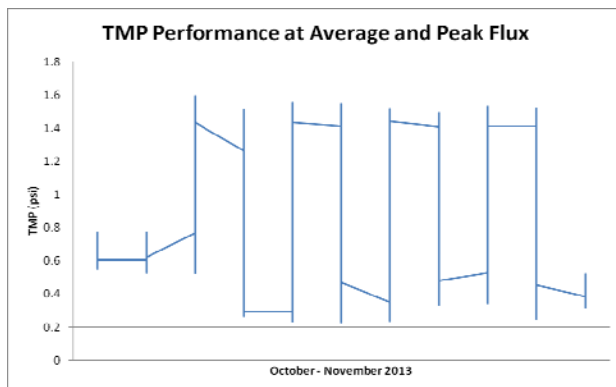


NEOSEP® Membrane Bioreactor (MBR) System Simplifies Installation And Maintenance

Over the past decade, Membrane Bioreactors (MBR) have gained acceptance as a viable and cost effective solution for upgrading or expanding many treatment plants. MBR systems come in countless different varieties, including many variants of activated sludge processes and an ever-increasing number and type of membrane products. One key to the continued success of MBR systems is the push for more energy efficient techniques for in-situ cleaning of membranes and reduction in the cost of production of membrane modules. But the ability of treatment plant operators to respond to potential problems with minimal impact on daily operations is as important as ever. 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 the K-120C and K-240C flat sheet membrane modules provided by Kruger, a subsidiary of Veolia Water Solutions & Technologies.

Kruger's K-120C and K-240C membrane modules are designed for use with a 0.08 micron PVDF flat sheet membrane and are operated in submerged MBR systems at MLSS concentrations up to approximately 15,000 mg/L. A single K-240C membrane module can process an average flow of 50,000 GPD. Recent start-up of a new NEOSEP® MBR with twenty-four (24) K-240C modules was subjected to several extended performance tests at average and peak flux rates. With MLSS concentrations at 13,000 mg/L and no chemical cleaning before or during the testing period, the K-240C units displayed superior performance with transmembrane pressures well below specified levels, averaging under 0.5 psi at average flux rates and never exceeding 1.6 psi at peak flux rates.



But if we think beyond when things are going well, we recognize that biological upsets or failure of ancillary equipment such as air scour blowers can happen, and when they do they greatly impact MBR systems and in particular the membrane module. Events can occur which necessitate removal of membrane modules from a tank for membrane cleaning or maintenance and at some point in the life of a facility, membranes will need replacement. These are important times for a facility and this is reflected in the design of the K-120C and K-240C membrane modules. The modules feature a single point, integrated 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 drawing 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. These features combine to minimize total downtime needed for any maintenance activities that require removal of one or more membrane modules from the tank. They also allow the tank to easily operate with one or more membrane modules removed from the tank without draining and refilling the tank.



When out of the tank, the construction of the membrane module further enhances the ability to maintain the system in the particular event where circumstances have allowed the spaces between the sheets to fill with sludge which can act to stick adjacent sheets together like glue. In the K-120C and K-240C membrane modules, individual membrane sheets are held together by compression from the

outside of the “block” of membrane sheets with a series of threaded rods. To remove sheets, the bolts on the rods must be loosened to relieve the compression. When fully compressed, the membrane sheets are separated by a gap of approximately 7 mm but when uncompressed, the sheets are allowed to separate and spread apart. This relieves the surface tension and the “glue-like” effect of sludge, greatly increasing the ease of individual sheet removal, inspection and maintenance.

As MBR systems continue to evolve and grow into new markets, advancements will be made and MBR systems will continue the push for lower installed costs, more energy efficient operation and lower chemical consumption. But such gains should not be achieved without equally ensuring the operators of these facilities are equipped to respond effectively when things aren’t going as good as planned.

I. Kruger Inc., supplies solutions and technologies for wastewater and drinking water treatment. Through years of extensive research and development, Kruger provides integrated solutions that optimize energy and operating costs. Kruger is a Veolia Water Solutions & Technologies company. www.krugerusa.com

Veolia Water Solutions & Technologies is the Veolia Water subsidiary specialized in technological solutions and design and build projects for water and wastewater treatment, serving industrial and municipal clients. Veolia Water Solutions & Technologies recorded revenue of \$3.1 billion in 2012. www.veoliawaterst.com
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Veolia Water, the water division of Veolia Environnement, is the world leader in water and wastewater services. Specialized in outsourcing services for municipal authorities, as well as industrial and service companies, it is also one of the world’s major designers of technological solutions and constructor of facilities needed in water and wastewater services. With 89,094 employees, Veolia Water provides water service to 100 million people and wastewater service to 71 million. Its 2012 revenue amounted to \$15.9 billion. www.veoliawater.com
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