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Vertical Polygon Panel Demister for Drying Towers
For safe removal & installation without tower entry

A major issue in recent years in the Sulphuric Acid industry has been the development and use of equipment that can be more safely accessed and maintained, for example by avoiding entry into acid towers unless absolutely necessary.

Drying Tower demisters – traditionally installed horizontally and with tight compression to the wall and section-to-section, to avoid gas by-pass – sometimes need regular cleaning and entry for diligent installation within the tower.

Initial attempts to design an externally-removable horizontal demister had mixed success. An internal drawer framework did allow demister sections to slide in and out, and most interventions passed without tower entry. Problems increased with time, as the heavy demister sections began to distort the internal framework, making it difficult to re-install and remove again (even sometimes requiring a man to go into the tower to help the process, i.e. self-defeating the concept).

Problems were increased with larger plants and larger diameters of demisters, with excessively wide platforms being needed at the access points on either side of the tower, with very difficult to handle, heavy demister sections requiring extra manpower to get them in / out.

A dirty demister is full of acid, and when sections were pulled out of the access doors for cleaning, there were inevitable falls of acid onto the areas below.

A better solution was needed that avoided these problems, and which gave only the safety benefits intended.

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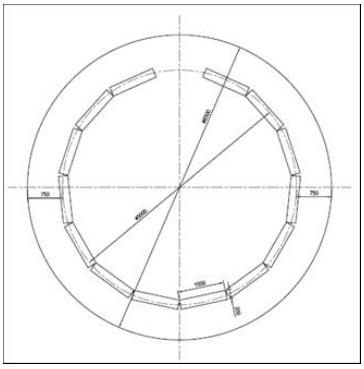
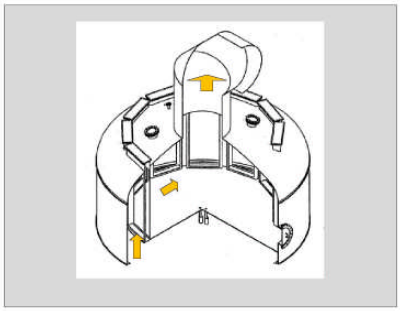
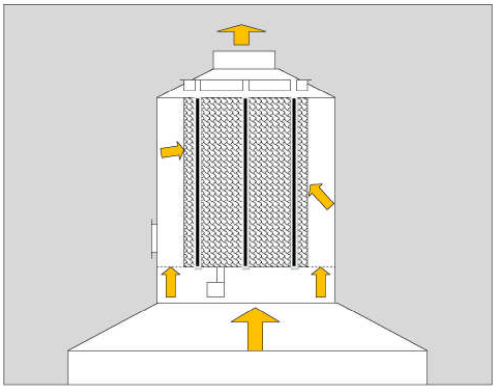
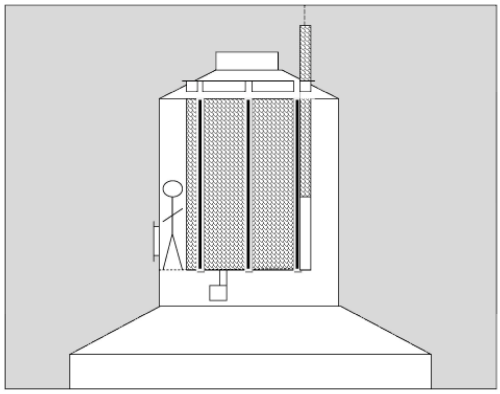
Begg Cousland, in association with Outotec GmbH of Germany, designed and developed the better solution, with a vertical demister orientation replacing the horizontal concept. By arranging the vertical demister as a series of panels, each with a top access door on the conical section on the top of the tower, a polygon layout proved to be an effective way to install them.





A typical polygon arrangement is shown above left, with the panels approximately 1 metre away from the shell. The gas flow comes from underneath and passes from the outside of the polygon, through the demister panels, and then goes upwards to the central top exit. See below.





Each panel is by-pass sealed within a ‘U’ frame on 3 sides and by the top access door. There are recessed lifting eyes included within the panels to allow each one to be lifted vertically in and out of it’s housing, sliding down inside the ‘U’ frame without risk of distortion. See below, and also the image showing the space below the horizontal path of the gas exit duct, where no panels are installed, for lack of access.

There have been other types of polygon style vertical panel filters used in the past in Sulphuric Acid plants. HTP Fibre bed panels for example were used for many years, with satisfactory efficiency. They needed a lot of bolting and gaskets inside the tower, and so fell out of favour.

Now this optimising of that idea, and adapting it to the safety-conscious era we now work in, has proved popular and Noracid in Chile chose this solution for their new plant from Outotec. An installed panel viewed from the top, the top access doors, and the Drying Tower in the workshop, are shown in the photos overleaf.

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In summary, what are the features and benefits ?

1. Lifting in and out vertically does not put any strain on the (polygon) framework inside the tower.

2. Lifting in and out can be done with 2 or 3 tower top mounted davits, saving crane and manpower.

3. When a dirty panel is just above the access opening, a drip trough can be attached to it's bottom edge to avoid acid falling onto the areas below.

4. The demister mesh compresses and seals against the 'U' frame sides and bottom and the top access door in the traditional way to ensure no gas by-pass.

5. This operation can then be 100% done from outside, on the top platform.

6. An access door is provided at the polygon level, to enter the tower and the middle of the polygon between blank plates joining the polygon to the shell. This allows tower access when desired.

7. The panels can be quickly lifted in and out, with only the access door bolts needing preparation, so plants where too-frequent blockage of the Drying Tower demister causes production and maintenance problems, can consider a spare panel set change out within a short stoppage opportunity.

8. Demister panels are fully washable, so dirty sets can be re-used after cleaning.

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