



PIONEERING AND ADVANCING **MEMBRANE TECHNOLOGY**



[PENTAIR.COM](https://www.pentair.com)

OUR HISTORY

Since its inception in 1966, Pentair has been known for venturing into new industries and finding operating efficiencies. In the course of half a century, Pentair developed from a U.S. paper company into a global water company. The need for water touches nearly everything we do. No matter who we are or where we live, we are all connected by our dependence on reliable access to safe and clean water.



Tubular membrane

Pentair delivers a comprehensive range of smart and sustainable water solutions to homes, businesses and industries around the world. Our global knowledge and service network has a great track record of solving real water problems with industry-leading technology and proven solutions. We help to protect our most precious natural resource by making it possible to purify, recover and reuse water.

When X-Flow was acquired by Pentair in 2011, it had already been a membrane technology pioneer for decades. X-Flow is rooted in research at the University of Twente in the Netherlands. In the early 1980s, a method was developed here to produce hollow-fiber membranes of exceptional quality and robustness.

In **1993**, a large outbreak of *Cryptosporidium* contaminated the water supply in Milwaukee, USA.

In **1997**, X-Flow became part of the Clean Process Technologies (CPT) division of Norit. Activated carbon and membranes are important technologies in drinking water production as well as wastewater treatment.

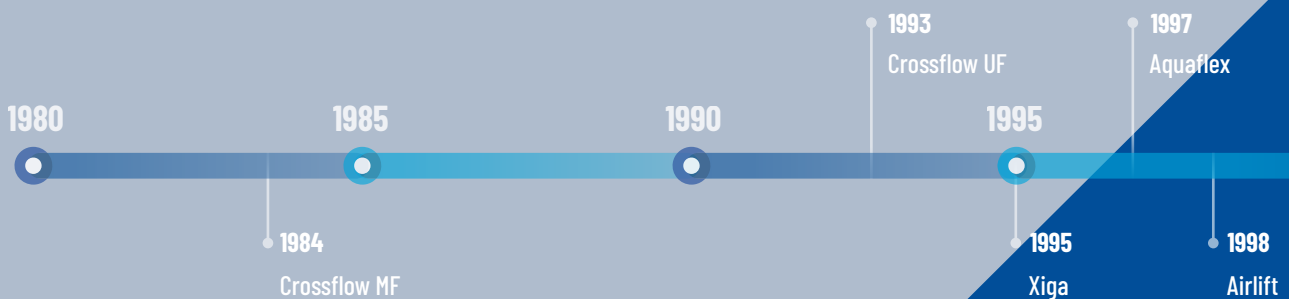
In **2011**, with the acquisition of X-Flow, Pentair became the world's leading UF membrane manufacturer. Today X-Flow membranes are applied all over the globe, in drinking water plants, in water recycling and reuse, and in a wide range of industrial applications.

Our history is about continuous improvement and innovation. As a leading manufacturer of membrane modules and developer of advanced filtration systems, we are the global forerunners in competitive membrane technology.

X-FLOW AT A GLANCE

X-Flow delivers membrane technology and application know-how to OEMs and contractors. As a leading pioneer and developer of membrane-based filtration concepts, we believe membranes will be essential in the purification processes of the future. Looking at worldwide health and environmental concerns, and at dwindling natural resources, we see membrane technology as an absolute necessity.

The introduction of our groundbreaking technologies through the years





Aquaflex membrane element

In many parts of the world, water scarcity is a growing issue. In order to secure future access to reliable water sources, crucial reuse opportunities have to be taken today.

Our strong belief in the need for ongoing development has made knowledge sharing part of our business model.

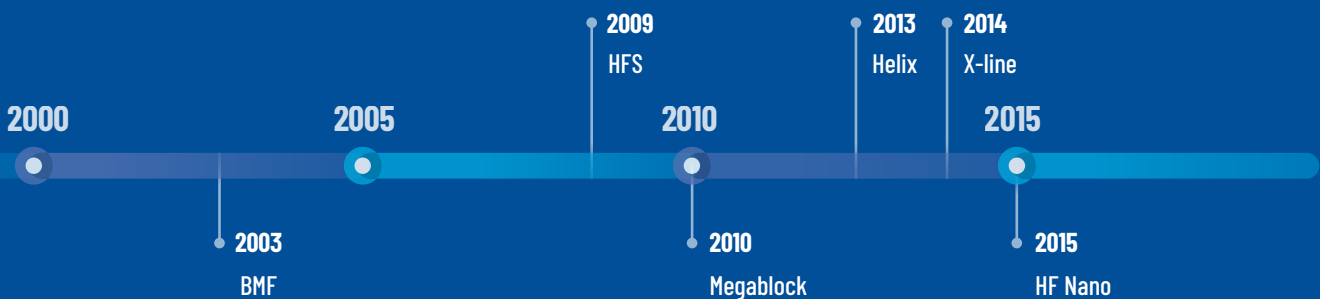
New applications and better solutions start with exchange and cooperation. That is why we regard our customers as partners.

X-Flow started manufacturing membranes and membrane modules in 1984. Today we have over 35 years of practical experience and countless project references around the world. Our partners directly benefit from our excellent reputation and knowledge base.

We aim to maximize results for our partners. With our world-class membranes, engineering services, and Membrane+ approach, they can meet and exceed client expectations.

The X-Flow facilities in Enschede, the Netherlands, include a membrane and module production plant, and R&D laboratory. Dozens of specialists focus on new developments, working to enhance membrane technology and improve existing filtration solutions.

Focused on practical and economic progress, X-Flow develops membrane-based filtration technologies with the lowest total cost of ownership and the highest efficiency.



X-FLOW MEMBRANE+

Membrane+ approach provides technological support to OEMs and contractors in every project phase. This expert assistance, especially when provided from an early stage onward, makes the difference in terms of quality, safety, efficiency and reliability.

Excellent performance starts with choosing the right concept and design for a particular membrane application. Once up and running, the system has to keep working well. This challenge is often underrated in many industries.

We support our partners not only with superior membrane elements, but also with engineering know-how, monitoring tools and automation solutions. We help with all the connecting parts and the design and construction of complete skid-based systems.

Membrane+ is our approach to helping partners solve any specific project-related issue. Our engineers are committed to provide all the practical support required in every project phase from conceptual design to piloting, start-up and beyond.



Xiga technology in Roetgen, Germany



X-Flow uniquely combines high-quality membranes with exceptional implementation know-how. Our specialized engineers contribute to the realization and flawless operation of your filtration systems.

Membrane+ offers you multiple advantages and clear benefits:

- ✦ Mitigates engineering and implementation risks
- ✦ Ensures cost optimization during the plant design phase
- ✦ Avoids design errors and changes in the execution phase
- ✦ Ensures first-time-right project delivery
- ✦ Ensures a smooth takeover by your customer

"TOGETHER WE
MAXIMIZE YOUR
RESULTS!"



01 Development phase

Through Pentair University, X-Flow offers advanced education in membrane technology and engineering.

Short and intensive training sessions also help to get the basic parameters right and avoid costly errors which can impact short-term and long-term plant performance.

X-Flow provides pilot plants and piloting assistance, allowing you to test applications in real-life circumstances anywhere, validate design choices and establish KPIs. Pilot performance optimization is a continuous process of (data) exchange between engineers.

02 Design phase

Our process design engineers help your bid evaluations run smoothly.

Pentair will fine-tune all project parameters and verify the technical and commercial feasibility of your full-scale membrane plant. Our engineers can also join you in meetings with your customers.



03 Execution phase

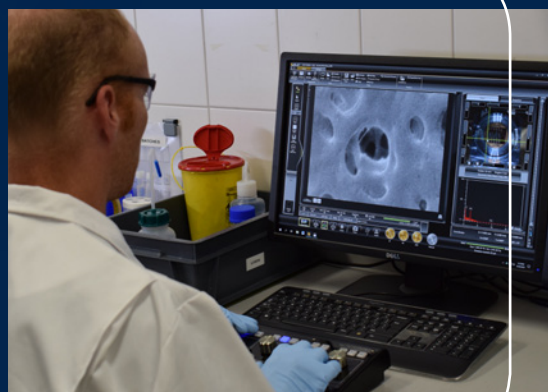
Our process engineers build the backbone of your membrane filtration system.

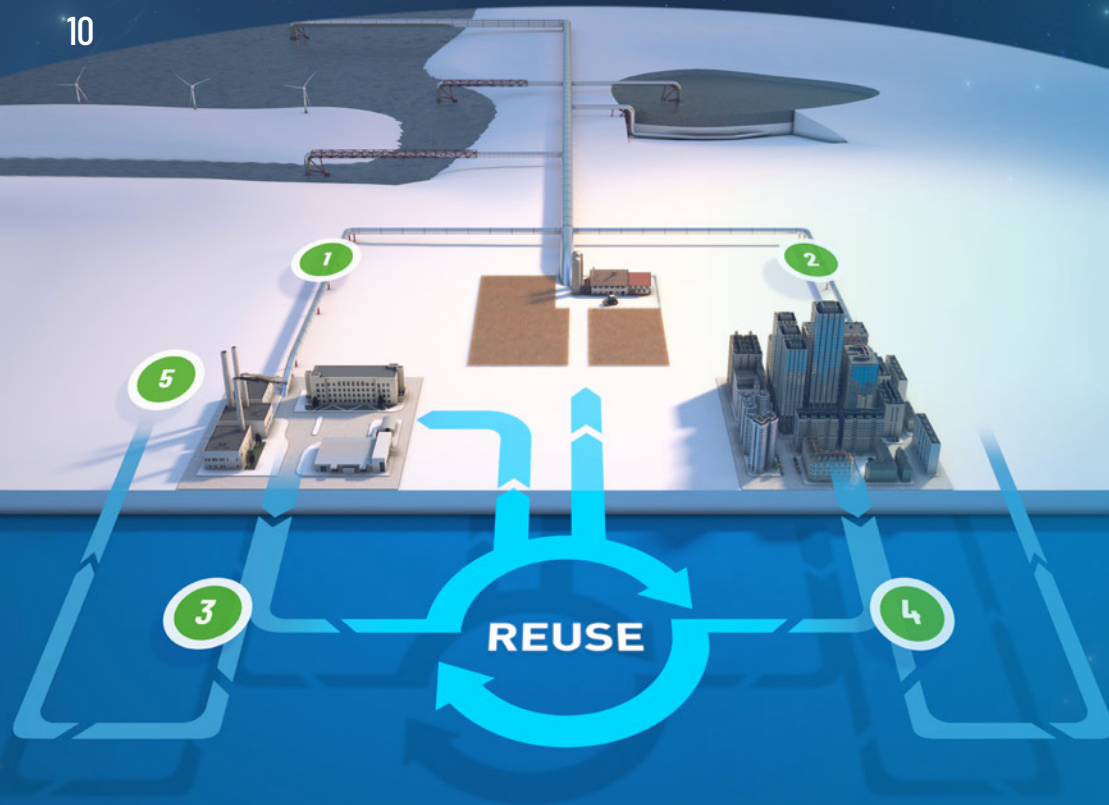
Our engineers finalize the basic design, produce drawings and documentations and review the drafts of the P&IDs, system layout, software protocols, and commissioning manual. Our commissioning engineers verify performance data and fully support you during commissioning for a successful start-up.

04 Operation phase

X-Flow offers after-sales support that keeps plants in optimal condition.

Our service engineers offer extensive operational support by continuously analyzing membrane performance in order to optimize your system and advise on further performance improvements, for example by reducing chemicals consumption and operating costs. With our MemScan, we assess the membranes' remaining operational life to avoid undue downtime and help with a replacement plan.





APPLICATIONS

Membranes are at the heart of many critical filtration solutions. X-Flow technologies are used around the world in a wide range of markets and industries.

1 Process water

- Pre-treatment RO
- Pre-treatment desalination
- Colloidal silica removal

2 Drinking water

- Pre-treatment RO
- Pre-treatment desalination
- Color & organics removal
- Point-of-Use (POU) & Point-of-Entry (POE)

3 Industrial wastewater

- Membrane bioreactor (MBR)
- Anaerobic MBR
- Effluent polishing
- Produced water

4 Municipal wastewater

- Leachate treatment
- Membrane bioreactor (MBR)
- Effluent polishing

5 Beverages

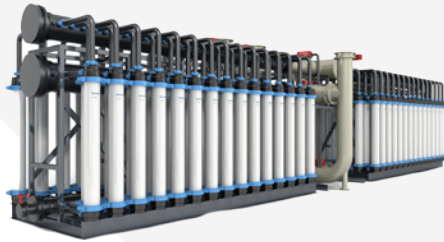
- Beer
- Wine
- Juice
- Soft drinks

TECHNOLOGIES

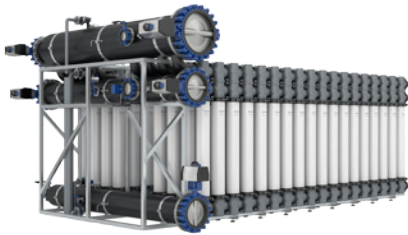
X-Flow membranes are known for their versatility, robust quality and reliable performance, even in the most demanding applications.

Water treatment

Aquaflex



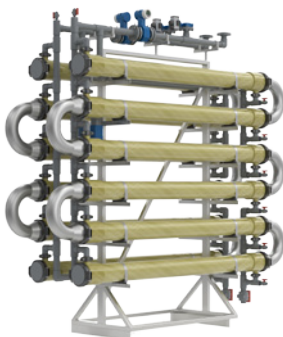
Aquaflex technology is widely used in the production of drinking water and process water, as well as in effluent polishing. Its mechanical strength and chemicals resistance allow it to handle a wide variety of feed water qualities and capacities.



X-line

X-line technology is a revolutionary pre-engineered UF system with maximum flexibility in rack design and a minimum footprint. This plug & play concept uses OptiFlow caps for smart flow optimization and unprecedented cost-effectiveness.

Wastewater treatment

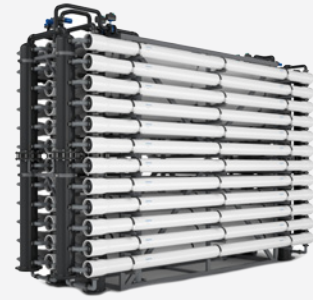


Crossflow

Crossflow technology handles industrial high-strength wastewater streams as well as landfill leachate effortlessly. This robust technology produces directly reusable effluent with very low maintenance requirements and automated cleaning.

Airlift technology hits the sweet spot of operational efficiency in the aerobic MBR treatment of municipal wastewater and industrial wastewater streams. This encased solution offers a small footprint, automated operation, and simple maintenance.

Airlift



Xiga

Xiga technology is the technology of choice for medium to large water plants. With the smallest footprint and highest operating pressure available, it offers major operational UF advantages. It can also be operated in-line with downstream (SW)RO.

HFNANO



HFNANO technology is the world's first hollow-fiber nanofiltration solution, combining NF separation properties with high mechanical strength and chemical resistance. It was developed to retain Natural Organic Matter (NOM) without using coagulation.

Anaerobic MBR

Anaerobic MBR technology prevents debris in the feed, including fibrous materials, from clogging up the system. Automated flow alternation feeds both sides of the membrane for uninterrupted operation.



INNOVATION IS IN OUR DNA.

We develop filtration concepts and design filtration systems, and manufacture membranes. Research and development are the heart and soul of our company, and the success of our technologies is rooted in scientific progress. We pride ourselves on proactive support and world-class solutions, turning ideas into business opportunities by realizing the full potential of membrane technology. While some innovations are market-driven practical improvements, others are outright breakthroughs and game changers.

Helix

technology enhances flux in high-strength wastewater applications, sustaining and boosting productivity by providing turbulence and continuous feed water mixing.

AnMBR

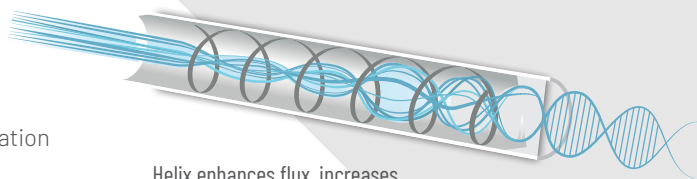
technology turns high-strength wastewater into two valuable resources: methane-rich biogas and water of reuse quality.

HFW1000

technology is the world's first hollow-fiber nanofiltration solution, combining NF separation properties with high mechanical strength and chemical resistance.

X-line

technology is a revolutionary pre-engineered UF system concept with maximum flexibility in rack design and a minimum footprint.



Helix enhances flux, increases flow and saves energy.



Optimized footprint-to-flow ratio due to OptiFlow Caps as part of our X-line technology.



X-FLOW BV

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