VEOLIA

NEOSEP® MBR

WATER TECHNOLOGIES

Kruger's NEOSEP® MBR

Incorporates Cutting Edge WastewaterTreatment Process Knowledge With Membrane Quality Effluent

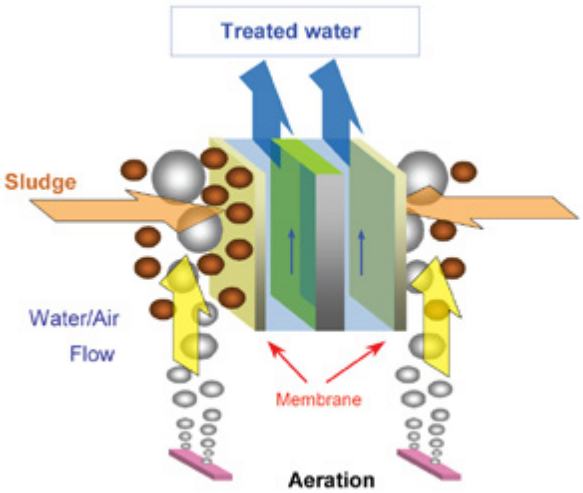
NEOSEP is a TITLE 22 APPROVED membrane bioreactor (MBR) combining Kruger's biological wastewater treatment expertise with polymeric membranes for solids removal.

Owners of NEOSEP MBR systems benefit from Kruger's experience and record in designing robust, reliable, and user friendly wastewater treatment process solutions, as well as Veolia's worldwide experience in MBR WWTP design and operation.

Title 22 Testing NEOSEP MBR Effluent Quality

CBOD	<2mg/L
TSS	non detect
NH_3-N	<0.5 mg/L
Virus Removal	>3 log removalTSS
Total and Fecal Coliforms	>5-log removal
Turbidity, NTU	<0.05

The NEOSEP MBR process enhances and simplifies conventional activated sludge processes by eliminating final clarifiers and filters. The membrane barrier ensures stable operation, consistently producing a high quality effluent in a small footprint. NEOSEP MBR systems are designed to accomplish BOD and TSS removal, nitrification, denitrification, and enhanced biological and/or chemical phosphorus removal.



A NEOSEP MBR system typically consists of separate aeration tanks followed by membrane tanks containing submerged membrane modules. The process incorporates screens; activated sludge bioreactors; aeration, mixing, and pumping equipment. The NEOSEP MBR process is controlled by a PLC based control and SCADA system.

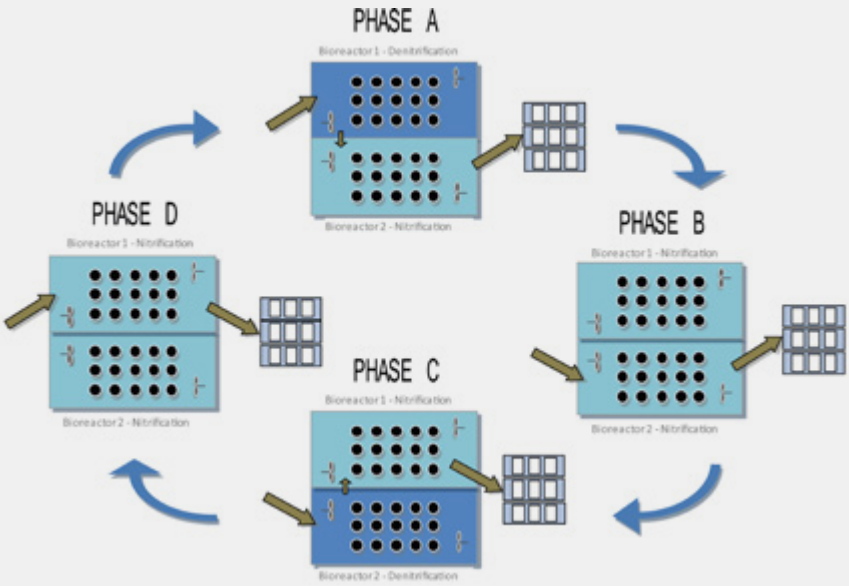
The membrane elements separate the mixed liquor solids from the treated effluent which is drawn through the membrane by either gravity or pumps. The permeability of the elements is maintained through air scouring of the membrane surface, a membrane relaxation phase and a periodic in-situ chemical cleaning. Excess mixed liquor solids are wasted directly from the aeration tanks.

NEOSEP® Flat Sheet Membrane Modules

Value
When You Need It Most

- The modules feature a single lifting eye at the optimum location for incredible balance that makes installation and retrieval a simple and stress-free process.
- There are no direct connections to the surrounding tank; rather a separate guidance system allows the complete unit including the fully integrated air scouring device to be removed and reinstalled without draining the tank.
- All permeate and air piping is internal to the membrane module with connection points at the top of the unit for very easy connection/disconnection.
- Downtime needed for any maintenance activities that require removal of one or more membrane modules from the tank is minimized.
- Individual sheets spread apart to relieve the surface tension and the “glue-like” effect of sludge, greatly increasing the ease of individual sheet removal, inspection and maintenance relative to other flat sheet membranes on the market.

The ability of treatment plant operators to respond to problems with minimal impact on daily operations is important and membrane modules should be easy to install, easy to retrieve when necessary and simple to maintain. These fundamental necessities of an MBR system are at the heart of our K-120C and K-240C flat sheet membrane modules.



Proven and Innovative EBNR Strategies

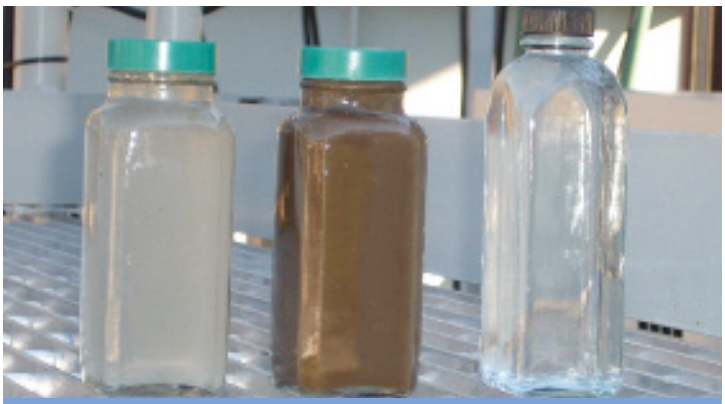
- Conventional BNR designs
- Phased Reactor designs offering Ideal Nitrogen Removal Conditions
- Maximum Flexibility and Energy Efficiency
- Fully Automated with Nutrient Based System Control
- Membrane Zone D.O. Does Not Impact Denitrification

Advantages of the NEOSEP® MBR

The NEOSEP MBR system combines two proven technologies: enhanced activated sludge treatment and immersed membrane filtration.

This combination:

- Eliminates the need for secondary clarification and tertiary filtration
- Allows for longer sludge retention times, resulting in lower excess sludge production
- Is compact and easy to incorporate in both retrofits and new plant construction
- Allows for permeate to be conveyed by gravity
- Delivers the highest effluent water quality consistent with reuse standards
- Complete biomass retention



Screened Influent TSS ≈ 220 mg/L | *Mixed Liquor TSS ≈ 12,000 mg/L* | *Treated Effluent <0.05 NTU; TSS < 2 mg/L*

Sample Streams From Operating NEOSEP MBR System

The samples shown are of typical screened influent with a total suspended solids (TSS) concentration of 220 mg/L and mixed liquor with a TSS concentration of 12,000 mg/L. The NEOSEP membrane removes all of the solids with typical effluent TSS in the non-detect range and turbidity of <0.05 NTU.

Process Control Features

- Customizable PLC-based control using open architecture software, allowing for ease of future modifications
- Point-and-click navigation and control
- KrugerLink™ remote process monitoring and control, providing Kruger engineers limited access to process specific information for advising plant personnel on optimizing the operation of the plant
- Delivers the highest effluent water quality consistent with reuse standards
- Manufacturer certified integrators of PLC and SCADA systems
- Award winning plant-wide SCADA system, including 2-D and 3-D rendered graphics

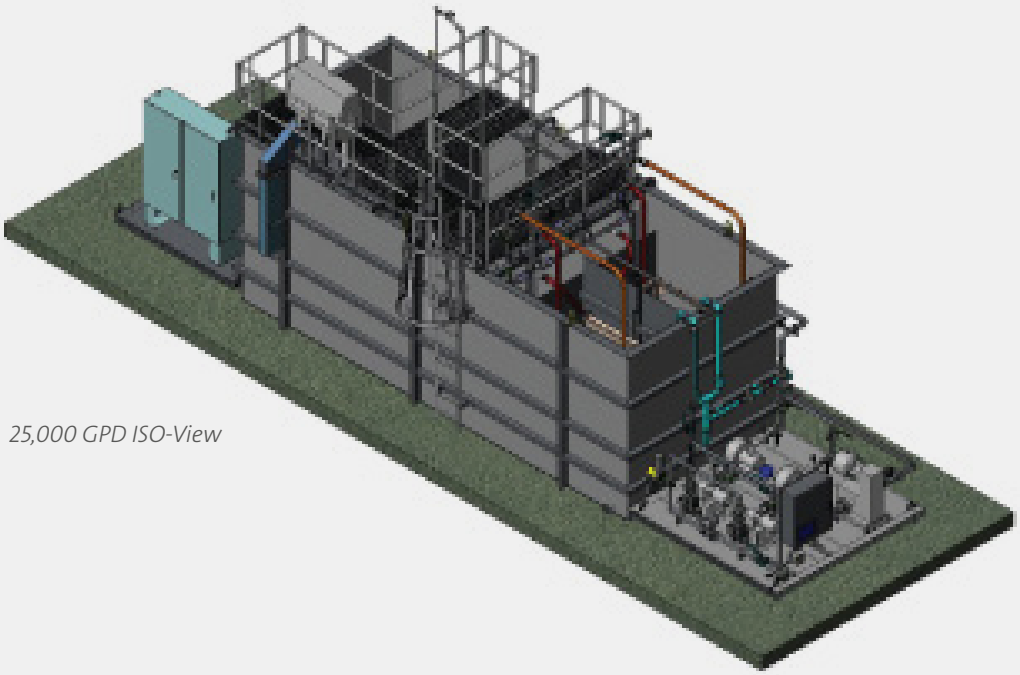
NEOSEP® MBR Package System

The NEOSEP Package System is a self-contained modular wastewater treatment plant ideal for nominal operating flows between 25,000 and 75,000 gallons per day (GPD). Each unit is pre-engineered, skid mounted and factory tested, allowing for savings on installation time and cost.

The MBR process is robust and requires minimal operator attention. The process is designed in an MLE configuration with submerged flat sheet membranes handling the liquid solid separation step. The membranes allow for a compact footprint and a superior effluent; CBOD5 < 5 mg/L, TSS < 1 mg/L, TN < 10 mg/L and Turbidity < 0.1 NTU. Phosphorus removal can be accomplished with the addition of coagulant.

Features and Benefits

- Minimal Site Work
- Compact Footprint
- Exceptional Effluent Quality
- Advanced Nitrogen and Phosphorus Removal
- Minimal Operator Attention



25,000 GPD ISO-View

Included Equipment

- Membrane Modules
- Painted steel tank (Anoxic, Aeration and Membrane Zones)
- Painted steel pump and blower skids
- Drum screen
- Mixed Liquor Feed Forward pump
- Internal Recycle pump
- Permeate pumps
- Anoxic zone submersible mixer
- Automated and Manual valves
- CIP System
- Process Aeration blowers
- Scour Aeration blowers
- Fine Bubble aeration grid
- Control and Power Enclosure
- Instrumentation
- Industrial Computer/SCADA System

Resourcing the world

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