IS MY MOLECULAR SIEVE UNIT PROPERLY REGENERATED?

The proper regeneration of molecular sieves is very important, as there might be progressive adsorbate accumulation (water in general, or sulphur species…) on it, causing a faster than expected adsorption time reduction and eventually premature breakthrough. By properly analyzing regeneration temperature profiles, it is easy to check the proper regeneration of the molecular sieves.

The left figure shows a typical temperature profile at the inlet (pink) and the outlet (blue) during the heating step of regeneration. For a gas drying unit, inlet temperature would be measured at the bottom (regeneration from top to bottom), and outlet temperature at the top of the bed.

In order to make sure the molecular sieves are properly regenerated, three points have to be checked:

1) The maximum temperature level at the inlet should reach a certain minimum: in general 210°C for 3A, 250°C for 4A when used for drying, 280°C for 5A and 13X when used for sweetening

2) The difference between inlet and outlet temperatures gives an indication of the quality of heat insulation. The temperature difference should not be more than 15-20°C (provided temperature probes are close to the vessel !)

3) The outlet temperature should show an almost constant value for between 30-120 minutes, depending on the vessel size and available time. This is necessary to be sure that the molecular sieves near the column walls are properly regenerated as well (heat losses)

Another important comment:

The temperature profiles above show a drying unit where little water is adsorbed on the sieves.

The right Figure shows a unit where a significant amount of water is adsorbed on the sieves: a more gentle temperature slope with an intermediate step can be seen.

If you want to make sure that your molecular sieve unit is well regenerated, do not hesitate to contact one of our specialists.

Do not miss the next issue: "How to choose the right Molecular Sieve?"