. Other concentrations on request

As an option EnvironTec can offer is the EnvironTec Double System: additional caustic savings

The process is based upon the following chemical reactions:

1: $H_2S + NaOH \rightarrow$ **NaHS** $+ H_2O$

2: $CO_2 + 2NaOH \rightarrow Na_2CO_3 + H_20$

Because of the selectivity in the process relatively lass CO, is absorbed, nevertheless the presence of CO_2 will be apparent in the amount of NaOH that is required. Important savings can be achieved via the following reaction:

3: **H_2S** + $Na_2CO_3 \rightarrow$ **NaHS** + **$NaHCO_3$**

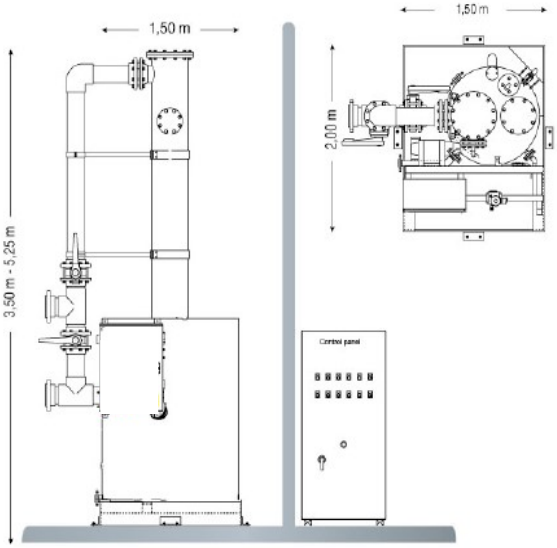
This requires an extra absorption column in which the spent lye according to reaction (1) and (2) can be used for the reaction (3).

In this way even less caustic is needed than in a single scrubber.

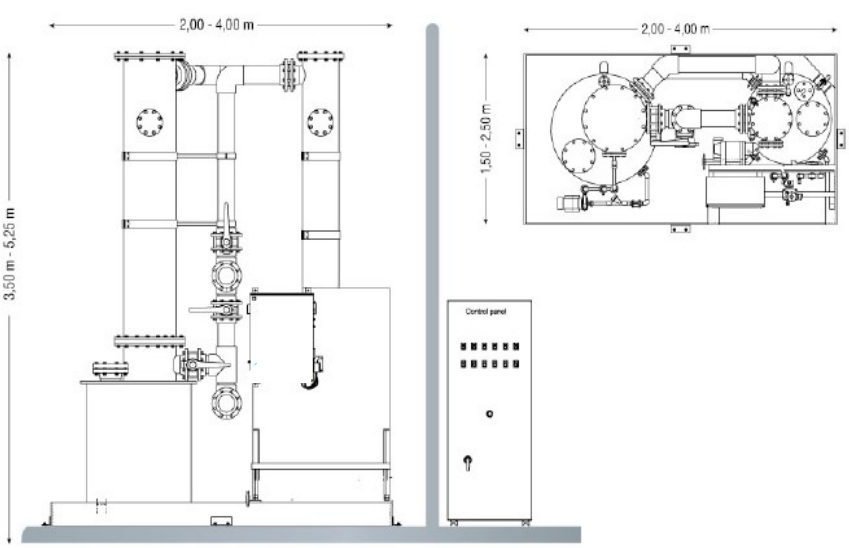
Cooling and drying of biogas:.

It is advisable to have the biogas cooled and dried before it enters the CHP engine because of potential for condensate formation, consequently EnvironTec has developed a very compact vertical biogas drying system, combining the removal of water and H_2S in one process. Because at lower temperatures absorption of H_2S is more efficient, a cornbined plant results in lower caustic consumption.

Outside dimensions EnvironTec

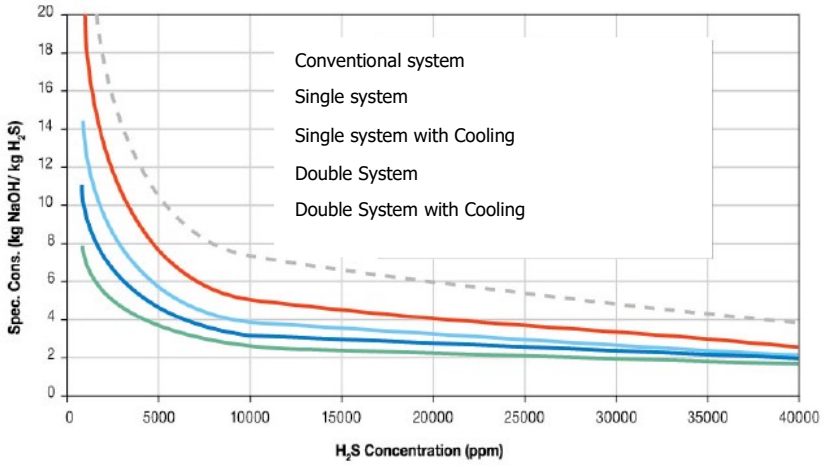


EnvironTec Sulfurex® single stege



EnvironTec Sulfurex® multiple stege

*Specific caustic consumption**



Bilgeri EnvironTec GmbH
Bundestr. 2, AT-6714 Nüziders
www.environtec.at

UniCredit Bank Austria AG
IBAN: AT191200010029491759
BIC: BKAUATWW

EORI: ATEOS1000013388
UID Nummer: ATU61502939

Tel.: +43 (0) 5578 77005
Fax: +43 (0) 5578 77005 33
Email: info@environtec.at