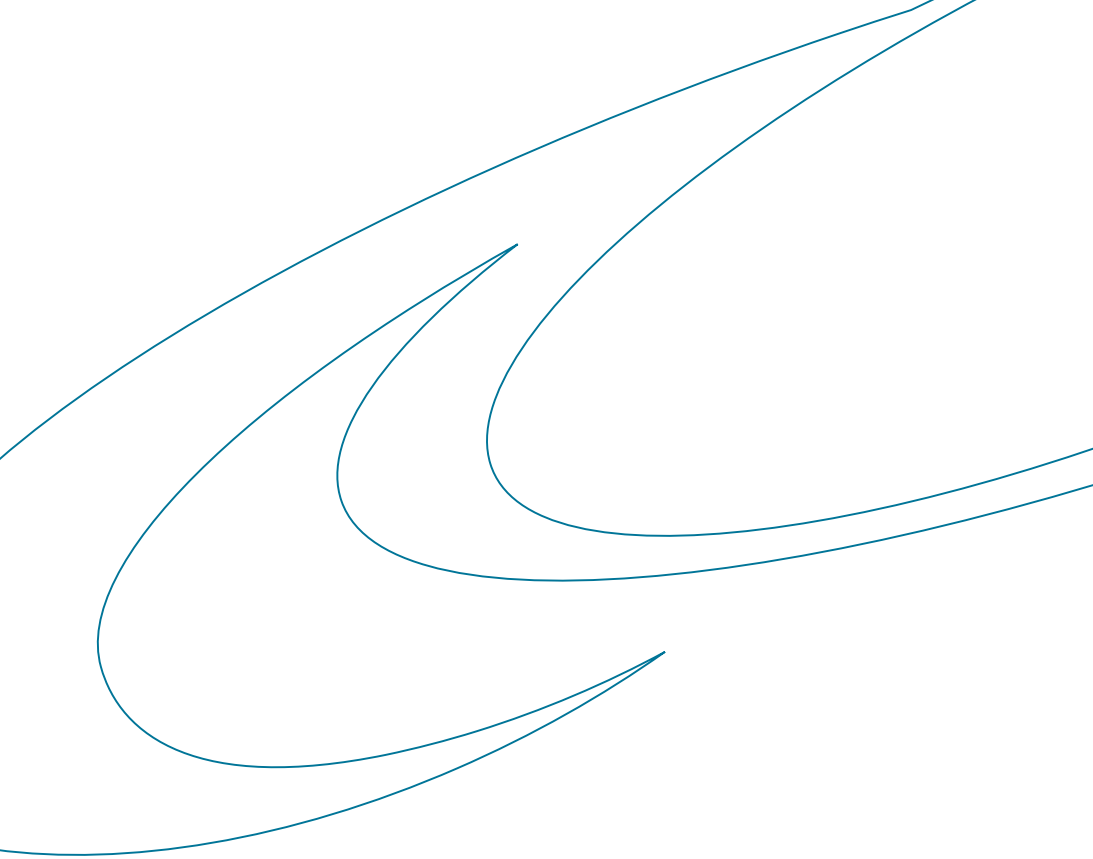




• **BIOPAQ® AFR**

Biogas from COD, fats and proteins



BIOPAQ®AFR

BIOPAQ®AFR is the state-of-the-art technology for generating biogas and purifying water that contains FOG (fats, oil and grease), proteins and other organic matter. It therefore is very suitable for treating waste water from e.g. food industries. With BIOPAQ®AFR, FOG is removed to less than 50 mg/l.

Anaerobic waste water treatment

Anaerobic treatment is the sustainable way to meet effluent discharge criteria and to produce biogas simultaneously: methanogenic bacteria convert organic compounds (COD, BOD) into valuable biogas. Paques is world leader in anaerobic waste water treatment, with more than 30 years experience and over 750 industrial plants. The BIOPAQ® product line of Paques is designed for the anaerobic treatment of industrial waste water; BIOPAQ®AFR is the most recent innovation.

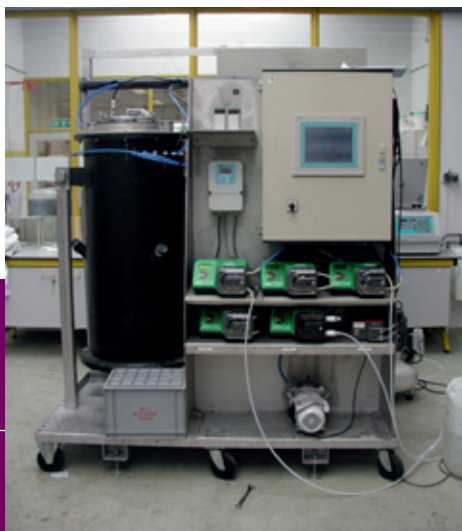
AFR: Anaerobic flotation reactor

BIOPAQ®AFR is especially developed to treat waste streams containing FOG and/or biodegradable solids like proteins and starch. It fills the long-existing gap between high rate anaerobic reactors and digesters.

Standard high rate anaerobic reactors require a pre-treatment step to remove FOG and solids in a settling tank and/or DAF unit. The addition of polymers is needed for flotation of FOG and less biogas is produced as the FOG is removed before the anaerobic treatment. Digesters, on the other hand, are low rate reactors with high retention times. They are designed to treat solid matter or slurries rather than relatively diluted waste water. The effluent of the digester needs post treatment to separate the water from the biomass.

BIOPAQ®AFR is an all-in-one reactor concept, that converts all the organic compounds, including FOG and biodegradable solids, into valuable biogas. It can handle water streams with COD levels up to 100 g/l. The integrated flotation unit ensures that biomass and not yet converted compounds are retained in the reactor, whereas biogas and purified water are extracted from the reactor.

BIOPAQ®



Pilot plant available for on-site testing



AFR reactor at ITC Holland Transport bv, with a capacity of 4200 kg COD/d



Why choose BIOPAQ®AFR

1. Economical solution

Waste water is purified and biogas is generated simultaneously, resulting in:

- considerable reduction in discharge cost
- production of valuable biogas

No pre-treatment is needed for removal of fats and proteins, thus:

- no polymer costs for flocculation
- no discharge costs for discharging fat- and protein sludge

2. Smart water treatment

- Compact reactor: hydraulic retention time is 1,5 to 8 days (in comparison to digester technology: 20-30 days)
- Effective biomass retention: volumetric loading rate up to 9 kg COD/m³/d
- No pre-acidification tank is needed
- No pre-treatment is needed to remove solids
- No pre-treatment is needed to remove FOG
- Very low level of solids in the effluent: no decanter is needed as effluent post treatment
- No odour emission due to closed reactor design

3. Reliable supplier

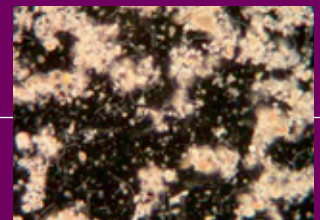
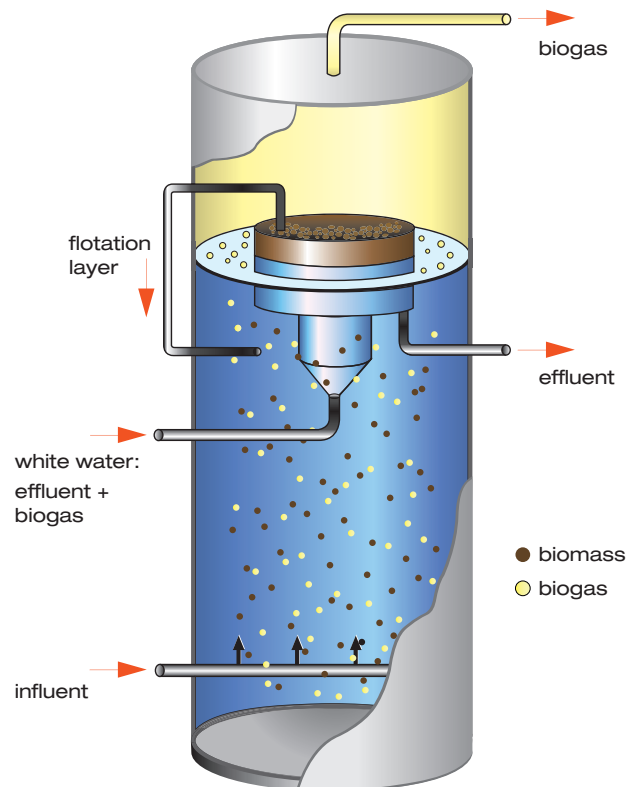
- Over 30 years of experience in industrial waste water treatment to accommodate the needs of each client
- Proven reliability with more than 750 industrial anaerobic plants
- Technical and performance guarantees
- Additional sustainable technologies available within Paques, for example aerobic post treatment, removal of nitrogen and phosphorous compounds, and biogas desulphurisation

Process description

The basic principle of the BIOPAQ®AFR technology is that biodegradable solids and FOG will remain within the reactor until they are digested to biogas while at the same time the retention time of the water is kept to a minimum.

This is achieved by integrating a flotation unit within the reactor. In this unit, solids and fats are floated with the help of biogas (so-called 'white water') and the flotation layer is sent back into the reactor to be digested. The effluent is extracted from beneath the flotation layer and contains virtually no solids. The generated biogas leaves the reactor from the top.

The application of an integrated flotation unit results in high sludge concentrations and a long sludge retention time. The hydraulic retention time on the other hand is very short: therefore the reactor design is very compact.



Biomass in the AFR reactor

Paques develops and produces cost-effective water and gas purification systems using innovative biotechnology. Examples are the removal of organics, sulphides, sulphates, nitrogen compounds (ammonium, nitrate), phosphates and metals.

These systems offer added value to industries and municipalities, such as:

- savings on water discharge costs
- generation of green energy
- re-use of water
- recovery of valuable substances from waste water

This way Paques helps its clients to combine economic progress with environmental responsibility.



For more information

Paques

P.O. Box 52

8560 AB Balk THE NETHERLANDS

t +31 514 · 60 85 00

f +31 514 · 60 33 42

e info@paques.nl

i www.paques.nl

