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Media information 01/21

Economy / Environmental technology

German Green Technology from DAS Environmental Experts for Swiss DSM Nutritional Products AG

Moving Bed Biofilm Reactor for sustainable wastewater treatment for the food industry

Dresden/Germany, 29 March 2021. Reliable, competent and in record time - this is how the German green technology experts of DAS Environmental Expert GmbH have expanded the capacities for wastewater treatment at a plant of the chemical group DSM Nutritional Products, where DSM operates the world's largest production facility for vitamin E. The Swiss plant also produces pharmaceuticals, substances for the cosmetics industry, dietary supplements and additives such as vitamins, carotenoids and folic acid.

"Increased production capacity had stretched the existing wastewater treatment plant to its limits. We needed to expand accordingly. We partnered with DAS Environmental Expert GmbH from Dresden for this and are very satisfied with the result," says Martin Brokatzky, Head Improve Plant Department at DSM Nutritional Products.

The challenge: Stringent requirements and special wastewater properties

The expertise of the Dresden-based environmental technologists was required to handle not only the increased volume, but also the purification of the wastewater. "The requirements of wastewater purification are a challenge in this project," reports Karl Ruediger, project manager at DAS Environmental Expert GmbH (DAS EE). "The wastewater characteristics correspond to those of the chemical industry - but the regulations to be met are similar to those for the beverage and food industries. These strict limits must be reliably met even after the production expansion."

The initial contact quickly turned into a large project. Ultimately, DSM assigned DAS EE with the analysis, planning, manufacture, delivery, construction, assembly and commissioning of the additional wastewater treatment plant. Initially, a temporary addition to the existing wastewater treatment plant was planned, because the production expansion at the site was accompanied by an increase of the hydraulic load. A wastewater volume of 2,250 m³ per day was expected, combined with 2,800 kg TOC (Total Organic Carbon) per day and a salt concentration of 10 g/l. The existing wastewater treatment plant was also to be expanded. It was also known that the wastewater may contain solvents. The aim was to reduce the load to approx. 1,000 kg TOC per day through suitable measures.



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Two-stage MBBR plant for flexible wastewater treatment

In agreement with the client, the environmental technology experts opted for a two-stage MBBR plant (Moving Bed Biofilm Reactor) in order to quickly adapt the wastewater treatment to the planned increase in production.

In this plant, wastewater is treated biologically by breaking down the TOC in the two moving bed reactors, connected in series, thanks to microorganisms that grow on a special carrier material. This aerobic process requires oxygen, which is blown in from below. The jet pump nozzles also keep the water in the reactor moving, ensuring constant contact between the contaminated liquid and the biomass. Excess sludge is removed along with the purified water and then separated in a flotation system.

This wastewater treatment solution can react flexibly to strongly fluctuating wastewater volumes and contamination levels thanks to the high buffer capacity of the containers. As requested by the client, the system has been set up as a temporary plant that can be dismantled later, after use. To ensure this, the MBBR containers were constructed with screwed and sealed plates. The necessary blowers, dosing system and substation were mounted and placed in containers.

In addition, the biological wastewater purification is completed by plants for draining and filling the sludge, a plant for waste air purification and a large stair tower.

Successful installation and commissioning despite unfavourable conditions

The project began in September 2019 and the first part of the plant was already operational by July 2020. This was followed by the commissioning of the flotation system and the sludge press, and then the final performance run. After a 14-month project, the new plant to expand the wastewater treatment system was handed over to DSM at the beginning of November 2020.

Despite unfavourable weather conditions and the significant impact of the corona virus pandemic, including the resulting halt in construction ordered by government regulations, it was possible to adjust the work processes on site and complete the plant on schedule. "Being able to adapt well, even to an unconventional course of the project, and constant flexibility to accommodate client requirements, are some of our greatest strengths. We rose to the challenges posed by the corona virus by increasing vigilance in managing the construction site. Excellent cooperation with our client was also essential for the success of the project," Karl Ruediger adds.

Reliable operation, simple online remote maintenance and expansion potential

Today, the plant is being used in food industry production conditions. DAS EE can now supervise it, along with DSM. Online remote maintenance will also ensure a more efficient and cost-saving service in future. And: "As production continues to grow, the compact design of our plant means we can expand it over the available area," concludes the DAS project manager.

Further information: <https://www.dsm.com/>

Photographic material available for download (approx. 13 MB, use free of charge for the media, © DAS Environmental Expert GmbH): http://bit.ly/DAS_DSM_visuals

1_DAS_EE_plant_at_DSM.jpg

Caption:

DSM in the Swiss municipality of Sisseln relies on the two-stage MBBR plant from DAS EE for wastewater treatment.



2_DAS_EE_builds_plant_at_DSM.jpg

Caption:

The environmental technology experts at DAS EE adapted the wastewater treatment of DSM Nutritional Products AG to the increased capacity in a very short time.



3_DAS_EE_MMBR.jpg

4_DAS_EE_MMBR.jpg

Caption:

In this plant, wastewater is treated biologically by breaking down the TOC in the two moving bed reactors, connected in series, thanks to microorganisms that grow on a special carrier material.



5_DAS_EE_plant_at_DSM.jpg

6_DAS_EE_plant_at_DSM_portrait.jpg

Caption:

At the client's request, the biological wastewater purification is completed by plants for draining and filling the sludge, a plant for waste air purification and a large stair tower.



7_DAS_EE_MMBR_portrait.jpg

Caption:

The MMBR (Moving Bed Biofilm Reactor).



8_DAS_EE_wastewater.jpg

Caption:

The wastewater properties at DSM are equivalent to those of the chemical industry, yet the applicable provisions are similar to the specifications for the food and drink industry.



9_DAS_EE_sludge.jpg

Caption:

View of sludge draining and filling.



10_DAS_EE_monitoring.jpg

Caption:

The wastewater is continuously monitored.



11_DAS_EE_exhaust.jpg

Caption:

View of the waste air purification: Droplet separator, ventilators and activated carbon filter



12_DAS_EE_maintenance.jpg

Caption:

DAS also supports maintenance as required.



13_DAS_EE_3D-plant.jpg

Caption:

3D representation of the plant



About the company

[DAS Environmental Expert GmbH](http://www.das-ee.com) is an environmental technology company based in Dresden. Founded in 1991, the company develops process and plant solutions to treat industrial wastewater. In addition, the company offers plant operators a comprehensive service for wastewater technology and plant maintenance. In another division, DAS is a world-leading technology and equipment supplier for solutions for the disposal of process exhaust gases (e.g. burner-scrubbers, wet scrubbers, fine particle and condensate separators) for use in the semiconductor, flat panel display and LED industries and in the solar industry. DAS Environmental Expert is active globally and currently employs about 600 people worldwide.

Further information: www.das-ee.com

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