

# **Sulzer's new Mellapak™CC™ Structured Packing : Reducing Pressure Drop in the CO<sub>2</sub> Absorber while Maximizing Mass Transfer Performance**

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## **Abstract**

The past few years have seen an unprecedented interest in proving the techno-economic viability of CO<sub>2</sub> capture technologies from flue gas streams (from power plants). The main challenge here stems from removing concentrations of CO<sub>2</sub> (typically between 3.5 vol% to 14 vol%) from large volume gas streams, thus leading to very large column sizes. Another important cost factor is the pressure drop per metre that can be saved inside the absorber. The correct choice of mass transfer technology assumes significance in such applications. Structured packing offers an excellent solution in terms of reducing the column dimensions (CAPEX) as well as providing low pressure drop (OPEX) over the CO<sub>2</sub> absorber.

This article presents a significant step taken forward to reduce the costs associated with CO<sub>2</sub> capture in post-combustion plants. Sulzer Chemtech has developed the next-generation Mellapak structured packings (Sulzer Mellapak™CC™) for post combustion CO<sub>2</sub> Capture, to fit individual process specific requirements; targeting process intensification by means of significantly reduced pressure drop to reduce OPEX, and increased separation performance to reduce CAPEX.

For liquid-side controlled applications involving a fast chemical reaction (usually the case in post-combustion applications), two types of Mellapak™CC™ have been developed, viz. Mellapak™CC™-2 and Mellapak™CC™-3. These two packing types were developed by optimizing the packing geometry in terms of the material requirement (lower CAPEX), the pressure drop (lower OPEX) and high effective interfacial area (lower CAPEX & OPEX). Here, Mellapak™CC™ is found to have the same efficiency as the equivalent conventional Sulzer Mellapak structured packing, but with significant reduction in pressure drop (upto 35% lower) for typical operating conditions seen in post-combustion applications.

To demonstrate the techno-economic impact of Mellapak™CC™, a case-study (industrial-scale) is presented here for a generic amine-based absorption process. A life-cycle cost analysis for a typical 800MW power plant over a 40-year span, clearly shows how millions of Euros can be saved, by using Mellapak™CC™ in the CO<sub>2</sub> Absorber.