



## Amine Reclaimers

Gas Treating Units that use Amines are prone to becoming contaminated by heat stable salts (HSS), and degradation products. HSS reduce the chemical reactivity of the amine by chemically binding with it. This in turn reduces the acid gas carrying capacity of the amine in the absorber. Under normal circumstances, over 2 wt.% HSS should be cause for concern, as it leads to loss in treating performance. The best designed and operated plants invariably end up having HSS due to several factors including oxygen ingress, carry over of anions from upstream units, degradation and so on.

HSS contamination levels tend to continuously build over time; however, plant upsets may accelerate the process. In cases where the HSS contamination level has reached the point of seriously impacting absorber performance, the solvent can be reclaimed using any of several methods, including thermal reclamation, ion exchange, and electro dialysis. Thermal reclamation commonly refers to a batch distillation operation, and sometimes a continuous operation. Similarly, reclaiming using electro dialysis and similar methods may be batch or continuous. While HSS and their removal are topics for a separate detailed discussion, the present discussion focuses on the setup and simulation of a continuous reclamation unit in ProTreat® simulation.

### Continuous Thermal Reclamation

Figure 1 below shows the PFD of a continuous thermal reclaimer within a larger amine treating flow-sheet. The section encompassed by the dotted red rectangle is enlarged and shown in Figure 2. A portion of the lean amine leaving the regenerator (slip stream) is sent to a continuous reclaiming vessel which is a steady state flash operation.

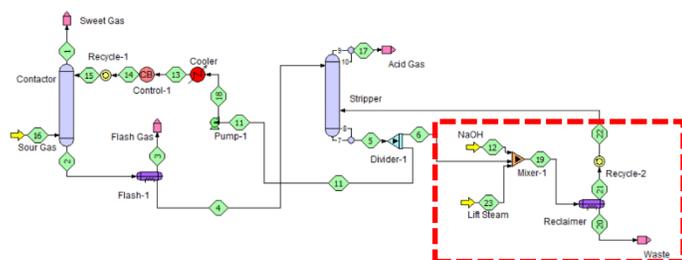


Figure 1. Continuous Thermal Reclaimer

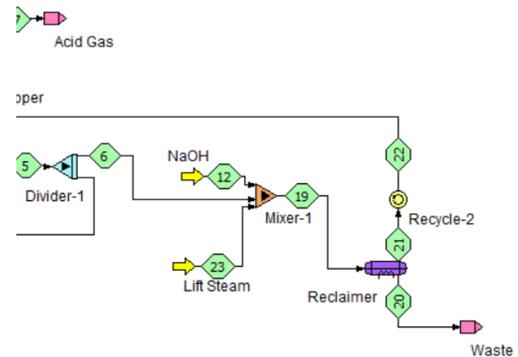


Figure 2. Continuous Thermal Reclaimer (Enlarged)

NaOH is added during thermal reclaiming to allow recovery of the amine from the amine HSSs by converting them to their sodium salts. In the reclaimer vessel the temperature and pressure that will be maintained in the batch still can be entered as input data. The liquid leaving the flash operation is rich in HSS and other degradation products and is typically sent to waste treatment; whereas, the amine (vapor) is returned to the column.

In a similar manner, reclamation using dialysis or other similar methods can be modelled as shown in Figure 3. The unit marked within the dotted red box is a component splitter within the ProTreat® simulator

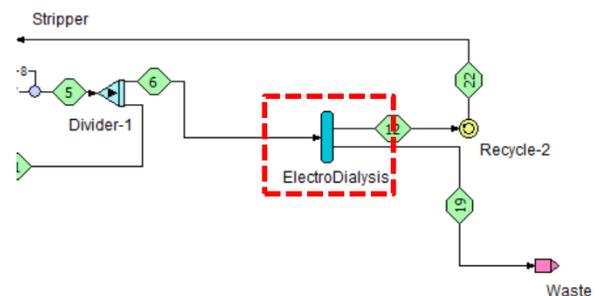


Figure 3. Continuous Non-thermal Reclaimer

**PROTIP:** By varying the slip stream flow (for thermal reclaiming) and the component splitter specifications (for non-thermal methods), it is possible to study the impact of different degrees of HSS removal on treating performance.

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