



## Outotec FiDi™ acid distributor

The Outotec FiDi™ acid distributor overcomes the limitations of other available solutions for acid distribution in drying and absorption towers for sulfuric acid plants. This new development from Outotec uses a design based on film distribution technology.

A key factor for the drying and absorption tower's performance is minimizing the carry over and mist generation while allowing high gas flow rates. The patented Outotec FiDi acid distributor addresses these basic requirements with a simplified design that maximizes the free gas flow area at the acid distributor's level while keeping a smooth and homogenous acid distribution into the packing regardless of misalignment.

### Benefits

- Reduced acid carry over
- Simplified design for best maintainability
- Minimized pressure drop
- Outotec Edmeston SX sulfuric acid steel for high corrosion resistance
- Homogenous flow density throughout the distributor
- Reduced investment and life cycle cost

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## SX sulfuric acid steel

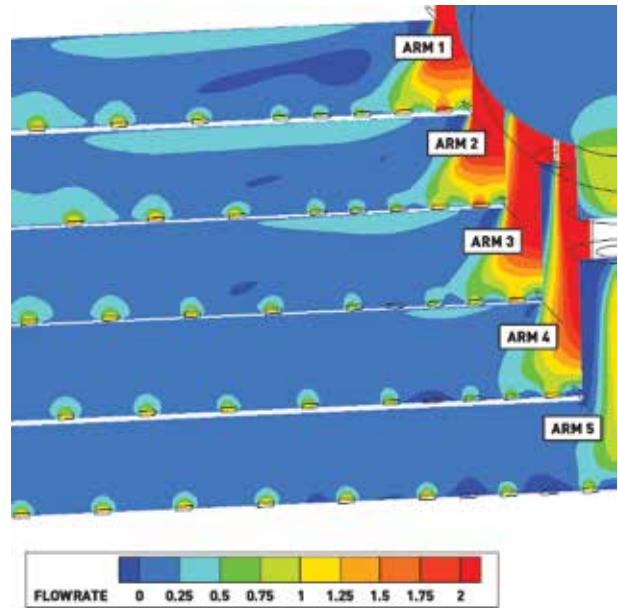
The lightweight design of the FiDi distributor is made of sulfuric acid resistant Outotec Edmeston SX steel. With its superior corrosion properties, the SX steel provides a lifetime expectancy of more than 20 years in this application.

In contrast to cast iron design, the use of SX steel for the FiDi acid distributor reduces weight significantly. This results in load reduction for both the acid distributor's support structure and for the tower itself. This is of high importance especially for older towers.

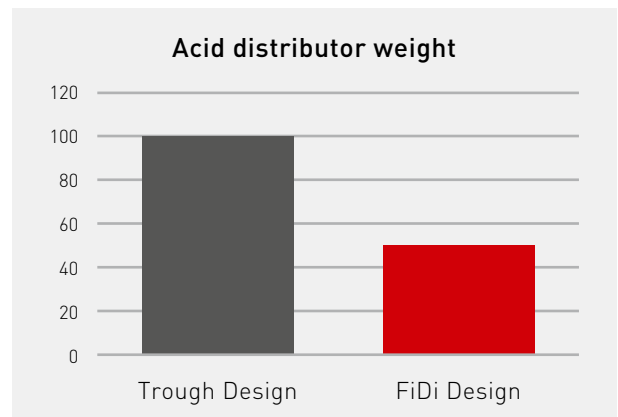
## Securing an even acid distribution

The core function of the acid distributor is to maintain an even wetting of the packing across the entire cross section of the tower. The flow geometry into the packing has been changed with the film distribution technology applied by the FiDi acid distributor. Laboratory tests and industrial installations have demonstrated an even acid distribution with the FiDi system already just beneath the surface of the packing.

In addition, a fluid dynamics analysis is executed for each new application, thus securing an even acid supply within the piping for all relevant load cases. The fluid analysis is applied to define the individual orifice size for each distributor arm, which eliminates deviations of the acid flow through the nozzles. With these measures the occurrence of  $SO_3$  slippage is efficiently prevented.



Fluid dynamics analysis for an even distribution (detail view)



Weight comparison FiDi and trough distributor here: tower ID 5400 mm (17' - 9")



## Maximizing gas flow rates

When developing the FiDi acid distributor the focus was set on maximizing the free gas flow area and avoiding the droplet formation that is typical for pipe distributors. Due to the reduction of the tower's cross-sectional area either from the acid distributor, the packing or both together, the gas velocity increases and tends to generate carry over and acid mist. This increases corrosion in downstream equipment.

With the FiDi acid distributor the free gas flow area has been increased to more than 70% compared to approximately 55% for a typical trough system. As a result, the gas velocity remains on a lower level when passing the distributor area, minimizing forces to entrain acid droplets or mist formation. In combination with the smooth film distribution into the packing, a significant reduction in carry over can be achieved.

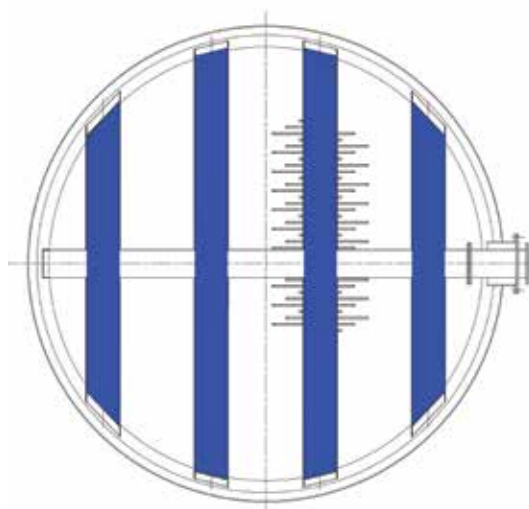
### FiDi acid distributor features

- Film distribution with unpressurized film forming troughs
- Reduced weight and low sensitivity to skew for easy handling during tower service and assembly
- Installation above packing for easy accessibility

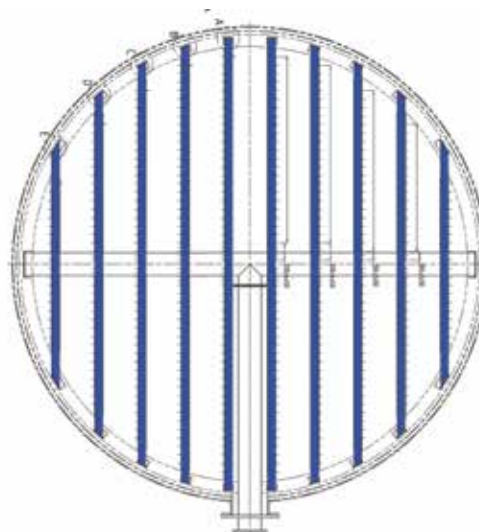
### Simplification is the key

The increase in the free gas flow area goes hand in hand with the simplified acid distributor design. The FiDi acid distributor is manufactured from standard SX stock materials, which form the system's profile and all accessories. As a result, both the manufacturing complexity and the weight are reduced, which results in an overall decrease in the life cycle costs of the FiDi acid distributor.

Maintenance benefits are also realized thanks to the new and simplified design. Due to the high assembly tolerances, especially compared to a trough system, no time consuming alignment is needed for the FiDi acid distributor. In addition, the minimized component weight facilitates assembly and ease of operation.



**Trough acid distributor: 45 to 60% free gas flow area at the level of the acid distributor**



**FiDi acid distributor: 65 to 75 % free gas flow area at the level of the acid distributor**

*Outotec provides leading technologies and services for the sustainable use of Earth's natural resources. As the global leader in minerals and metals processing technology, Outotec has developed many breakthrough technologies over the decades. The company also provides innovative solutions for industrial water treatment, the utilization of alternative energy sources and the chemical industry. Outotec shares are listed on NASDAQ OMX Helsinki.*

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