ceca ARKEMA GROUP

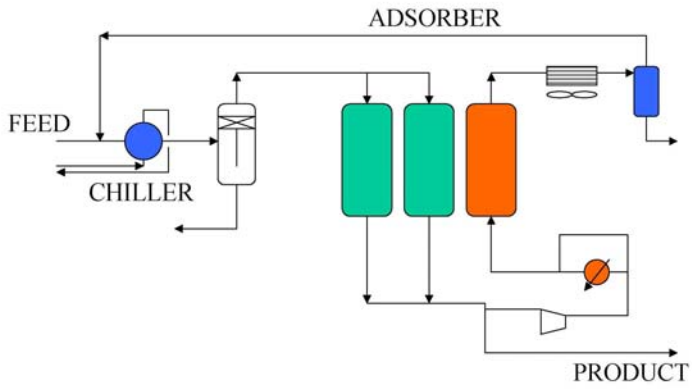
ON SPEC
The Adsorption Gazette

Siliporite molecular sieves BY CECA S.A.

May 2010

KEEP YOUR CHILLER COOL

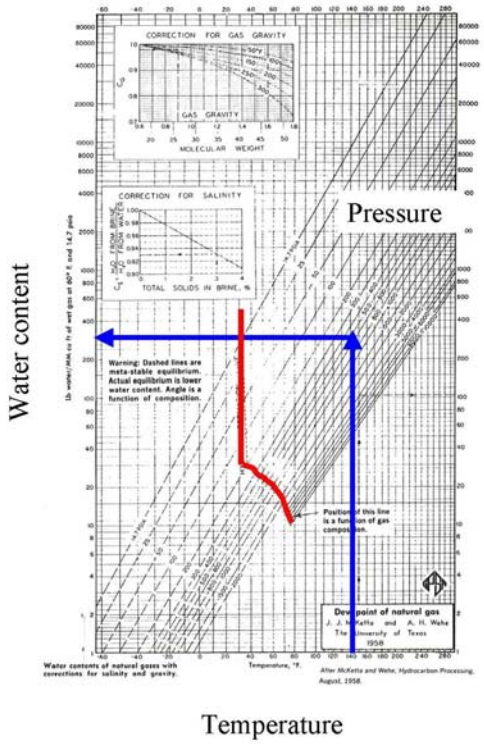
Some weeks ago a process engineer of an LNG plant told me that he had request from operating people to increase the outlet temperature of the chiller from 23°C to 28°C. They were afraid of hydrate formation and additionally wanted to economize energy.



In the unit the feed gas is mixed with the recycled regeneration gas and the condensed liquid is separated from the gas in a KO drum with filter coalescer.
The chiller serves to cool down the gas coming from an Amine unit.
In consequence the feed gas is saturated after the chiller.

This is what I explained to him. And to tell them NOT to increase the temperature. The gas comes in with a pressure of 60 bars and saturation at 23°C gives a water content of 620 ppmV and at 28°C a water content of 820 ppmV.

At this higher temperature there will be 32% more water on the sieves and by keeping all the operating conditions constant this would lead to a premature water breakthrough. Only by reducing the flow rate down to 76% or by reducing the adsorption time the chiller could be run at a higher temperature.



"Yes, but we are afraid of freezing in the chiller due to hydrate formation."

At 23°C certainly not and you may find this in the McKetta chart for example.
For a given temperature and a given pressure the chart indicates the water content in the gas (see blue line). Different correction factors could then be applied.
In order to know whether there is risk of hydrate formation or not the red line has to be respected.
Only if the T, p conditions are at the left of this line there is risk of hydrate formation. At 60 bar the hydrate formation is at about 17°C, far away from present conditions.

The process engineer was happy to hear this and showed it immediately to his colleagues.

If you wish to know more about static and dynamic adsorption capacity, read the next issue of the "On-Spec" Newsletter…