

Membrane Degassing and Debubbling of High Viscous Fluids with Liqui-Cel® and SuperPhobic® Membrane Contactors

Increased gas content often leads to problems with bubble formation in highly viscous fluids. Membrane Contactors can provide an in-line and simple solution for improving processes by removing the bubbles from viscous liquids before they create a problem in a process operation. Membrane Contactors provide a very compact and efficient solution to the problems caused by bubbles.

How It Works

Liquid is introduced to the outside of the hollow fiber membrane while a vacuum is pulled on the inside of the membrane; this facilitates the removal of gasses from the liquids that are in contact with the outside of the hollow fibers.

The hollow fibers are knit into a fabric array which is wrapped around the center tube. A high packing density provides a large membrane area that gives enough contact time to deaerate the liquid to low gas levels.

4x13 and 4x28 Liqui-Cel® or SuperPhobic® Contactors in Stainless Steel housings that utilize our patented Extra-Flow baffle are ideal products for this application. The baffle design forces fluid to travel in a radial flow path that is perpendicular to the hollow fiber membrane. This patented baffle increases contact area and improves degassing efficiency.

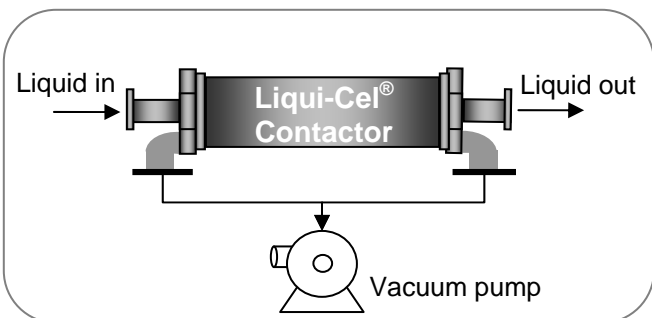


Figure 1: Typical Extra-Flow Operation

For highly viscous fluids such as paper coatings, the center baffle combined with normal operation where the liquid travels in one side of the device and out the other side can lead to a high pressure drop over the length of the contactors.

What Makes It Work Better

For viscous fluids we have modified the standard Extra-Flow design and the housing ports to improve the pressure drop and the contactor operation. An additional fifth port has been added in the middle of the stainless steel Housing. This additional port becomes the new outlet port for the liquid and now both original liquid ports are used to flow the liquid into the device towards the baffle in the center. This modification divides the liquid path into two streams each comprised of half of the flow. As shown in figure 2, half of the fluid enters from each end port and exits from the new middle port thus improving the pressure drop.

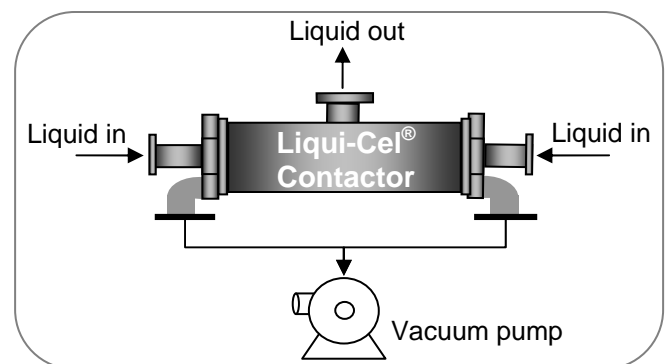


Figure 2: Adding a new liquid outlet port in middle

With longer contactors like our 4x28 Extra-Flow device, a sixth port can also be added in the center to help stabilize the inner cartridge and further improve the pressure drop. This is depicted in Figure 3.

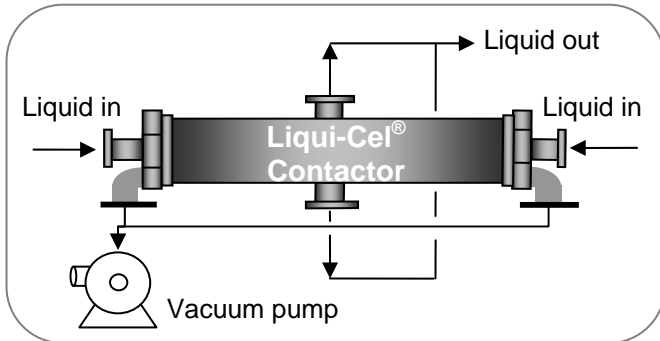


Figure 3: Adding two additional liquid outlet ports in the middle

All membrane types can be used to degas highly viscous fluids. The SuperPhobic® Contactors, however, are used for liquids with surface tensions lower than water. Most coating solutions require the SuperPhobic® Contactors.

We have worked closely with a variety of customers over the years to improve an already efficient design so that it will be even better suited to degas high viscous solutions.

The multiple port design was the first step for improving pressure drop and degassing efficiency. We also introduced an additional spacer between the layers of hollow-fiber array to further lower the flow resistance and decrease the pressure drop while still maintaining an adequate degassing performance.

We would be happy to discuss your application and help you determine which of the product modifications would best suit your needs.

Please contact your Membrana representative or visit us online at www.superphobic.com.

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