

Reference case

Effective removal of 1,4-dioxane from industrial wastewater with Advanox

In chemical processes, the very toxic substance dioxane can be generated. Van Remmen UV Technology prevents this substance from ending up in nature and eventually drinking water with a sustainable and innovative advanced oxidation technology; Advanox. KLK Kolb, a manufacturer of surfactants and paper process chemicals, discovered the power of Advanox.

Background

Companies in the chemical industry are facing stricter EU regulations regarding dioxane, a common by-product of chemical processes. This is a positive development because dioxane is persistent and toxic, can easily spread in water, and is carcinogenic. To prevent dioxane from entering nature and even our groundwater, reliable removal is necessary. This poses a challenge for companies to develop robust water treatment methods that mitigate risks and avoid downtime.

The challenge

KLK Kolb in Moerdijk encountered the issue that their on-site wastewater treatment could not remove 1,4-dioxane, resulting in outgoing concentrations exceeding local regulations. The permitted maximum outgoing concentration was <1 mg/L, requiring a removal efficiency of >92% to meet discharge limits.

The solution

We supported the client with an Advanox Precision reactor in their wastewater treatment. This reactor utilizes advanced oxidation to purify water from dioxane. It combines UV-C light

and (sustainable) hydrogen peroxide from Nouryon, reacting with the contamination and 'burning' it in the water, breaking it down into harmless particles. We developed a customized pilot installation, extensively testing it with various dosages and variations in wastewater. This led to a final installation that effectively removes dioxane with the optimal dosage of UV-C light and hydrogen peroxide, minimizing energy waste.

Results

Since the Advanox process requires an intensive treatment, the energy consumption (0.70 kWh/m³) is higher and the treatment extremely effective. Any residual hydrogen peroxide is not a problem for the subsequent wastewater treatment plant, in other applications it can be easily removed with minimal impact on treatment costs. The Advanox proved to be superior in water quality, CAPEX and OPEX to all other alternatives tested and researched by KLK.

Facts

Customer

KLK Kolb

Location

Moerdijk, The Netherlands

Purpose

Removal of 1,4-dioxane
from industrial wastewater

Solution

Advanox™ Precision
series in partnership with
Nouryon