

## Sulzer Technologies for Biofuel Applications

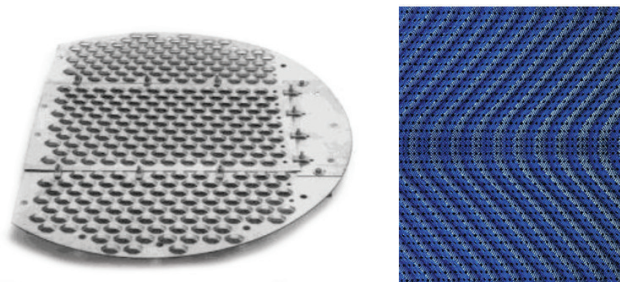


### Background

In recent years, there have been many advancements in the development of biofuels for the global transportation markets. First generation fuel ethanol plants performed fermentation of grains into high purity ethanol. Further R&D led to the development of biofuels from renewable feed stocks: grains, bagasse, switch grass, sugar cane, beets, turnips and wood pulp. These second generation biofuel processes produce high purity methanol, propanol, butanol and other oxygenated hydrocarbons for this emerging market. The development of biofuels has included new technologies for mechanical and thermal processing of biomass, fermentation, and chemical separation processes.

### Process Technology

Sulzer offers several technologies for second generation biofuels. Our process design experience includes pressure swing, azeotropic and extractive distillation to separate alcohols from aqueous feed streams. Membranes can be used to perform dehydration and overcome azeotropes to produce high purity alcohol products. The combination of these technologies leads to significantly lower energy demands. Our test center can verify the capabilities of novel processes with pilot plant studies that can then be applied to scale-up to demonstration and industrial plants. Process plant equipment can be delivered as skid-based solutions that include distillation columns and other process equipment, piping and controls.



**V-Grid™ Tray and MellapakPlus™ Structured Packing**



**Membrane Module and Skid Mounted Column**

### Mass Transfer Equipment

Sulzer's product portfolio has been successfully used in biofuel applications for many years. In first generation fuel ethanol plants, VG AFT™ trays have a proven track record of resisting fouling by biomash solids and extending the plants' operating time. MellapakPlus™ structured packing offers low pressure drop and high capacity for distillation and absorption columns. The Kühni extraction column with its rotating agitation chambers is applied in liquid-liquid extraction applications. Vapor permeation with zeolite membranes is most suitable for bioethanol processes. These membranes can be incorporated into hybrid distillation systems used to dehydrate biofuels.

### Sulzer Chemtech, USA, Inc.

1 Sulzer Way | Tulsa, Oklahoma 74131  
Phone: (918) 446-6672 | Fax: (918) 446-5321  
Email: [ContactPT@Sulzer.com](mailto:ContactPT@Sulzer.com)  
[www.sulzerchemtech.com](http://www.sulzerchemtech.com)