

A new system solution for challenging separation processes

Sulzer Chemtech recently introduced the new structured packing AYPlus™ DC to the market. It is combined with a new distributor system — the VEPK. This Sulzer solution for thermal separation performs outstandingly in challenging processes with extremely low aqueous liquid loads and makes some demanding applications technically and commercially feasible.

The wettability of the packing material has a decisive impact on the separation efficiency. The most important physical property that determines the wetting behavior of liquids on surfaces is the surface tension. Separation processes involving aqueous systems need to deal with the high surface tension of water. Aqueous systems show poor wetting on plain steel, plastic, and glass surfaces, which leads to critical limitations for the designers of such units.



1 Sulzer AYPlus™ DC packing: ready for installation in an industrial distillation unit.

The new packing shows improved wetting behavior

By making use of new materials, an almost complete wetting of the geometrical surface area can be achieved—even at extremely low water flow rates, such

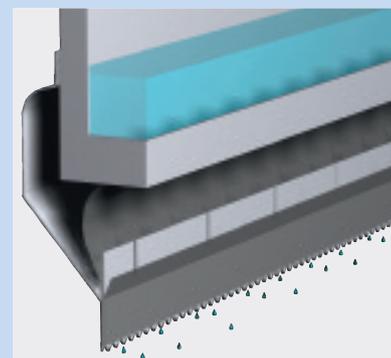
as those below $0.1\text{ m}^3/\text{m}^2\text{h}$. Compared to structured packing made of metal or plastic sheets, the new Sulzer AYPlus™ DC packing is more than twice as efficient in the targeted application range 1. The

The efficiency of the packing has been more than doubled.

outstanding wetting behavior is achieved by capillary forces, which spread the liquid and avoid the formation of rivulets. Thereby, the pressure drop is even smaller than with conventional structured packing.

A new, patented distributor system

In order to ensure sufficient initial distribution quality, it is very important to evenly distribute the liquid across the cross-sectional area when the liquid is fed into the top of the packing. Conventional liquid distributors are not able to achieve sufficient distribution quality with such low liquid flow rates. The new, patented liquid distributor type VEPK achieves the required distribution quality through a two-step process, where the second step, again, uses capillary forces 2.



2 The arm channel of the new liquid distributor VEPK distributes extremely low liquid flow rates.

Industrial implementation and targeted applications

Together, Sulzer AYPlus™ DC and VEPK form a solution that has already been successfully applied in industrial applications. Separating water from high-boiling organic components to achieve pure products was the first industrial application. Removal of water-soluble, high-boiling components from gas streams is another promising application. Here, the main goal is the absorption of solvents from flue gases in post-combustion carbon capture absorber units (CCS) to minimize the emissions of toxic components to the atmosphere.

How can the separation efficiency be improved?

Distillation and absorption applications are thermal-separation processes where mass transfer between the gas and liquid phases is the fundamental mechanism of the separation. The effective interfacial area between the

vapor phase and the liquid phase is thereby the single most important factor for the separation efficiency of the unit. Column internals, such as structured packings, are used to maximize the interfacial area between the phases.

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