nx filtration

PFAS retentions of direct nanofiltration validated by KWR (the independent Dutch Water Research Institute)

PFAS process retention rates from real world validation by KWR

PFAS20 – A group of substances on the EU monitor to be regulated. Average dNF40 process retention for these molecules is **94.7%**

PFAS4 – A group of substances that e.g. Sweden will be using in their legislation. Average dNF40 process retention for these molecules is **94.6%**

KWR

NX Filtration's hollow fiber nanofiltration membrane technology (or dNF) is very efficient in rejecting PFAS compounds, based on a sustainable process that significantly reduces the need for energy and avoids the use of pre-treatment chemicals.

Our dNF40 membrane has proven to be an effective and sustainable solution to facilitate PFAS removal processes.

NX Filtration's hollow fiber nanofiltration membranes

Our direct nanofiltration (dNF) membranes can be used for both the sustainable treatment of surface water for the production of drinking water and the treatment of wastewater treatment plant effluent to re-usable high-quality water. NX Filtration's dNF membranes retain color, micropollutants, nano plastics, pharmaceuticals and other alarming substances such as PFAS. In addition, it saves significantly on energy and chemical consumption compared to traditional membrane technologies, typically the combination of ultrafiltration and reverse osmosis.

KWR, an independent Dutch water research institute, has assessed the effectiveness of NX Filtration's dNF in retaining and concentrating a representative set of PFAS with a full-scale test under the most realistic conditions.

PFAS process retention rates from real world validation by KWR
PFAS20 – A group of substances on the EU monitor[1] to be regulated. Average dNF40 process retention for these molecules is **94.7%**
PFAS4 – A group of substances that e.g. Sweden will be using in their legislation. Average dNF40 process retention for these molecules is **94.6%**

PFAS
Per- and polyfluoroalkyl substances (PFAS) are manmade substances used in many industries and products that often end up in the environment. PFAS are not biodegradable (hence referred to as "forever chemicals") and have a negative effect on the environment and human health. Increasing knowledge and awareness about PFAS in various water sources is resulting in calls for more stringent legislation around the globe.

1. Annexes to COM(2017)753 - Quality of water intended for human consumption (recast) - EU monitor

KWR conducted full scale tests on Municipal Wastewater and Surface Water

A long term full scale test has been performed by Dutch independent research institute KWR to investigate the actual retention of PFAS with NX Filtration's dNF membranes. The tests were not only performed on surface water from the Lekkanaal in The Netherlands, but also on biologically treated effluent from a municipal wastewater treatment plant.

"Especially PFAS requires a robust barrier to reject them from polluted water to obtain high quality and safe permeate or product water with lowest ecological footprint possible. Therefore, we see an increasing interest for our membrane technology" says Erik Roesink, founder and CTO of NX Filtration.

KWR tested on a realistic and representative subset of main PFAS

The aim of the research was to determine the retention of various PFAS with dNF membranes by dosing PFAS into real surface water and municipal effluent streams. A unique element of the test protocol was that a representative subset of PFAS has been tested under realistic concentrations, regularly seen in practice. "Also, the duration of test plays an important role in getting to realistic and representative results" according to Joris de Grooth, R&D Director at NX Filtration. Long term testing ensures that PFAS removal via adsorption in the systems could be omitted.

The specific research questions to be answered within the experiment were: What is the process retention of a wide range of PFAS substances by applying hollow fiber direct nanofiltration? And what is the influence of the water matrix (surface water and effluent) on this retention? KWR also researched the PFAS adsorption behaviour. The test has been performed with a containerized full scale Mexpert pilot unit of NX Filtration located at the premises of KWR.

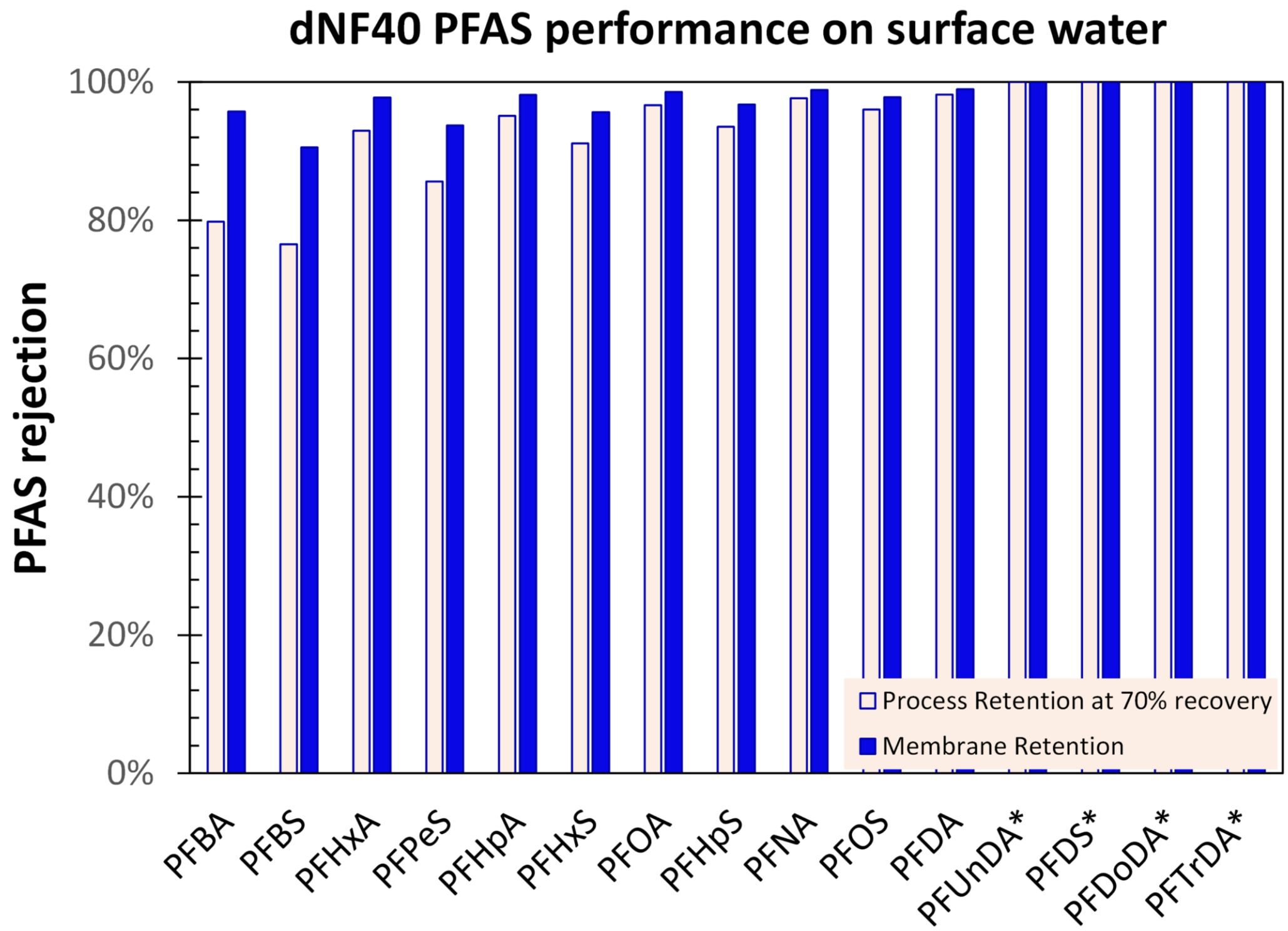

Figure 1: dNF40 performance on a variety of PFAS, ordered by size. Both membrane retention (based on retentate concentration) and process retention (based on feed concentration) are provided. *permeate below the limit of detection (LOD). All PFAS presented are within the PFAS20 group. PFOA, PFOS, PFNA, and PFHxS constitute the PFAS4 group.

KWR - Watercycle Research Institute

KWR is an independent water research institute covering the entire water cycle. It stems from Kiwa, the Dutch certification institute for water. Building on a solid foundation of more than 60 years of research and development for the Dutch drinking water sector companies, KWR is now applying this knowledge base and research capability more broadly to serve all partners in the water cycle. As experts in a wide range of specialized fields, KWR inspires the water sector in defining its research issues and questions.

Figure 2: Fully automated Mexpert installation on-site. It is developed for maximum flexibility in all piloting circumstances and uses our largest dNF modules for the most realistic full scale testing results.

About NX Filtration

NX Filtration is a provider of direct nanofiltration membrane technology for producing pure and affordable water to improve quality of life. Its direct nanofiltration technology removes micropollutants (including pharmaceuticals, medicines, PFAS and insecticides), color and selective salts, but also bacteria, viruses and nanoplastics, from water in one step whilst offering strong sustainability benefits. For further information on NX Filtration please visit www.nxfiltration.com

For enquiries, please contact:

Robert Gerard
Email : r.gerard@nxfiltration.com
Mobile : +31 6 5438 6090