



BIOLAK[®] GROUP
COMPETENCE IN WATER

System SKJÖLDGAS

a process to produce biogas by fermentation of highly polluted process water and organic bi-products



combined **SKJÖLDGAS-BIOLAK[®]**-plant for a brewery with 1,5 Mio hl/a

Due to the fact that energy is getting more expensive every day, we have developed the system **SKJÖLDGAS** as a combined fermenter. You too can benefit from **SKJÖLDGAS** producing electrical and thermal energy from your process water and organic residuals. Simultaneously the water will be pre-cleaned to a high extent and the volume of organic residuals will be extremely reduced.

VON NORDENSKJÖLD • VERFAHRENSTECHNIK GMBH

SKJÖLDGAS REFERENCE PLANTS SKJÖLDGAS APPLICATIONS

SKJÖLDGAS is suitable for COD values from approx. 2000 mg/l up to many thousands of mg/l. Typical examples are

Breweries
Dairies
Distilleries
Fruit processing

Beverage production
Potatoe/Starch processing
Whisky Distilleries
Slaughter houses etc.



SKJÖLDGAS-plant for a brewery with 2 million hl/a

Inlets of warm temperatures (up to 40°C) are of great advantage, but even in the case of cooler inlet temperatures (approx. 20°C) **SKJÖLDGAS** is producing an optimum of energy from the water and organic by-products (grains, rumen, peels etc.) through heat recovery and good isolation. This is reached through low volume load, double-stage type and high degree of digestion.

So far 8 plants with loads from 2,45 t COD/d to 40 t COD/d are in operation.

ADVANTAGES OF SKJÖLDGAS

Simple construction with HDPE lined earth basins and integrated acidification, gas storage and final clarification result in:

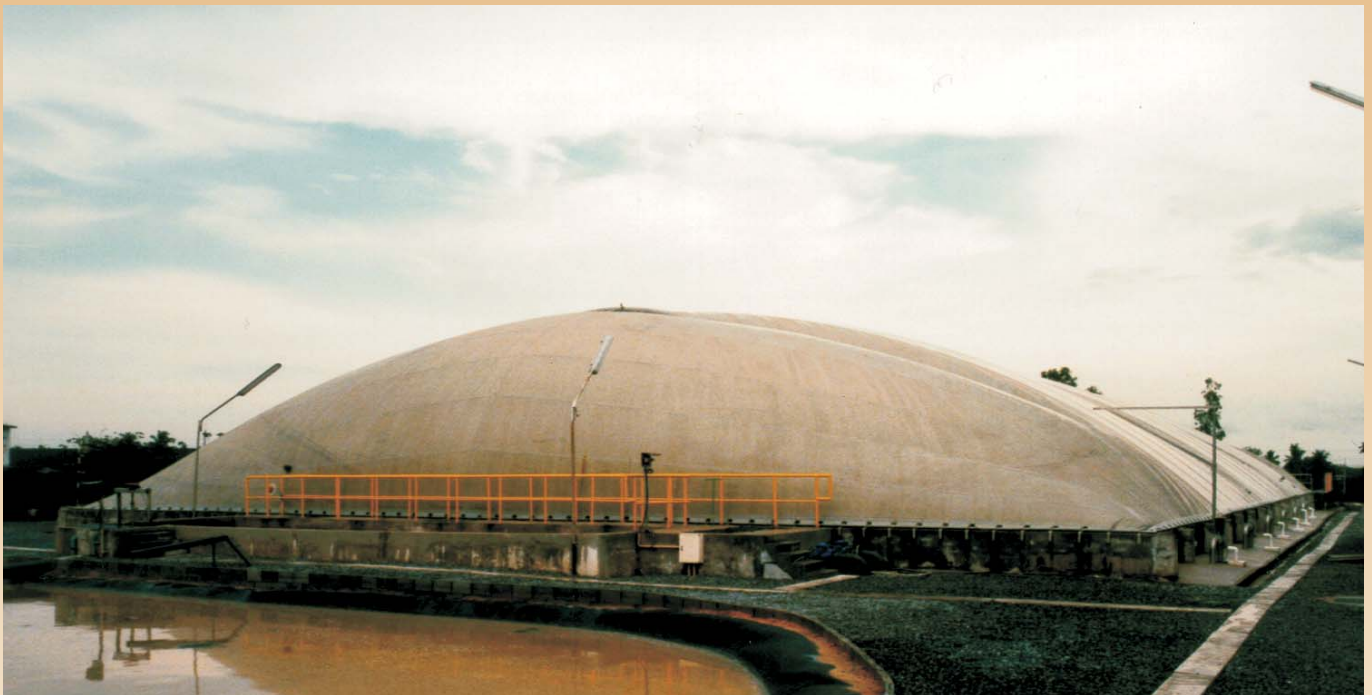
- **low investment - and operation costs**
- **the payback period of the investment is only 2 - 4 years. Thereafter the plant makes cash money.**

Low volume load (approx. 5 kg COD/m³ d) and double-stage configuration with „adapted“ anaerobic sludge lead to:

- **a maximum of energy production**
- **high process stability**

Further advantages of **SKJÖLDGAS** are:

- **only approx. 25 % space demand compared to aerobic cleaning**
- **low maintenance costs**
- **equalization of the produced gas during a period of one week**
- **optimal use for alternative energy production**



SKJÖLDGAS-plant for a starch factory for approx. 40 t COD/d

Configuration of SKJÖLDGAS

Stage I

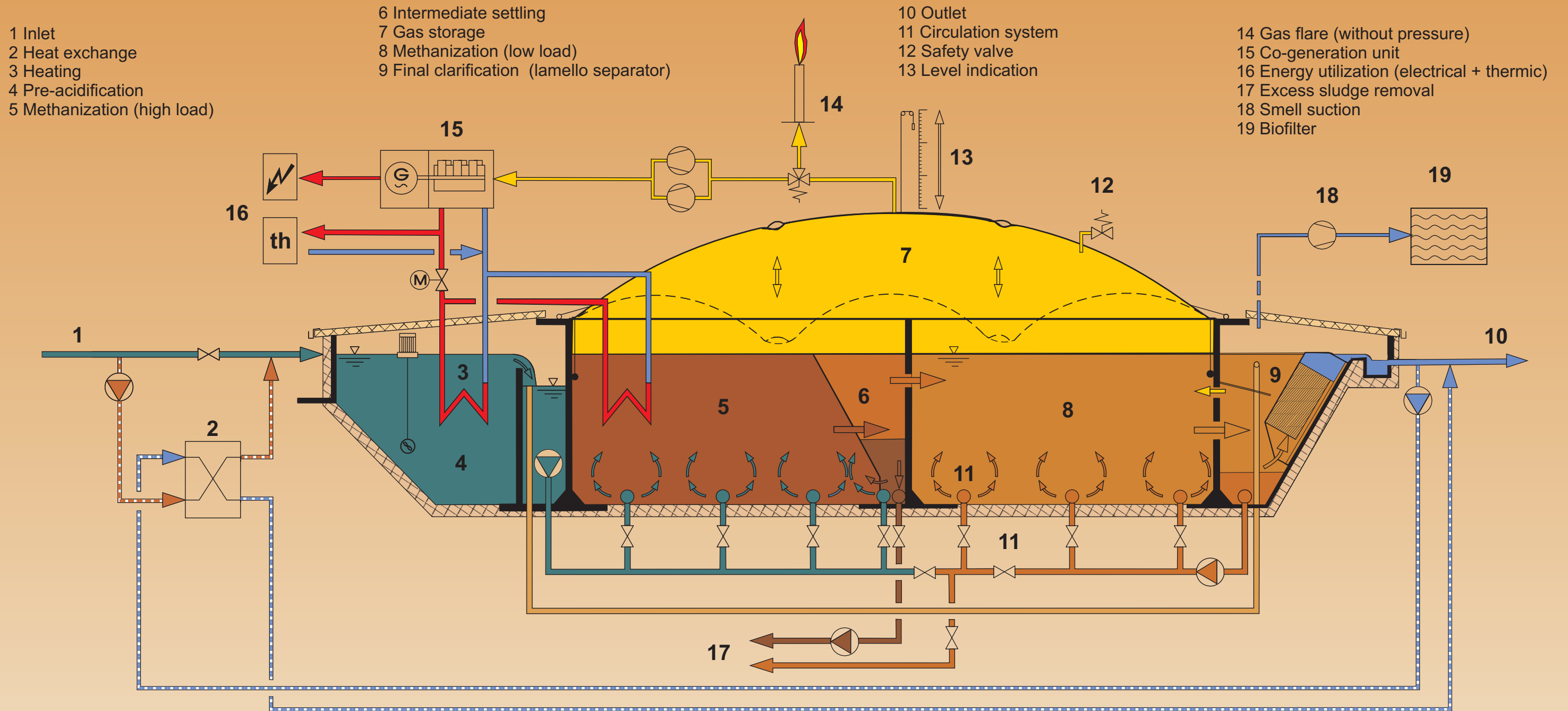
The process starts with the so-called pre-acidification at temperatures from 20°C - 35°C. Process water which is already warm is an advantage. In case of colder inlet water a heat exchange from the outlet water takes place. The remaining energy demand is covered by approx. 15% of the energy produced by the plant.

Stage II

The next step is the double-stage methanization at approx. 35 °C (high load and low load stage). In this stage two different kinds of microorganism are developed which guarantee optimal decomposition of organic substances and a stable process. This process guarantees maximum energy production due to a decomposition rate around 90% and a high methane content (low-temperature reactor). Essential nutrients as N and P are pre-served and are mostly used as fertilizer.

Stage III

Stage III is a generously dimensioned lamello separator which guarantees advanced retention of the bio mass and its return to the plant.



The SKJÖLDGAS FFF - Alternative

Only high digestion and pre-acidification rates guarantee good decomposition and high gas profit. As generally liquids and solids react differently in this process, we developed the **FFF-System** (solids-fluids-fermentation).

Different characteristics of the substances are compensated and all organic substances can be treated in one reactor simultaneously with great efficiency.

TECHNICAL DETAILS

The gas storage

is configured as a hood covering the whole plant. It is generously dimensioned in order to catch up the variations in gas production, i.e. during the weekends. The hood is made of high-quality, multi-layer PVC textile membrane with UV-protection and has frequency damping weights. This construction will withstand heavy storms and even hail storms.

The gas flare

is used to burn the excess gas respectively is used as a safety unit. It is a new development and is a self-contained unit (no emergency power system needed), running on battery and quasi without pressure. In case the operating pressure has exceeded a spring valve switches the flare on. All gas warmer and safety units are running on batteries.

The lamello separator

is used as clarifying unit and separates the light anaerobic sludge. The size is individually dimensioned according to inlet characteristics and hydraulic load. The separator is easy to service resp. maintain and well arranged for the operator.



lamello separator without flow

The basin lining

a high-quality, strong HDPE layer makes it possible to use earth basins for a Biogas plant. As in toxic-waste deposits **SKJÖLDGAS** is using HDPE-layers of 2 mm thickness. Welding is carried out by TÜV-tested welders following strict rules and after various tests a protocol will be issued. HDPE-layers guarantee a 50 years life time; durability by far longer as usually for concrete.

SKJÖLDGAS is using this inexpensive construction type in order to build robust and completely lined reaction basins. This permits „generous“ dimensioning creating process reserves, which guarantees best cleaning, even in case of inlet variations and short-term overloads.

The training of the operating staff

is part of the delivery comprising a comprehensive training of the operating staff with regard to operation and maintenance. Our specialists of our service department are available when it comes to starting up a plant and also at later times when the plant is in operation. This way a smooth operation with high profits is guaranteed.

With service contracts

we are offering the possibility to our customers to make the operation even safer. A break-down of the plant is very expensive and this way we do everything to avoid this.

WHAT MAKES SKJÖLDGAS SO ECONOMICAL?

As done with all our developments we put the focus on three important points:

- Inexpensive and simple solutions
- Robust construction type and high process stability
- Agreement with the nature

Therefore our **Motto:**

„Support the power of nature with a minimum of technique“

According to this motto the system **SKJÖLDGAS** was created, an innovative technology for optimal production of biogas. Regarding investment it is the most inexpensive on the market, equipped with a simple, high-quality technique, constructed for a long period of time and simple operation. A **Return on Investment of 2 - 4 years** is achieved.

Our system is constructed in a compact way; so to speak: “everything under one roof”. This keeps the investment costs and current costs low. Short distances and well isolated „warm areas“ avoid heat losses and keeping the „own energy consumption“ extremely low.

SUPPLY OF A SKJÖLDGAS PILOT PLANT

In difficult cases, like if the COD value is severely fluctuating, we are offering our customers to carry out a considerable number of analysis. For this special case we have developed our pilot plant, which fits on a truck and is easily to install everywhere. At a capacity of for example 5 m³/d and a COD value of approx. 30.000 mg/l we get reliable results in the 33 m³ methane reactor which can be used for dimensioning a large plant.





BIOLAK[®] GROUP

COMPETENCE IN WATER



SKJÖLDGAS-plant for a brewery and beverage industrie with 0,2 million hl/a

VON NORDENSKJÖLD
Verfahrenstechnik GmbH
Killistrasse 3
85658 Egming-Münster
Germany
phone: +49 (0) 8093-2061
Fax: +49 (0) 8093-2223
email: nover@t-online.de
www.biolak.de
close to Munich

BINOWA
Umweltverfahrenstechnik GmbH
Weinstrasse 22
06636 Weischütz bei Laucha
Germany
phone: +49 (0) 34462-7030
Fax: +49 (0) 34462-21620
email: info@binowa.de
www.binowa.de
close to Leipzig

VON NORDENSKJÖLD LTD
Beijing Office
Guo Heng Ji Ye Building
No. 7 Bei Tu Cheng Xi Lu
Chao Yang District, Beijing 100029
P.R. China
phone: +86 (0) 10 82275366
Fax: +86 (0) 10 82275350
email: vnobj@vip.163.com

Licencees

Parkson Corporation

Mr. Ch. Morgan
P.O.box 408 399
FL 33340-8399
Fort Lauderdale/ **USA**

Tecnologia Intercontinental S.A.

Sr. J.A. Primelles
Rio Lerma 171-4
06500 Mexico D.F./ **Mexico**

Representatives

Baltic States
Bulgaria
Denmark
Egypt
Iran
Poland
Russia
Saudi Arabia
Turkey

