



Smart water management in Bio- and recycled CO₂ based refineries

When the world is now moving away from fossil-based materials production into renewable carbon based production, the focus on smart water management is increasing:

Production of chemicals and materials from renewable carbon is intensive in water usage no matter which production process used.

Many renewable plastics and chemical intermediates are produced via fermentation processes using different microorganisms. The nature of these biological processes is that they live, breathe and work in a diluted environment. The chemicals that are produced are hence also produced in relatively low concentrations and efficient separation and concentration is crucial. To improve the production process economy, decrease the need for fresh water and substantially reduce the ecological footprint, the water loop around these new production facilities needs to be closed.

Another and very important production route for renewable chemicals and materials are via advanced recycling processes. Material that has already been used is now recycled via both materials and chemicals recycling routes and is in this way transformed into a fantastic raw material for industrial production processes. However, the nature of already used material is that they need to be separated and, in many cases, cleaned. The water usage is hence high and, again, to improve the production process economy, decrease the need for fresh water and substantially reduce the ecological footprint, the water loop around these new production facilities needs to be closed.

Alfa Laval has, based on the industrial need that has arisen in this new renewable area that we are moving into, developed an efficient and dedicated system for water recycling. The Zero Liquid Discharge system, ZLD, is based on rising film plate evaporation/ flash evaporation and the final removing of solid particles is done using decanter centrifuge. Any source of excess heat from the production process is preferably used as energy input to drive the ZLD system and the design is hence customized to each customer need.

Alfa Laval's installed base of ZLD systems is large and growing every day. As an example, we can mention a case in Oostende, Belgium where a customer that is running a plastic pyrolysis plant is using our ZLD system on mixed wastewater to recirculate 5 ton/hr water into the process.