

Purification performance

The increasing price of water, combined with stricter legislation, is making thorough water treatment an economically viable activity. Producing good quality waste water means considerable savings on discharge costs, enables re-use as process water and reduces the pollution of the environment.

When it comes to treating waste water, industrial companies and water boards are often pointed towards aerobic biological conversion, since both organic and inorganic pollution such as COD and nitrogen must be eliminated completely. However, there are disadvantages associated with using conventional aerobic waste-water treatment systems. Conventional systems take up a lot of space and involve the risk of noise and odours.

The Paques CIRCOCX® technology provides an alternative. The compact CIRCOCX® reactor is a fully closed aerobic system with outstanding purification performance. The system uses very little space, excludes noise and odours risks, and purifies the effluent in such a way that it can be directly discharged to the surface water. Re-use as process water is also a possibility. Many CIRCOCX® plants are operational world wide. These plants

can successfully treat effluent from anaerobic plants, as well as raw waste water and process flows.

Characteristics of CIRCOCX® technology

- excellent effluent quality
- compact and space-saving system
- limited sludge production
- completely closed system
- low operational costs

A cost-effective system

As a result of extensive applied research, Paques has developed the process of using biofilm on a carrier in an airlift reactor, into a cost-effective system for purifying waste water. This has resulted in the CIRCOCX® technology which is protected by various patents. The high volumetric conversion capacity and compact construction of the plant make the CIRCOCX® a powerful purification system. The CIRCOCX® technolo-

gy development phase was completed with the introduction of the denitrifying CIRCOCX® variant in 1995 (patent WO 93/255485).

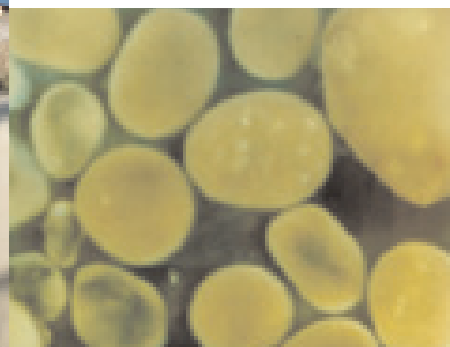
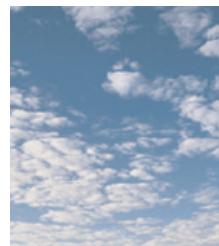
Complete nitrogen elimination

Because of environmental legislation, nitrogen needs to be entirely eliminated from waste water. Consequently, Paques has integrated the denitrification process into the CIRCOCX® system. By extending the system with an anoxic compartment, the denitrifying CIRCOCX® was developed. Thanks to the long sludge-age of granular sludge in the CIRCOCX® reactor, full nitrification is always achieved. In nitrification, organic nitrogen is oxidised to nitrate. This nitrate is reduced in the anoxic compartment and converted to nitrogen gas. The nitrogen is stripped from the water into the atmosphere. Re-use of the water and discharge directly to surface water become distinct possibilities (values lower than 10 mg N-total/dm³ can be achieved).

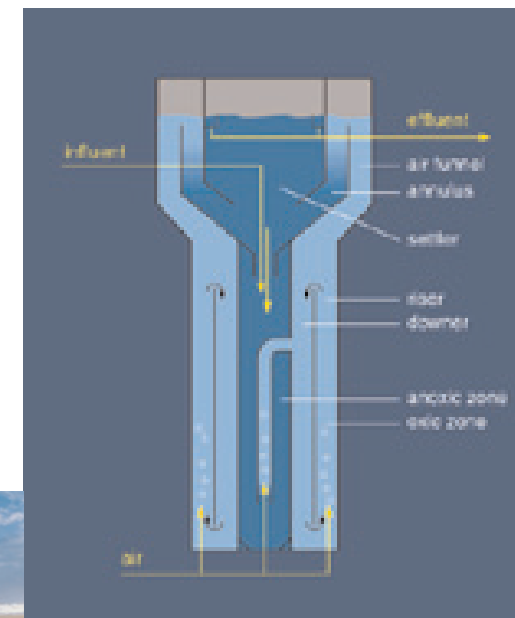
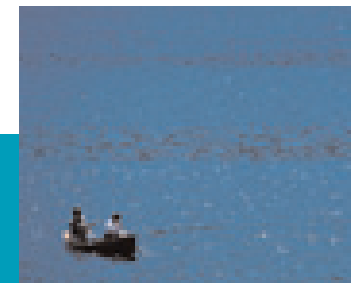
How the CIRCOCX® reactor works

The CIRCOCX® reactor uses biofilm on a carrier material. The granular sludge is suspended in the water by means of the airlift principle. The granular biomass that develops in the CIRCOCX® reactor has a high density and is compact in structure. The granular biomass has good settling characteristics and can easily be separated and returned to the reactor system with the aid of a small settler at the top of the reactor. A high biomass concentration of 20-40 g VSS/dm³ can be achieved. As a result of these high concentrations and the good mixing characteristics of the reactor system, conversion capacities of more than 5 kg COD/m²/day can be achieved. This capacity is much higher than conventional purification systems, that can handle capacities in the region of 1 kg COD/m²/day.

CIRCOCX®



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Schematic diagram of CIRCOCX® technology with integrated denitrification.



• **CIRCOX[®]**
The compact answer to higher effluent quality

For more than fifteen years, Paques has developed and produced high-quality, cost-effective purification systems for water, gases and air, using innovative biotechnology. Our aim is to provide solutions to industrial problems with our extensive range of purification techniques. The added value of the treatment process is most important, such as the re-use of water, the generation of energy by the conversion of residual organic compounds, and the reclamation of valuable substances from the waste water. This way, we bridge the gap between environmental responsibility and economic progress.



For more information

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