

# **Current Applications and Future Trends for Hollow Fiber Membrane Contactors**

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3M™ Liqui-Cel™ Membrane Contactors have been recognized as a standard in gas transfer technology for many years. They were adopted over 20 years ago for providing a very clean solution for low level gas removal with highly purified water in the microelectronic and pharmaceutical industries. Microporous hollow fiber Membrane Contactors are now widely accepted and used in the beverage, power, graphics and other industrial water applications as well. Because there is such a wide need for gas transfer in so many different industries, the company 3M has developed a variety of module sizes and design options to fulfil the needs of these different markets.

The more common applications over the years have been carbon dioxide and oxygen removal from liquids. Other soluble gasses are also transferred through the hydrophobic membrane, however, providing a broader application base. More recent developments in membrane development, material selection and module construction allow gas transfer with low surface tension liquids or high viscous fluids like inks, coating solutions or oily emulsions. The inline removal of bubbles through 3M Liqui-Cel Membrane Contactors provides a superior solution to problems caused by these bubbles when processing the liquids. The membrane in the gas transfer contactors acts as non-selective barrier between two or more fluid or gas phases and provides a large contact area through its porous structure. The contactors are commonly operated to remove gasses from liquids or add gasses to liquids. However, 3M Liqui-Cel Membrane Contactors are not limited to gas-liquid contact, but they are also suitable for mass transfer between liquid-liquid or liquid-gas-liquid. In some other applications the contactor is referred to by different names. Examples include blood oxygenator, membrane distillation, osmotic distillation, membrane extraction or membrane humidification.

This presentation will discuss the development and progression of 3M Liqui-Cel Membrane Contactors as they have been accepted in many applications and industries that require different types of membranes and a variety of capacities. Some of the processes that utilize 3M Liqui-Cel Membrane Contactors will also be

explained in more detail and all are related to industrial applications currently operating in the field.

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