Ammonia is used as a cleaning and bleaching agent in the production of fertilizers, plastics, explosives, and many other products. Industries using ammonia have to treat their wastewater to remove ammonia so that it is not discharged back into the environment, where it can negatively affect human health, agricultural production, and natural ecosystems.

3M™ Liqui-Cel™ Membrane Contactors offer a great alternative to conventional ammonia removal methods that often produce secondary waste streams that are difficult to treat. The large surface area of Liqui-Cel membrane contactors facilitates fast separation of ammonia from wastewater. In addition, the membrane contactors can provide cost savings by reducing the ammonia load on the wastewater treatment system.

Liqui-Cel membrane contactors have been in service for over 10 years in many different industries and industries proven to be durable and reliable.

System Process

For ammonia removal, wastewater flows through the shellside (outside of the hollow fibers), while an acid solution flows countercurrent through the lumenside (inside of the hollow fibers).

The composition of the ammonium salt at the end of the process depends on the acid used in the stripping process. For example, a sulfuric acid extractant will convert ammonia into ammonium sulfate, which is widely used as a fertilizer and can be sold commercially.

Exceeding goals

An ammonia removal system installed in from 2002 to 2004 Europe had the capacity to process a 10 m³/hr (44 gpm) wastewater stream with an incoming ammonia concentration of 1100 mg/L.

The plant's reduction goal was 91% ammonia removal. The system performance surpassed expectations with a 95% removal rate. A planned future expansion will increase the wastewater stream to 30 m³/h (132 gpm). This will save the company several hundred thousand Euros.

Process parameters such as wastewater pH, water temperature, acid concentration, and the wastewater/acid ratio all affect the system's removal efficiency.

Liqui-Cel membrane contactors are ideal for ammonia removal where the concentration of NH₃ is >500 ppm and the temperature is >35°C.

For more information and system sizing, please contact your 3M representative or visit 3M.com/Liqui-Cel.