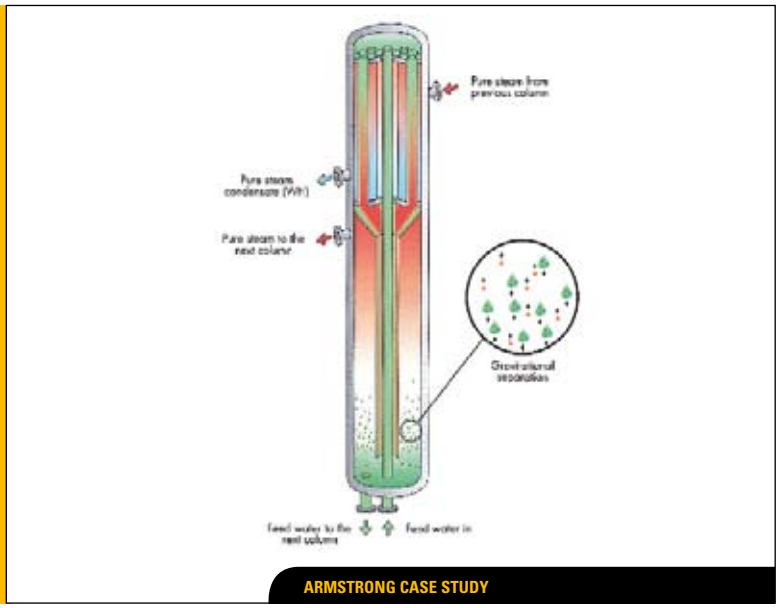
PHARMA

Case study

Concentrate recovery from distillers



ARMSTRONG CASE STUDY

Case summary

Energy savings	
Steam savings	500 GJ/year
CO_2	25 tons/year
Financial savings	€ 4,800/year
Investment	5,000 €
Payback time	13 months

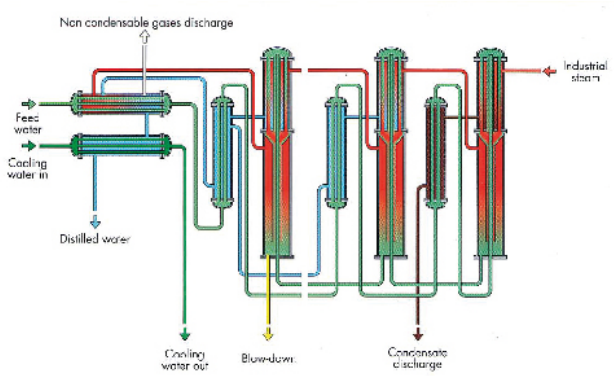
The concentrates are thrown down the drain

In a distillation system, the concentrates emitted from the last column are generally thrown down the drain (yellow line called "Blow-down" in the figure shown here).

The principle of operation of a distillation column requires evacuation of the concentrates by gravity. Therefore, no back pressure can be tolerated as that would disturb normal operation of the distiller. This makes it difficult to re-inject these concentrates into a return circuit.

Distiller users regularly decide to throw the concentrates down the drain. Because the concentrates are at very high temperature (near 100°C), they need to be cooled beforehand. To reach an acceptable temperature (approximately 45°C), the ratio between the quantity of cooling water and concentrate can reach up to 5:1.

This system is not really efficient from an energetic and environmental standpoint, to put it mildly. Not only is the energy contained in the concentrates not recovered, but a relatively large quantity of cooling water is required as well.



Distillation system - copyright Stilmas (www.stilmas.com)

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Case study

Send the concentrates back to the condensate return

It is now technically possible to recover concentrates emitted from the last distillation column using a mechanical pump. The body of this pump serves as a storage tank. When the tank is full, the pump is pressurized with a motive fluid (generally, steam). The "fill – pump" cycle is controlled by a float mechanism that measures the level of concentrate in the pump.

Unlike electric pumps, mechanical pumps fill by gravity, without intermediary tank. The body is filled as the concentrates are discharged. No back pressure is created because the pump body is brought to atmospheric pressure during the filling phase. Pumping using a motive fluid have no cavitation problems. Therefore, a mechanical pump doesn't need a minimum NPSH.

However, installation of a mechanical pump requires a height of at least 300 mm between the outlet of the distillation column and the floor. Distillation system manufacturers often seek to make installations more compact and do not always provide for this distance. Nevertheless, when space is available, installation of a mechanical pump can make substantial savings possible.

Installation of a mechanical pump

A payback of less than one year

One of our pharmaceutical customers was able to install a mechanical pump at the outlet of the last column in a distillation system.

As a result, they were able to send 95°C concentrates back to the condensate return, thus saving 500 GJ/year. Furthermore, they were able to eliminate the cooling system and thus reduce cooling water consumption by 3,200 m^3/year.

The financial savings made possible by this project totaled € 4,800/year, which made installation of the mechanical pump payback in a little over one year.

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