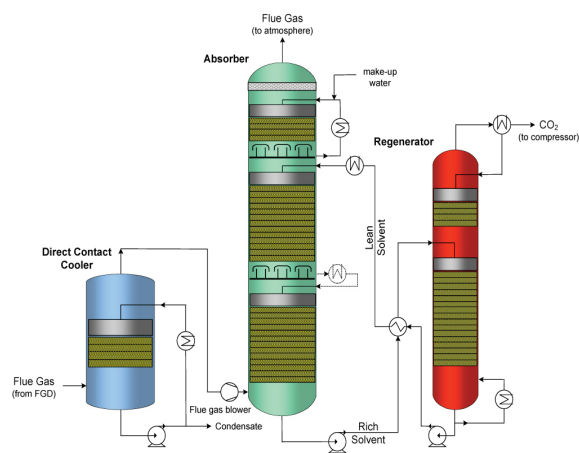


Tower Technical Bulletin

Improved Technology for Carbon Capture & Storage Saves Capital Cost

Background

Total man-made carbon dioxide (CO₂) emissions in the world today amount to approximately 30 Gigatons per year, with fossil fuel-based power stations contributing in excess of 30% of this total. Carbon Capture is an energy intensive process, but Sulzer's specialized technology allows the operator to minimize capital expenditures and at the same time, minimize power output losses that can result from poor designs.



**Schematic of CO₂ capture plant
based on amine-scrubbing process**

High Efficiency Mass Transfer Products Reduce Capital Costs

Generally, only structured packing can meet the low pressure drop requirements for the design of the Direct Contact Cooler and the CO₂ Absorber. Compared with random packing or trays, structured packing's significantly lower pressure drop and better mass transfer efficiency make it ideal for these services. The resulting lower column diameters and packed bed heights translate into lower capital expenditure and lower operating costs.

Sulzer's new MellapakCC™ structured packing absorbs CO₂ more efficiently than conventional packings, particularly for post-combustion capture. Compared with Mellapak™ 2X structured packing, MellapakCC provides 20% higher efficiency and 20% lower pressure drop. When compared with conventional Mellapak 250.Y structured packing, MellapakCC provides the same efficiency but up to 60% lower pressure drop.

Specialized Structured Packing Excels at Low Liquid Rates

In post-combustion capture, solvent emissions to the atmosphere from the top of the CO₂ Absorber must be controlled in order to meet environmental regulations. The make-up water required to reduce the solvent emissions substantially (from ppm down to ppb range) is very low due to the low vapor pressure of most amine solvents. Low water rates result in specific liquid loads of <100 liters/m²hr operating conditions where conventional structured packing shows significantly reduced efficiency. Sulzer has developed a new structured packing, AYPlus™ DC, which shows extraordinary wetting characteristics with aqueous systems. To handle such low liquid rates, a special liquid distributor (VEPK), was also developed. This combination of AYPlus DC structured packing and VEPK liquid distributor dramatically increases the separation performance, thus making it possible to realize "close to zero" solvent emissions at the top of the CO₂ absorber.

Unique Technical Challenges Require Experienced Designers

Carbon Capture column diameters can reach 20 meters or more. Poor structural design or internals that cannot properly distribute gas or liquid across an extremely large cross-sectional area can create major increases in initial capital cost or serious operating problems. The installation of the vessel internals must be carefully considered to minimize the time and cost of field work. To effectively address the unique challenges related to these mega size columns, an experienced mass transfer engineering company, like Sulzer Chemtech and Sulzer's Field Services Group, is required.

Sulzer Chemtech knows CO₂ Capture.

Sulzer Chemtech has over 50 years of operating and design experience in distillation and absorption processes. We are the world leader in mass transfer technology for CO₂ capture, and have unmatched experience in the design, manufacture, and installation of packing and internals for columns diameters greater than 10 meters. Our services include simulation and CFD studies, pilot plant tests, and structural and hydraulic analyses.

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