TechBrief

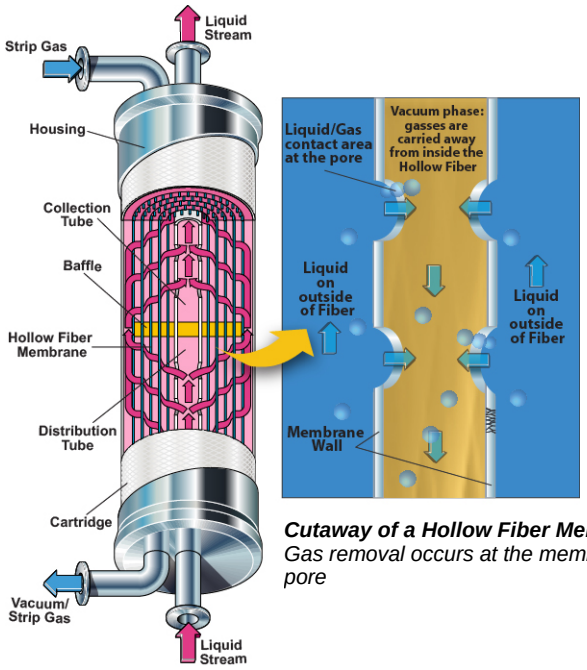
Liqui-Cel® MEMBRANE CONTACTORS

Liqui-Cel® Membrane Contactor Degassing System Installed to Increase Well Pumping Efficiency in Rockland County New York

Liqui-Cel® Membrane Contactors have a long history of improving a variety of water treatment systems by adding and/or removing dissolved gasses in many industries. Typical industries include Semiconductor, Beverage, Pharmaceutical, Power Generation, Digital Printing and many others. Liqui-Cel Contactors were recently selected among competing technologies to be used in a municipal environment to improve water distribution efficiency while reducing capital and operating costs.

United Water New York (UWNY) operates the water supply and distribution system throughout most of Rockland County. There are forty-five wells in the water supply system. Two of these wells in the New Hempstead region contained high levels of entrained/dissolved gas forcing the wells to operate below their optimal flow rates. Running higher flow rates generated an increase in customer complaints about cloudiness of the water. Additionally, any dissolved air that entered the distribution system could accelerate corrosion and cause reduced carrying capacity in main lines, particularly those that are made of unlined cast-iron pipes.

Liqui-Cel Membrane Contactors



Cutaway of a Hollow Fiber Membrane
Gas removal occurs at the membrane pore

Evaluating Technologies

During the research phase, UWNY evaluated alternative degassing technologies. A Liqui-Cel Membrane Contactor system was in use for gas transfer at a beverage plant nearby. UWNY was intrigued with the technology and its potential to reduce operating and capital costs in their well pumping systems enough to run a pilot program at their Viola 106 well. This well water was supersaturated with air and already had an existing stilling basin with booster pumps that was used to compare to the Liqui-Cel membrane technology.

Liqui-Cel Membrane Contactors contain microporous Hollow Fiber membranes that allow the removal of dissolved gasses from liquids. In the contactor, gas flows across one side of the membrane and liquid is on the other side. Because the membrane is hydrophobic and microporous only the gasses can pass through the membrane pores.

Lowering the partial pressure of the gas in the contactor allows the dissolved gasses in the liquid to more easily transfer through pores in the porous wall of the Hollow Fiber membranes.

When the pilot test was complete, it was apparent that the Liqui-Cel Contactor system was the superior choice due to the reduced operating costs and lower capital requirements. Membrane contactors removed the dissolved gasses that caused the water cloudiness. Additionally, gas removal helps to prevent corrosion of the piping. The Liqui-Cel Contactor system is also modular and can be easily expanded.

Exemplary Liqui-Cel Membrane Contactor System Configuration and Operating Conditions

- 90 m^3/h water flow
- Ten 10 x 28-inch contactors used in parallel
- X-40 membrane
- Operating mode: vacuum only

Benefits of Using the Liqui-Cel Membrane Contactor System

- Water can be pumped from the well, directly through the membranes, and into the distribution system without breaking head. This eliminates the need for a separate basin or clearwell and repumping of the water.
- The overall headloss through the membranes is less than 5 psi so the existing well pumps can be used without a significant reduction in pumping rate. New well pumps can be installed to maintain the design pumping rate.
- The elimination of a stilling basin reduces the risk of contamination by any impurities that could enter the basin.
- The footprint required for the Liqui-Cel Membrane Contactor system is about half the size required for the stilling basin alternative. Also, the building to house the Membrane system requires only a concrete slab on grade compared to an underground basin.

- The smaller footprint and above-ground construction helps to streamline the permit process and construction schedule allowing for a shorter period for implementing this technology.

Results Before and After Installation for Wells 18 and 24
The use of the Liqui-Cel® Membrane technology for removing entrained/dissolved air from selected wells was proven to be both technically feasible and cost-effective. The application of this technology allowed for these wells to operate at their design and permitted capacities, thereby providing more peaking capacity for the UWNY system.

For more information and system sizing, please contact your Membrana representative or visit us online at www.Liqui-Cel.com.

	Before	With Liqui-Cel® Installed	Improvement
Maximum Capacity	1030 gpm*	1700 gpm	670 gpm
Typical Operating Capacity	1030 gpm*	1300 gpm	270 gpm
Entrained/ Dissolved Air	Cloudy appearance	Clear appearance	Complaints eliminated, pumping capacity greatly improved

* Three day peak operation 2001. Liqui-Cel Membrane Contactor System results may differ based on the particular installation.

This is the building that was erected around the Liqui-Cel® Degassing System. This installation is in a residential area and it was important to conceal equipment in an aesthetically pleasing manner.

Certified System
ISO 9001
ISO 14001

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