# Sulzer welcomes new random packing design

To provide optimal column performance, the design of random packings should provide a number of features. Firstly, they should generate a large surface area that brings the liquid and the vapour phases into contact. The packings should spread evenly within the column packing section, creating a uniform surface area distribution to provide an orientation-independent column performance. In addition, the structure of the packings should not create a tortuous flow path for the vapour in order to maintain a low pressure drop. Finally, the shape should discourage nesting between packing elements and promote lower liquid flow resistance.

Combining all of these considerations and providing an optimized structure for random packings can be challenging, but the results offer improved separation efficiency inside the column.

Highly skilled suppliers/providers of random packing can boost the efficiency and performance of columns and the entire plant by providing cutting-edge designs for random packings. In order to ensure the quality of the products, Sulzer's R&D engineers conduct in-house testing before their launch on the market. Some of these tests were verified by an independent institute in the US.

Sulzer's latest advance in random packing design is NeXRing, which provides higher capacity and efficiency compared to conventional random packing designs, as attested by in-house and third-party tests.

The performance of this packing is delivered by a relatively large and accessible ring surface on which the separation process can take place, the special shape of the rings, which allows for a higher packing density and thus a larger available surface, and the open design of the rings, which reduces the pressure drop compared to conventional rings by up to 50%.

*NeXRing™ The NeXt generation random packing.*

NeXRing packings distribute themselves evenly within the column packing section, while the structure of the rings provides for uniform liquid and gas flow through the column. The shape of the packing appears fragile, but the end flanges and the reinforced ribs give the packing a high mechanical strength.

These packings are used in many industrial sectors, such as for the removal of CO2 and H2S from natural gas or biogas. For this purpose, the gas is brought into contact with amine-based solvents, such as monoethanolamine (MEA), diethanolamine (DEA), methyldiethanolamine (MDEA) or MDEA/piperazine solutions (activated MDEA).

A common feature of these solvents is their strong tendency to foam, which affects the flow of the gas through the separation column. The high open surface area enables separation with less pressure drop and thereby reduces the hydraulic effect of foaming. As a result, the overall column efficiency is increased.

The company upgraded the random packings to the NeXRing model in the two lower sections of the three-part column, where the fouling occurred. Even after half a year of operation no increase in pressure drop could be detected. The open design of the new packings the small particles to flow through unhindered without getting stuck. In addition, in all three column sections, the overall pressure drop in the column is lower than in the previous arrangement. The customer regularly checks the pressure drop for quality assurance in order to ensure compliance with the state's requirements.

Governments globally have adopted stringent regulations to reduce global air pollution from $SO_2$ emissions. An Asian customer, operator of a refinery, was unable to meet the new government regulations with its existing equipment. To reduce the $SO_2$ content in the flue gas, a new column had to be built. Sulzer performed the calculations and developed a concept that allowed the customer to meet government regulations using Sulzer's products and a new process arrangement.

$SO_2$ is removed in several stages using water and alkaline solutions. The goal was a reduction of the $SO_2$ content in the exhaust gas below 50 ppm. By replacing the original random packings, it was possible to increase efficiency. Since a certain amount of dust is to be expected during the process, the resistance of NeXRing to contamination was also an advantage.

The calculations convinced the customer, which opted for a column equipped exclusively with NeXRing packings. The column is now successfully in operation and the $SO_2$ content could be reduced to 35 ppm. The total pressure drop is 40% less than required, resulting in significant energy savings over the service life of the column.

Sulzer engineers have developed a design programme called Sulcol that gives customers the ability to design their own columns. Columns of different sizes can be configured with various types of internals. The Sulcol program then determines the hydraulic capacity of the system. Columns can be configured with different types of trays, random or structured packing. ◆