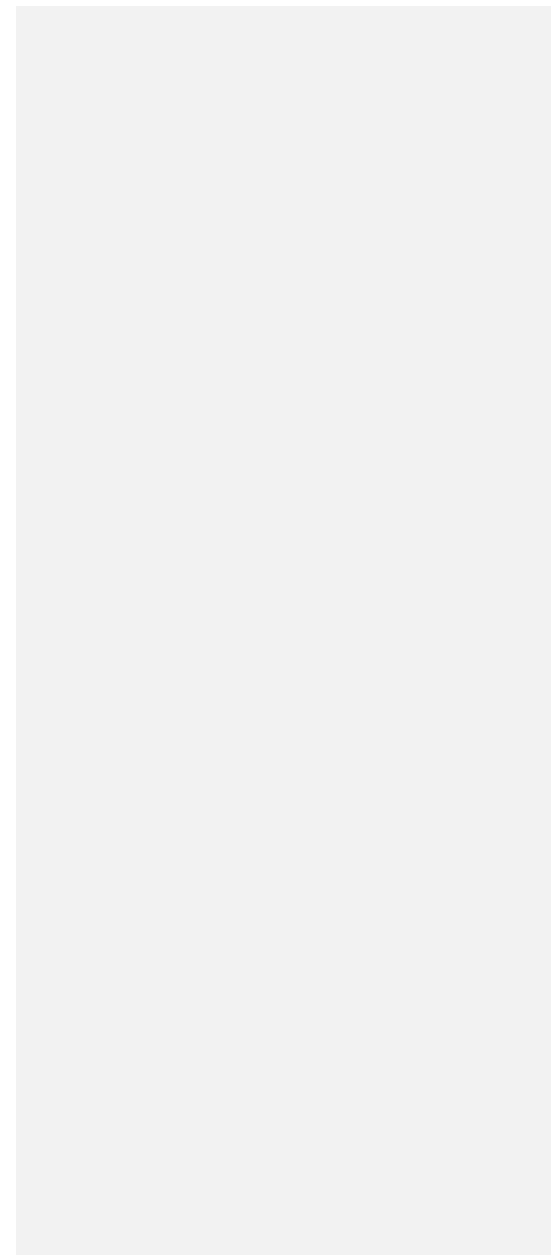


Abstract Title	<b>Effective removal of micropollutants, nutrients and solids from waste water effluent by using a combination of ozonation and denitrifying GAC filtration</b>
Topic	<p><b>O Improving water quality</b></p> <p>O Resilient water systems</p> <p>O Circular solutions: Reuse, Recover and Recycle</p> <p>O Transitions in water, agro/food and energy</p>
Challenges and Solutions	Solutions to improve the effluent of waste water treatment plants by removing OMPs, nutrients and TSS
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Abstract

Municipal waste water treatment is changing. In the Netherlands, surface water quality is one of the lowest of Europe due to heavy pollution of river Meuse and Rhine and due to the dense population and heavy agricultural sector. This makes it increasingly difficult to comply with the stringent discharge regulations for municipal wastewater treatment plants. This is why several tertiary treatment technologies are tested to remove micropollutants and decrease the nutrient concentrations.

Based on a successful pilot, one of these treatment technologies can be the O3-STEP filter, which combines ozone with a specific type of denitrifying GAC filter (1-STEP® filter). The 1-STEP® filter has already proven (built in 2012) to be successful in nutrient, suspended solids and micropollutant removal from wastewater effluent. During a recently conducted pilot study (finalized in 2022), ozonation prior to granular activated carbon (GAC) filtration has demonstrated to strongly increase activated carbon lifetime and improve organic micropollutant removal. The addition of a preceding ozonation step at least doubled the lifetime, during which >80% of micropollutants were removed. The increased lifetime resulted in lower carbon reactivation frequency, hence lower costs and CO<sub>2</sub> footprint than the already successful 1-STEP® filter. At the same time, the addition of ozone extended the range of removed organic micropollutants. In addition, concentrations of nitrogen, phosphorous and suspended solids strongly decreased during the complete pilot period. Furthermore, bromate appeared to decrease in the 1-STEP® filter, reducing one of the risks of ozonation. As an integrated effluent polishing technique, this so-called O3-STEP filter is added to existing WWTPs. Due to the successful results, several filters are currently being designed for Dutch WWTPs.

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Figures/diagrams/illustrations

