

Membrane Degasification Chemical-free alternative for the pharmaceutical industry

Technology for the Removal of Dissolved Gases

In treating water for the production of pharmaceuticals, the concentration of gases dissolved in the water plays an important role. In many cases the CO₂ content in the raw water has to be further reduced to obtain purified water with a conductivity of < 1.3 μS/cm (at a temperature of 25°C).



Contactors in an 8m³/h ROCEDIS plant

Historically, NaOH dosing has been used to control CO₂. With chemical dosing CO₂ is converted into a carbonate, which can be removed by the RO. The latest state of the art technology for this task is membrane degasification where chemicals are not needed.

Design / Function

ONDEO Industrial Solutions - Hager + Elsässer, is an OEM who now specifies Liqui-Cel Membrane Contactors for CO₂ removal for pharmaceutical water systems. These system designs place the

membrane degasification system downstream of the RO system and before an EDI system. See the flow diagram on page 2.

A Polypropylene Hollow Fiber membrane is used to put a gas and liquid phase in direct contact with each other. Because the fiber is hydrophobic, the liquid will not penetrate the pore. A strip gas or vacuum used on the inside of the hollow fiber lowers the partial pressure of the gas phase

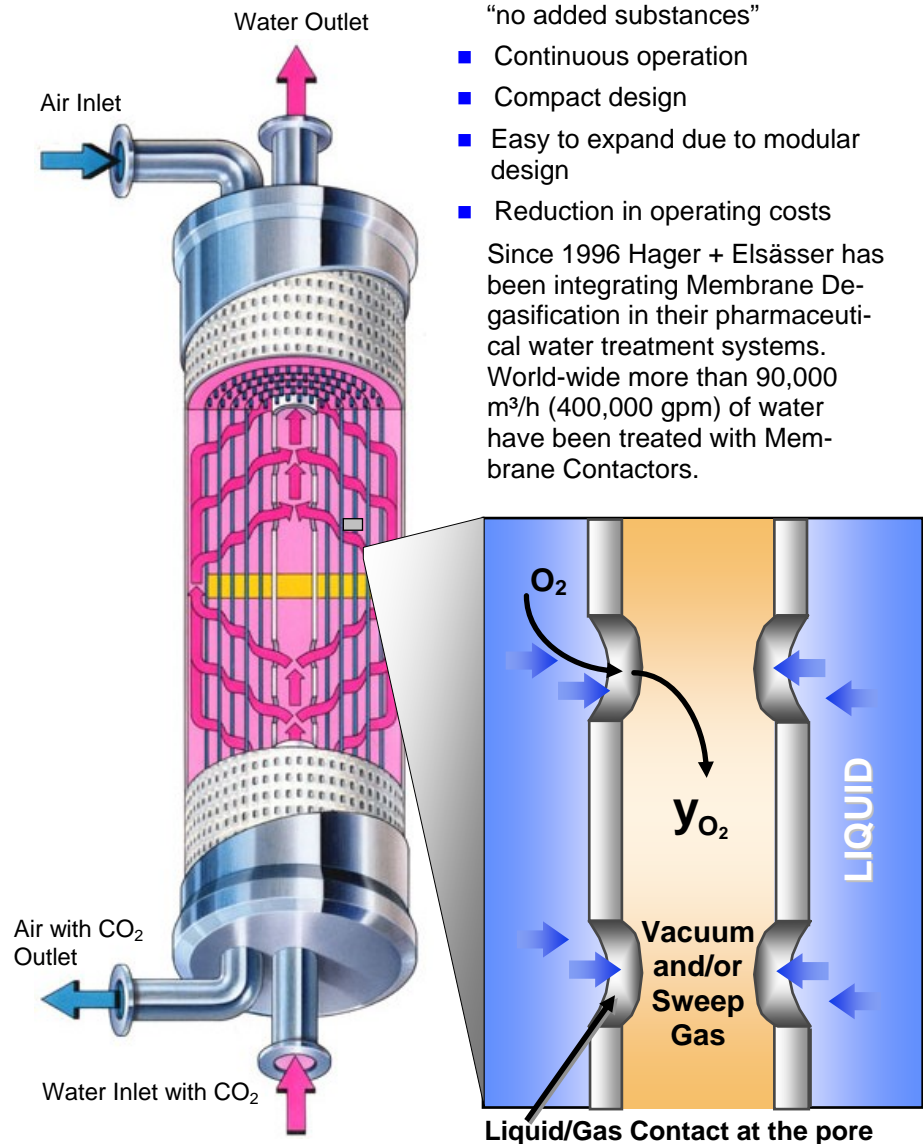
which causes the gases to diffuse from the liquid phase through the membrane wall into the gas phase. The removed CO₂ is continuously swept out of the contactor by the air sweep.

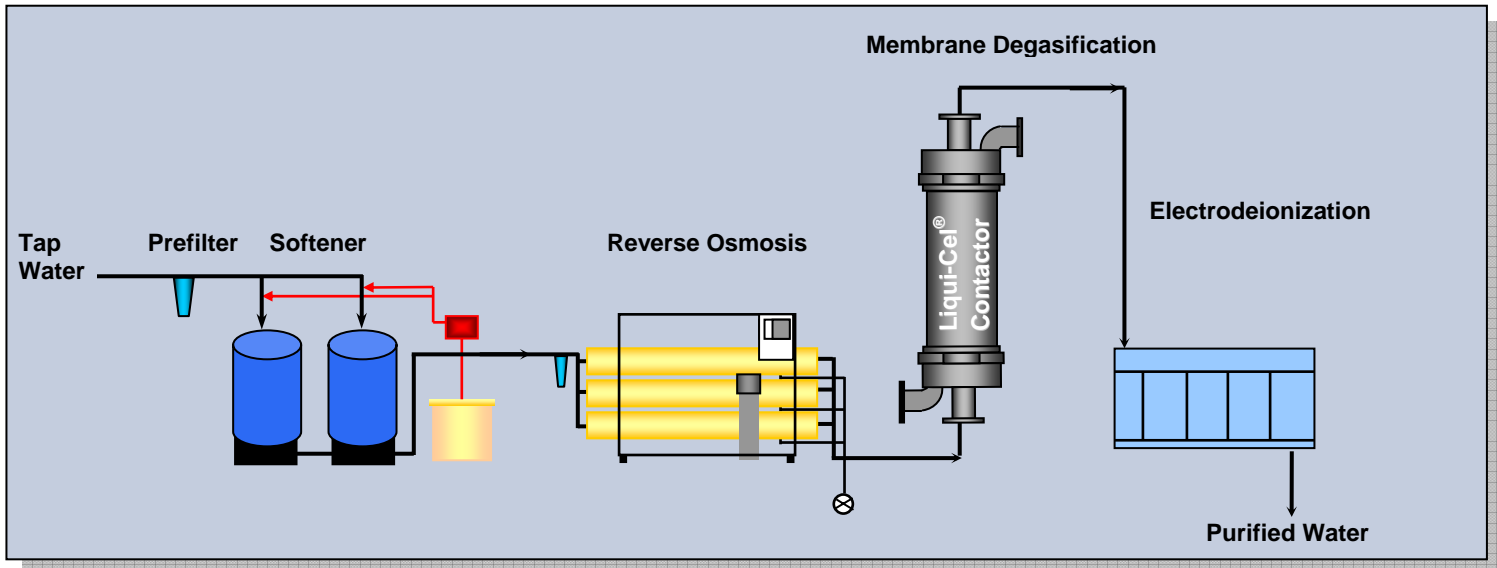
Hollow fiber membrane contactors maximize the surface contact area for efficient, chemical-free, CO₂ removal.

Advantages

- Chemical free
"no added substances"
- Continuous operation
- Compact design
- Easy to expand due to modular design
- Reduction in operating costs

Since 1996 Hager + Elsässer has been integrating Membrane Degasification in their pharmaceutical water treatment systems. World-wide more than 90,000 m³/h (400,000 gpm) of water have been treated with Membrane Contactors.





Flow diagram of the plant design to produce Purified Pharmaceutical Grade Water per US and European Pharmacopoeia Requirements

Produced in conjunction with ONDEO Industrial Solutions GmbH - Hager+Elsässer Centre of Excellence. For more information, visit www.hager-elsaesser.com

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