

### Tower Technical Bulletin

#### Channel Baffles: Improving Efficiency on Trays with Low Vapor Loading

##### Background

Sour water strippers, wastewater benzene strippers, or any other column that operates with low vapor rates often have active areas that are easily oversized for the actual operating vapor traffic.

For optimum tray efficiency, good contacting of the liquid flowing across the tray deck with the vapor flowing up through the tray orifices is critical. Channel baffles are a very straightforward design modification that improve vapor/liquid contact, increasing tray efficiency in low vapor services. During an outage opportunity, replacement of existing tray active panels and bolted channel baffles can allow the column to improve overall separation and mass transfer.

##### The Challenge

To achieve maximum efficiency, a good tray design needs to have a sufficiently long flow path length (> 2 ft) and intense, uniform contacting between the vapor and liquid streams. In processes that simply do not have a lot of vapor traffic, the number of valves must be minimized to reduce open area and prevent weeping. This can often result in a very low valve density (large spacing between valves on the tray deck), allowing liquid to find flow pathways across the deck with minimal vapor contact.

##### The Solution

Channel baffles are vertical plates, bolted to the tray deck parallel to the liquid flow path. The area inside the baffles has active liquid and vapor traffic, while the area outside the baffles is a blanked zone.



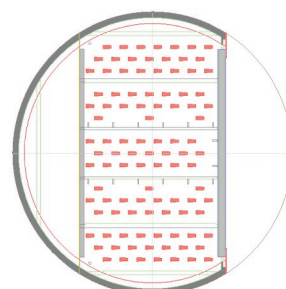
In a channel baffle tray, the same open area and number of valves required for a full deck tray are installed in a restricted-width channel, increasing valve density while not sacrificing flow path length.

Although liquid should not have a normal path through the blanked region, condensation from the open vapor space or normal froth height above the channel baffles can allow some

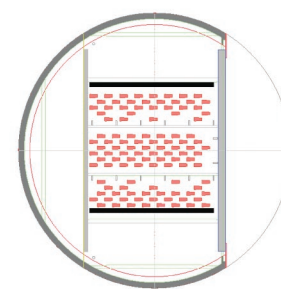
liquid accumulation in the blanked regions. Sulzer incorporates features into the design to force liquid to flow only onto the channeled area, and to allow free draining of any accumulated liquids in the dead zone.

##### An Example

When looking at the layout of a channel baffled tray, it is easy to see how vapor/liquid contact will improve. The schematic below illustrates the obvious change in valve density as a result of fitting the tray with channel baffles. While exact efficiency is very dependent upon loadings, the "Tray B" design with the channel baffles will have a significantly higher efficiency than "Tray A".



Tray A: 100 Valves



Tray B: 100 Valves  
with Channel Baffles

Example: Channel Baffle Improvements		
	Standard Tray	Tray with Channel Baffles
Column ID, in	84	84
DC Width, in	20	20
Valve Count	100	100
Valve density, 1/ft <sup>2</sup>	3.3	13.0
Flow Path Length, in	44	44
Jet Flood	14%	53%

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