

Industrial Wastewater Treatment at Ten Kate

From indirect to direct discharger by running an own treatment plant

The company Ten Kate GmbH & Co. KG, based in Sögel Germany, is a processing company for animal by-products that produces high-quality animal fats and proteins for a wide range of applications. The products are used as ingredients in farm animal feed, in pet food, in the oleo chemical industry and for the production of biodiesel.



Initial Situation:

Since the beginning of the 1970s, the company's organically highly contaminated process wastewater has been fed into the sewer network and thus into the municipal sewage treatment plant. For reasons of a more needs-based and more economical purification of the wastewater, it was decided to build and operate its own company sewage treatment plant on the company premises. With this step, the company became a direct discharger into the small river Radde in July 2017.

Implementation:

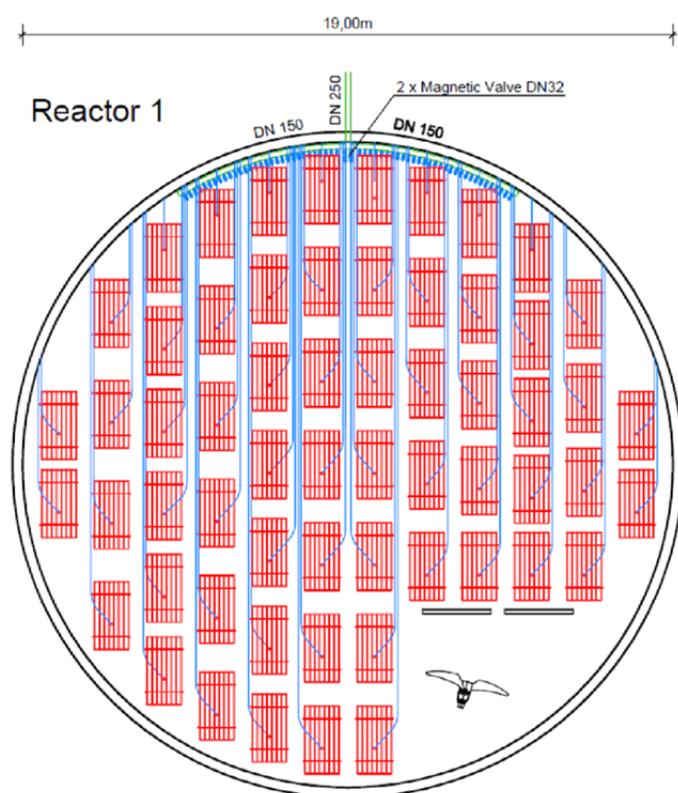
During construction, the question arose for the most suitable aeration system for complete decomposition of the highly contaminated industrial wastewater. After careful consideration between the installation of ejector aerators or large-format plate aerators, the decision was made in favor of the highly efficient and extremely durable MESSNER® Aeration Panels Classic HT. Each aeration panel is provided with 2m² high temperature membrane with a heat resistance of up to 40°C, which can deal with the very hot waste water.

After the structural completion of the original planning done by a foreign engineering office (upstream denitrification basin, downstream nitrification basin) it has quickly become clear that this concept was not sustainable in reality. The production breaks during the weekends led to a considerable undersupply of the bacteria during this time. In consequence the renewed high loading in the course of Monday morning strongly reduced the cleaning performance again, since the already weakened biology has been completely overloaded then.

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After consultation of the Rudolf Messner Umwelttechnik AG, a new concept was jointly developed. On the one hand, this concept provided for a change of procedure and, on the other hand, an updated calculation of the loads entering the wastewater treatment plant.

In the first step, the denitrification tank was converted into a storage tank. A more even feeding of the activated sludge plant could thus be ensured even during the weekend. In the nitrification basin (reactor 1) a controlled intermittent aeration operation was introduced. The resulting shorter aerated contact time was compensated by an extension of the active aeration surface and thus increased oxygen supply capacity. The number of MESSNER® Aeration Panels was increased from 34 to 60 pieces.



The effective floor coverage increased from 24% of the floor area to over 42%.

Furthermore, the updated calculations of incoming freight showed a significant increase in freight rates between the original planning year 2013 and the trial operating year 2016. The incoming nitrogen freight had doubled in the meantime. The inflowing COD load had almost nine folded with inflow concentrations of up to 10,000 mg/l. The nitrogen load had doubled. It became obvious to the operator that an expansion of the plant was unavoidable. A further, somewhat smaller and also intermittently operated reactor 2 was built and equipped with 54 of the high-temperature MESSNER® Aeration Panels. As in the first tank, the

effective floor coverage was over 42 %. Both reactors are fed from the mixing and equalizing tank (former denitrification tank). An additionally installed fully automated acetic acid dosing system from RMU keeps the pores of the membrane permanently clean and clog-free.

Result / Benefit:

The new discharge limits for the direct discharge of the treated wastewater into the weak receiving watercourse have been complied with since the completion of the plant sewage treatment plant. Due to the possibility of variable operation of the aerators, the strongly fluctuating wastewater loads can now be optimally and energy-efficiently reduced on site.