EconoPure™ Water Systems

Treatment. Simplified.

LFNano™ System

Employing decades of experience, proprietary methodologies, and patented technology, EconoPure™ Water Systems is a world leader in the design and manufacture of economical, scalable, low-fouling membrane-based water treatment systems.

EconoPure™
Water Systems

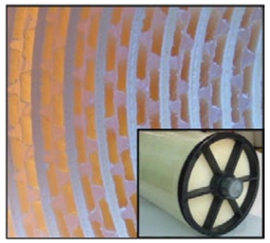
LFNano™ System

The LFNano™ is a patented* membrane system that uses a combination of "Low-Fouling" techniques and nanofiltration ("NF") thin film composite technology. NF membranes have most of the advantages of RO but operate at much lower pressure. EconoPure™ founders have devised a way to mitigate the greatest limiting factor for membrane water treatment; fouling. Three factors contribute to the low-fouling nature of the LFNano™ system:

1) Proprietary open architecture NF membrane element

2) Anti-fouling particulate coating/injection

3) Feedwater circulation to increase crossflow velocity

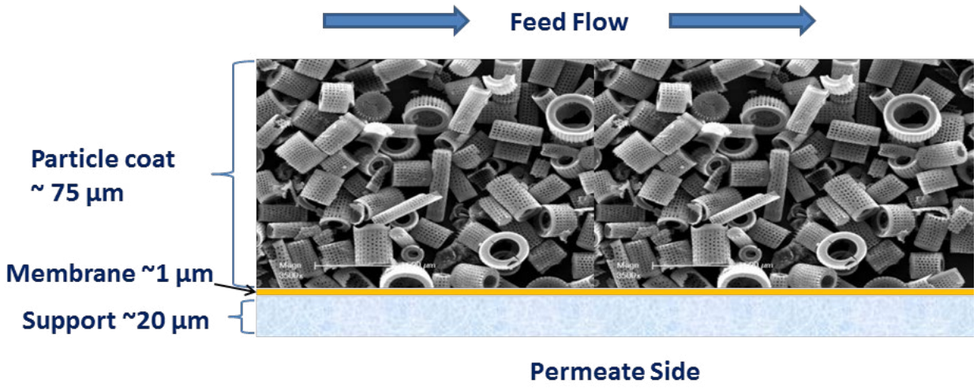


These factors dramatically reduce the effects of fouling and make membrane cleaning simple and infrequent. The unique membrane element imparts very little headloss allowing low energy circulation of the water to eliminate the velocity-recovery limitation of once through systems. This also allows high concentrations of suspended matter in the feedwater eliminating expensive pre-treatment systems.

An anti-fouling particle coating on the membrane consisting of high surface area particles provides 500 to 1,000 times the surface area of the membrane below it. This vast area grabs the foulant particles from the water and keeps them away from the membrane making cleanup simple.

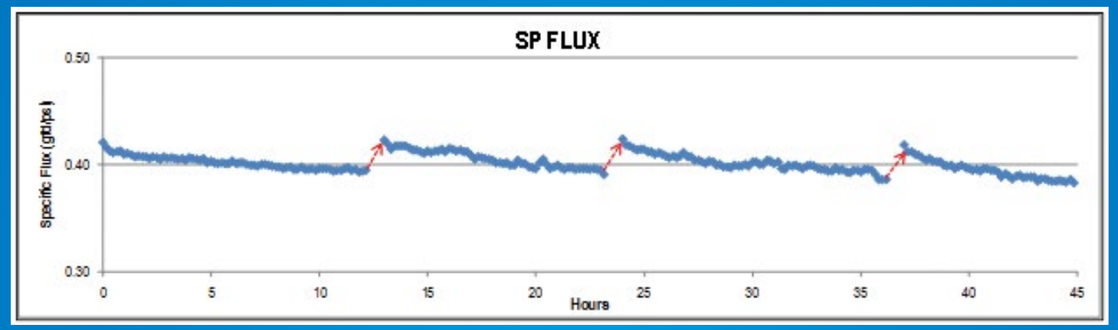
The photo above shows the unique cross section of the LFNano™ membrane element. This element comes in seven (7) different grades of NF membrane from 'tight' (almost a brackish water RO membrane) to 'loose' (removing very little salts but virtually all organics, bacteria and viruses).

Anti-fouling particulate – below is a microscopic view of the coating of particles on the membrane. This particular image is of diatomaceous earth-based particulate but there are other high-surface area particles that can form this coating. The vast surface area can be seen as this cake of particulates forms above the membrane.



* United States Patent 8,685,252 Vuong , et al. April 1, 2014

Rest cycle – as the coating of particulate eventually becomes saturated with contaminants it compresses, thereby restricting the flow of water to the membrane. Flux is rapidly restored by simply employing the proprietary EconoPure™ rest cycle. This can be done manually or as programmed in the controller. A brief period of pressure equalization combined with high velocity internal recirculation allows the coating to decompress, sloughing off accumulated contaminants, restoring unrestricted flow to the membrane. This infrequent rest (1 to 4 times per day) effectively resets the flux as seen in the figure below.



This particular rest cycle was every 12 hours on the same water that a microfiltration (MF) system required backwashing every 22 minutes. Unlike the rest cycle of the LFNano™, other typical low-pressure membranes systems backwash cycles requires far more valves and complexity.

MARKETS/APPLICATIONS

Industrial water reuse – zero liquid discharge (ZLD) – wastewater can be remediated with the LFNano™ for reuse in industrial applications, agriculture, or even for aquifer recharge. EconoPure™ helps industrial plants meet discharge and water reuse requirements with far less complexity than conventional methods. Applications: Hydroponic remediation, textile dye removal, and pharmaceuticals, plastics, pulp/paper waste treatment.

Food processing - the open channel configuration of the LFNano™ combined with internal circulation provides an ideal platform for many food processing water treatment systems. Applications: De-watering, concentration, selective separation.

Oil & gas – the particulate injection of the LFNano™ can keep the residual oils in produced water or refinery wastewater off the surface membrane providing a low-cost solution for & gas operations. Applications: Frack flow-back, produced water and offshore water remediation, 'designer' water production,

Drinking water – most rivers, lakes and boreholes do not require desalting and NF membranes achieve virtually the same microbial removal as RO membranes at far less pressure, less energy, and less maintenance. Applications: Water bottling, village drinking water, municipal water treatment.

EconoPure™ Water Systems

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EconoPure™ Water Systems was formed in 2007 as an R&D company (DXV Water Technologies) to commercialize the water treatment inventions of Diem Vuong, a 40-year water treatment industry veteran and world-renowned membrane expert. The first product introduced by EconoPure™ was DEMWAX™ (depth-exposed membrane for water extraction), an ultra-low energy, natural pressure seawater desalination system. The engineers at EconoPure™ employed the experience of the DEMWAX™ membrane system to develop the "Low-Fouling Nanofiltration System" or LFNano™.

In 2009 the company successfully introduced the first LFNano™ and has since established itself as a global leader in nanofiltration technology. Subsequent technological advances have made the LFNano™ the professionals' choice for enhanced performance and decrease cost - both capital and operating.

In 2014, EconoPure™ was granted a US patent for the LFNano™ and introduced a revolutionary point-of-use (POU) system as well as the Revolver™ - the next generation LFNano™.

Please contact us with your water treatment challenges, large or small.

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