

## PROCESS

SEMICONDUCTOR

SOLAR

PHARMA

POWER GENERATION

**FOOD & BEVERAGE**

PULP AND PAPER

CHEMICAL

**OIL AND GAS**

MINING

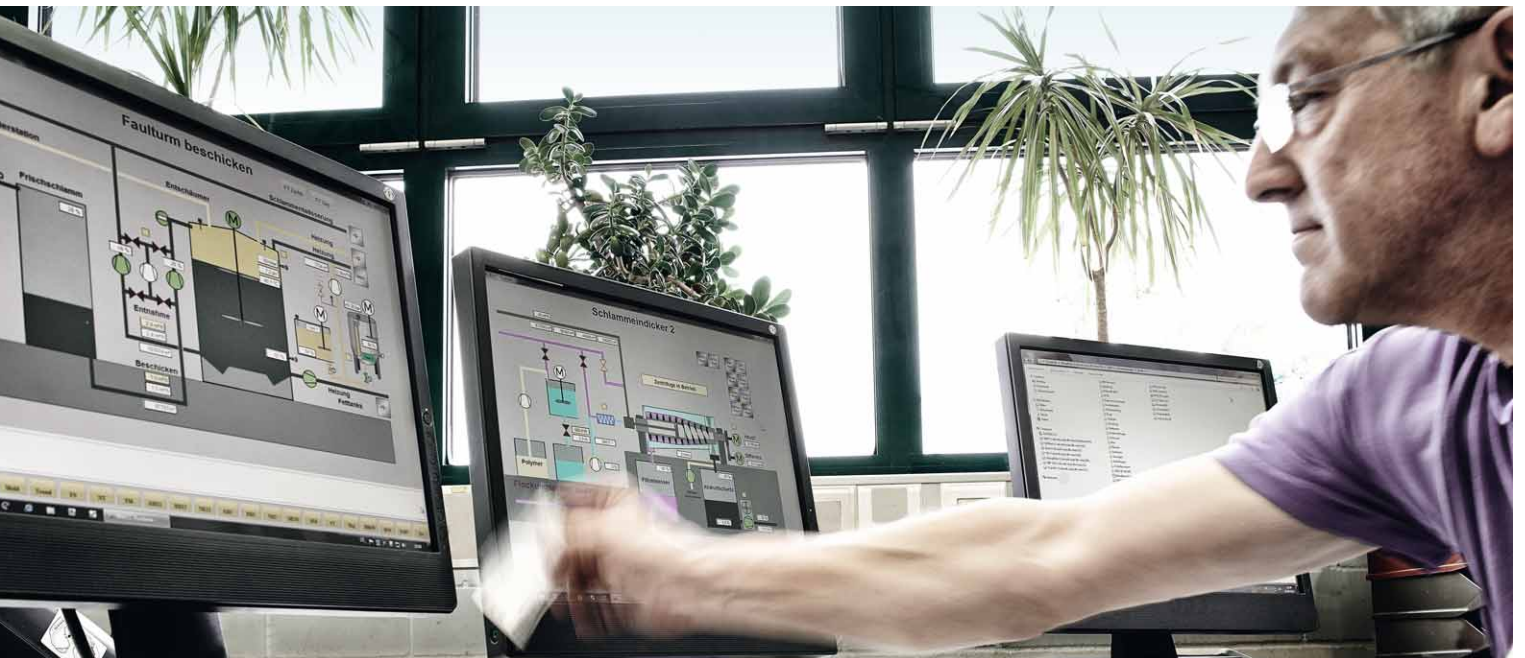
AEROSPACE AND TRANSPORT



# BIOFIT<sup>®</sup>.N

Combined Nitrification and Denitrification  
for Wastewater Treatment in Industry





BIOFIT®.N in Industrial Wastewater Treatment

# Compact. Efficient. Stable operation.

*Especially in the production of food and beverages, as well as in the oil and gas industry, wastewaters contain medium to high nitrogen loads. BIOFIT®.N is a proven process for nitrogen removal from treated wastewaters.*

**D**BIOFIT®.N is used if nitrogen is existent in wastewater in the form of ammonia, organically bound nitrogen or nitrate, which is the case e.g. in the cleaning and manufacturing processes in the food industry.

The BIOFIT®.N process achieves this exceptionally high rate of nitrogen removal through its procedural

structure. Constructional separation of the nitrification and denitrification process steps increases the efficiency, so that highest removal rates of over 90% can be achieved. At the same time, BIOFIT®.N can be used as an individual process stage or in combination with an upstream selector without additional anaerobic stage.

# Advantages

The arrangement of denitrification and nitrification in concentric ring tanks creates a plug flow with optimum retention time and ensures highest efficiency and stability of operation of the BIOFIT®.N process.

Using the carbon already present in the wastewater for denitrification makes adding further chemicals unnecessary; this reduces operation costs of the BIOFIT®.N process.

The concentrate containing nitrate from the nitrification is recirculated into the denitrification up to eight times which ensures the enormously high removal rates of 80% to even over 90%. Thus the limit values for nitrogen and also COD and BOD are reliably met.



Nitrification stage of BIOFIT®.N with AEROFIT®.D aeration system in a test run

The recirculation pump as well as the submerged mixer can be dismantled and maintained during operation without any problems. Due to its special construction, the BIOFIT®.N process produces much better sludge and constant low discharge values compared to conventional systems.

# Process Components

*The efficient treatment of nitrogen-containing wastewaters requires both treatment steps nitrification and denitrification.*

While the nitrification process requires a lot of oxygen, the denitrification process can only take place in anoxic conditions; to be precise, without dissolved oxygen, concurrently present nitrate, and a carbon source. For this reason, BIOFIT®.N organises these processes separately in two concentric ring tanks. This arrangement leads to a uniform ring-plug flow in the nitrification

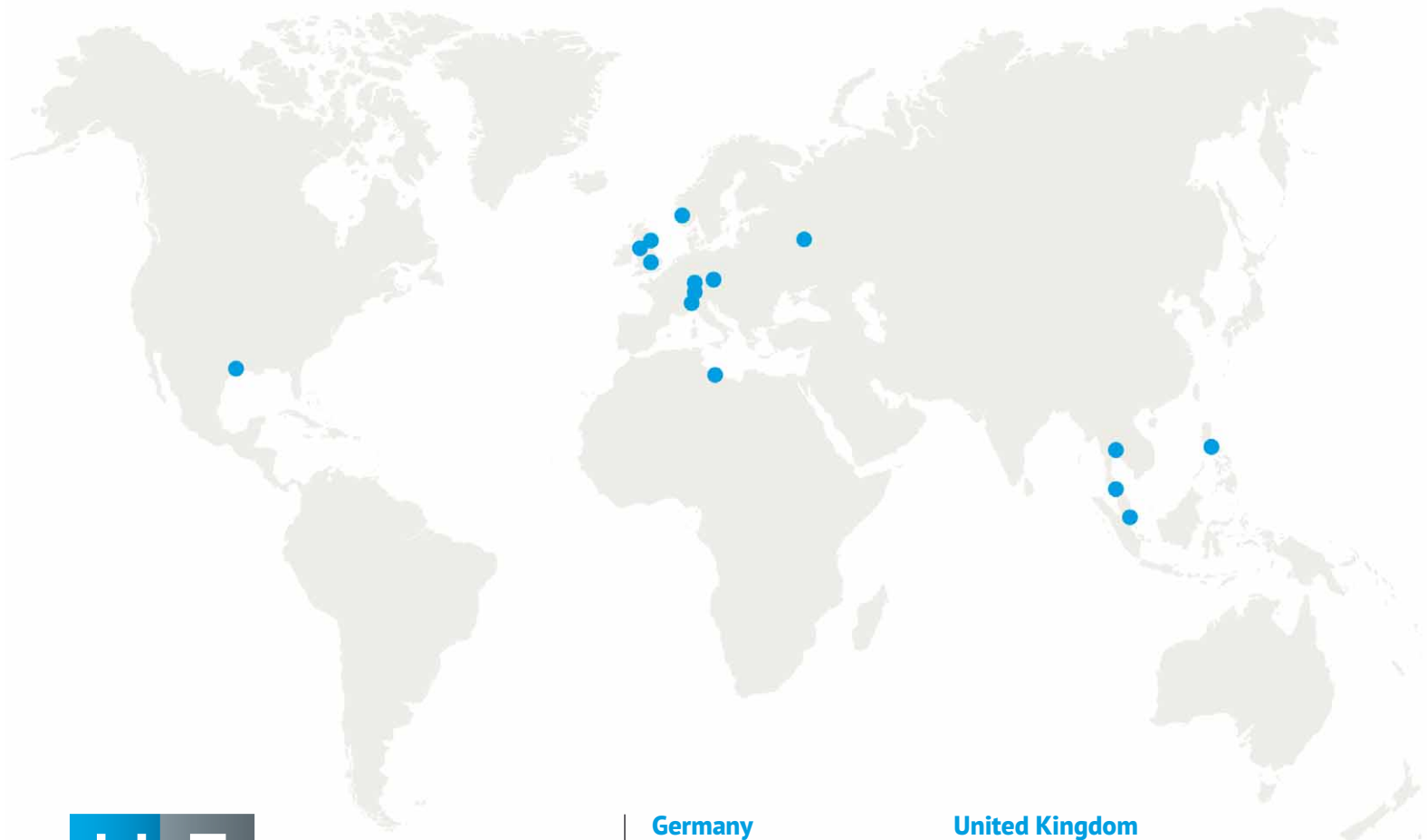
section, which ensures uniform operation behaviour at optimum efficiency.

The first stage of denitrification, i.e. the reduction of nitrate to elementary nitrogen, takes place in the non-aerated cylindrical inner ring of the activated sludge tank. A large amount of the nitrified wastewater is recirculated into the inner denitrification zone and a submerged mixer ensures its movement. The carbon amount in the inflowing wastewater provides the energy for the nitrate respiration. The wastewater then flows from the inner tank into the aerated outer ring, where the ammonia nitrogen oxidises to nitrate and the remaining carbon is removed.



Biological treatment with nitrification and denitrification

Due to the cascades in the denitrification and nitrification process a sludge is formed that can be easily separated from the wastewater via sedimentation in the post-treatment. Especially if the reactors are very high, a degassing stage will be placed before the post-treatment to avoid gas release and resulting flotation effects. The excess sludge is fed to the sludge treatment.



HAGER + ELSÄSSER® ranks among the world's leading suppliers in the fields of water & wastewater treatment. Based on its global presence, the HAGER + ELSÄSSER® has completed projects in more than 50 countries.

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