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Let's Solve Water

Case study
Emsland Frischgeflügel GmbH

Cleaning wastewater with ozone in slaughterhouse application

The installation of an ozone system in Emsland Frischgeflügel GmbH is a clear demonstration of how ozone can be used to treat wastewater in slaughterhouses, in a safe, economical, and environmentally-friendly manner.

The wastewater in large poultry operations are organically polluted and must be cleaned before they are discharged into public waters. They typically have high Chemical Oxygen Demand (COD) values, Adsorbable Organic Halogen (AOX) and possibly bacteria in the wastewater.

Emsland Frischgeflügels's plant in Haren has been expanded to increase production quantity. Coupled with this expansion, they had to request for a re-approval of the wastewater discharge – specifically, to prove that the wastewater falls below the valid limit values. Due to the many years of successful cooperation, along with Xylem's one-stop solution offering, guarantee, technological capabilities and ability to deliver with a short period of time, the company first contacted Xylem.

With the help of Xylem, the governmental value limits were achieved using a properly dimensioned ozone system from Wedeco and the sensor technology of WTW for water analysis.

Challenge

Wastewater in slaughterhouses is polluted with organic substances that must not enter the normal water cycle: carbonceous compounds, nitrite, as well as chlorine and nitrate. Due to the production expansion of the plant in Haren, Emsland Frischgeflügel had to ensure that despite the increase in wastewater, properly treated water left the plant. It was also challenged by a short provisioning lead time of less than a year – ensuring that the whole system is planned, produced and delivered without delays.

The Solution

With the ozonation of the wastewater, Emsland Frischgeflügel was able to achieve several goals at the same time. Firstly, the decomposition of pollutants is performed in an environmentally friendly process, which is also highly economical because ozone is always used according to demand. "The water cascades through three stages, and ozone can be added at each stage. At high levels of pollution, all stages are active; at lower levels, the dosage can be

Customer: Emsland Frischgeflügel GmbH

Xylem's Task:
Clean organically contaminated wastewater in a safe, economical and ecological way using an ozone system.

The cleaning process must ensure that the wastewater can be discharged into public watercourses, even after capacity expansion of the poultry farm.

Additional requirement: Provision the entire plant and integrate measurement technology systems within a short period of time.

System:
Wedeco ozone system SMOevo 710
WTW Sensor technology NiCaVis UC 705 IQ NI

Wedeco SMOevo 710, built in a Xylem container.

WTW Sensor technology NiCaVis UC 705 IQ NI

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reduced accordingly," explains Robert Rongen, Key Account Manager for Wedeco ozone and UV systems at Xylem. On the average, a retention time of about 30 minutes must be observed in order to achieve the necessary water purity.

The plant in Haren is supplied from the central oxygen tank on the site. Oxygen (O_2) is used to produce ozone (O_3) at a voltage of 5,500 volts. Sales engineer Sonja Winandi explains: "After the ozone generator, the gas mixture consists of around 10 percent ozone, the remaining 90 percent pure oxygen. This is sufficient to trigger the desired reactions in the wastewater."

In order for the system to run safely and reliably, several security aspects were taken into account. In concrete terms, the highly reactive ozone breaks down particularly the long-chained organic molecules, which are not biodegradable or are difficult to biodegrade. The now short molecules, on the other hand, can be easily eliminated from the water in the next filter stage - a downstream sand filter. "The water, which now ultimately flows into the Ems river via the canal, is not only very clean, but is below all the relevant limit values. It also contains a lot of oxygen, which is good for the entire 'flowing water' ecosystem," says Rongen, pleased about a positive side effect. Another positive side-effect is the significant reduction of bacterial contamination in the water.

The Wedeco system installed has an ozone capacity of 7 kg/h. It is designed in such a way that even peak loads of up to 175 m³/h can be safely run.

In regular operation, the ozone requirement is between 3.5 and 4.0 kg/h. The contact basin - two metres wide, six metres deep, six metres long - is constructed underground with a three-stage cascade. Before the wastewater flows into the basin, a WTW sensor in the transfer shaft determines the COD value. The ozone system then automatically doses the ozone requirement in the basin. "This contamination-dependent dosing ensures economical operation," explains Jan-Karl Nielebock, Application Manager for Food & Beverage Applications at Wedeco.

Safety delivered within in a short period

In order to run a safe and reliable system, several security aspects were taken into account. One is the forced ventilation, that was set up to ensure a constant (low) negative pressure in the tank and that no ozone is released into the environment. In addition, a residual ozone destroyer was installed to convert the extracted residual ozone into harmless oxygen.

After the Wedeco engineers and the planners from Emsland Frischgeflügel had designed the wastewater treatment, they had to implement in a very short span of time. This was where the Wedeco's experience paid off - setting up with ozonisation and the necessary technology for electricity generation. "We were able to offer an 'all-in-one solution,' which included the delivery of the complete system in a container. "Only the tank and the ozone supply line with the pipeline bridges had to be built on the factory premises, no separate building was required for the plant," reports Rongen.

> The water cascades through three stages, wherein ozone can be added at each stage. All stages are active when there is a high level of pollutants, and the dosage can be reduced accordingly when there is a low level of pollutants.

Hans-Georg Meyer, department head at Emsland Frischgeflügel GmbH, is convinced of the Wedeco ozone system:

"The project planning and cooperation went very well, and the plant itself runs without any problems. We have now also installed this technology at our plant in Wietze". Previously, Meyer had made his own impression and visited a reference plant in Rhineland-Palatinate - where a Wedeco ozone plant treats the wastewater of a paper factor.

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Deutschland
Xylem Water Solutions Deutschland GmbH
Bayernstraße 11
30855 Langenhagen
Tel.: +49 511 7800 0
Fax: +49 511 782893
info.de@xyleminc.com
www.xylem.com/de-de

Österreich
Xylem Water Solutions Austria GmbH
Ernst-Vogel-Straße 2
2000 Stockerau
Tel.: +43 2266 604
Fax: +43 2266 65 311
info.austria@xyleminc.com
www.xylem.com/de-at

xylem.com