A 62 m² building accommodates the complete BioBooster plant!

Arla Foods first with compact biological wastewater treatment plant from Grundfos

Arla Foods is at present Europe's second largest dairy company, co-operative society owned by approximately 10,600 dairy farmers, with an annual turnover exceeding 6 billion EUR.

Arla Foods' highly optimised production facility in Hobro, Denmark, processes around 140 million litres of liquid milk into fresh milk and sour products every year.

The situation

Arla Foods in Hobro has been facing high and increasing discharge costs for wastewater during recent years as a result of a pollution-based cost model implemented by the local municipality.

For some years, Arla Foods had investigated several wastewater treatment technologies in order to try to reduce their discharge costs. Because Arla Foods in Hobro is situated in dense urban settings, and furthermore neighbouring an odour-sensitive camping site, they were unable to find a technology that could meet their requirements to cost reductions, space savings and environmental soundness, until they were presented to the Grundfos BioBooster PBR technology.

Grundfos provided

- Complete turnkey installation
- Compact, easy expandable and odour-free solution
- Cost savings
- Complete service agreement

The Grundfos solution

Grundfos BioBooster performed an analysis of Arla Foods' current wastewater situation, and prepared a feasibility study to calculate investment and expected cost savings, thereby providing the customer with a good basis for decision.

The outcome was a BioBooster plant which at present consists of 23 Pressurised Biofilm Reactors (PBR). However, capacity expansions to accommodate future increases in production volume at Arla Foods are done simply by the addition of further PBRs.

The BioBooster plant is connected in series with the existing ZEDA flotation unit, which partly removes oils, fats, proteins and other suspended solids from the wastewater. Also, to keep initial investment costs at a minimum, both the existing sludge tank and balancing tank system were reused. The biological sludge is separated from the wastewater stream on a belt filter and pumped to the existing sludge tank. The sludge from the flotation unit and the PBRs is subsequently recycled in a biogas plant for biogas generation.

The BioBooster plant is completely odour-free, as all vents from the enclosed reactors, including all other vents and open areas where the wastewater is in contact with the air (primarily the belt filter), are run through activated carbon filters before discharge to the surrounding environment. This completely eliminates odour emissions from the plant.

The plant could easily have been fitted into the basement of Arla Foods' production facilities. But because the customer wanted to use this for other purposes, it was decided to build a new, small 62m^2 building to house the compact BioBooster plant. Furthermore, the BioBooster building is cladded on the exterior to ensure maximum blend with the existing building architecture on the premises.

A comprehensive service agreement comprising planned maintenance, repair, remote operation and monitoring of the plant formed part of the complete turnkey solution from Grundfos. This means that Arla Foods' personnel have very little involvement in the daily running of the BioBooster plant.

The outcome

After commissioning of the BioBooster plant, Arla Foods is gaining substantial savings on their discharge costs, as well as better documentation of what is going down the drain.

Better documentation and increased knowledge about the dairy production's impact on BioBooster plant operations have led to an increased awareness within the dairy. Arla Foods' personnel are now more focused on reducing spillages in the production, and so far milk spillages have been reduced by around 400-1000 litres per day.

Due to the high biogas potential in the sludge, a biogas plant has agreed to collect the sludge at no cost for the dairy, which has reduced the operating cost of the plant.

The local municipality was informed about the project at an early stage and has therefore been very positive towards the new technology. Thanks to Grundfos' pilot project, they now consider the new decentralised wastewater treatment technology a viable alternative to centralised treatment of large industrial dischargers' wastewater.

The 23 PBRs are installed in vertical layers to ensure max. compactness and flexibility in case of future expansions.

Remote monitoring of the BioBooster plant at Arla Foods in Hobro.

BioBooster Plant Data	
Flow	225 m^3/day
Influent	2300 mg BOD5/litre and 115 mg N-total/litre
Effluent	400 mg BOD5/litre and <80 mg N-total/litre
Total installed capacity	580 kg COD removed/day

Quote:

"We have examined various new technologies on the market, aiming to find a solution that could reduce our wastewater treatment discharge costs, and at the same time meet our requirements to environmental soundness. By far, Grundfos BioBooster came out as the most attractive solution.

This was primarily due to its very compact design. What's more, the cooperation with Grundfos BioBooster has been characterised by partnership rather than a traditional customer-supplier relationship. We are extremely satisfied with BioBooster's performance so far – and the solution is very attractive not only for Arla Foods in Hobro, but also for several other Arla production facilities".

Nils Mogensen, Environmental Coordinator, Arla Foods, Hobro