



Question of the month - January 2020

Which dew points are reached with an adsorber?

Residual moisture after adsorption

If a respiratory dryer is in use, the suctioned air is taken up by the desiccant. The system is protected in this way.

The drying efficiency depends on the desiccant, the air speed and the state of saturation of the adsorber.

The desiccant in silica gel has proven itself because the color indicator visually shows the state of saturation, the maximum water absorption capacity of 40% (the dry matter) is very high and the handling is harmless. As the load increases, the color change increases from bottom to top in the adsorber. In practice, complete discoloration takes place at approx. 33% of the dry matter.

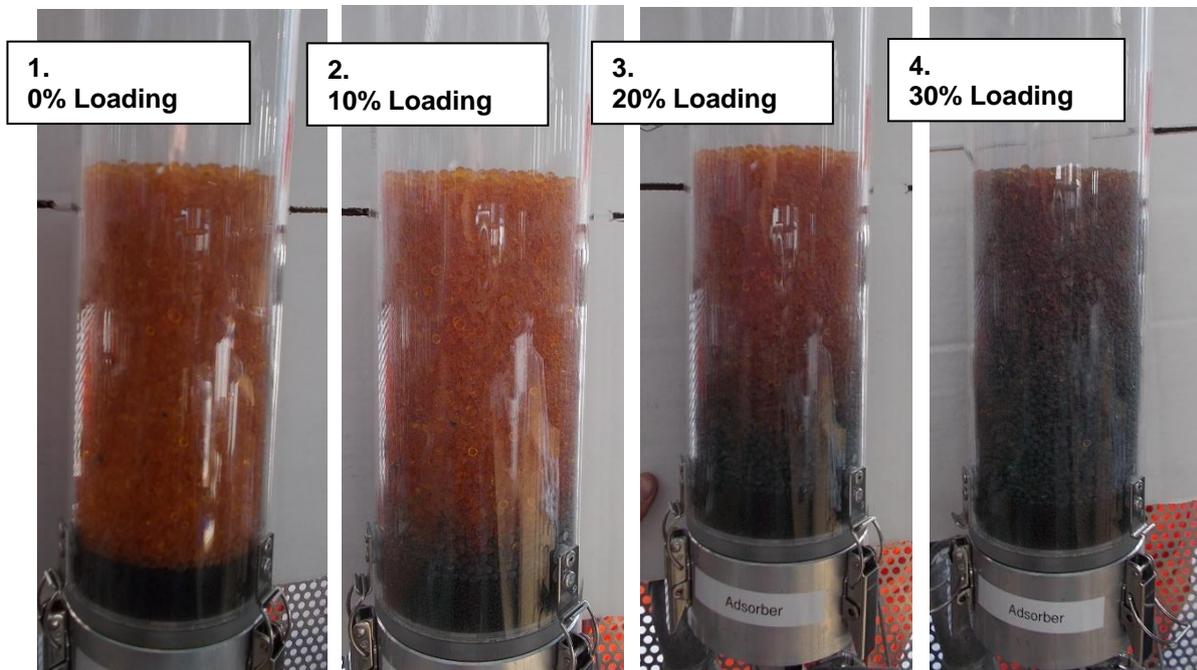


Figure 1: Adsorber with 1kg silica gel orange-green at different loading levels.

The residual air humidity after the flow through an adsorber is shown in the graphic below. It can be seen that this is approximately 0% RH at the beginning and increases with increasing satiety. It can



be clearly seen that when the load of 33% is reached, the residual air moisture rises and the system is unprotected.

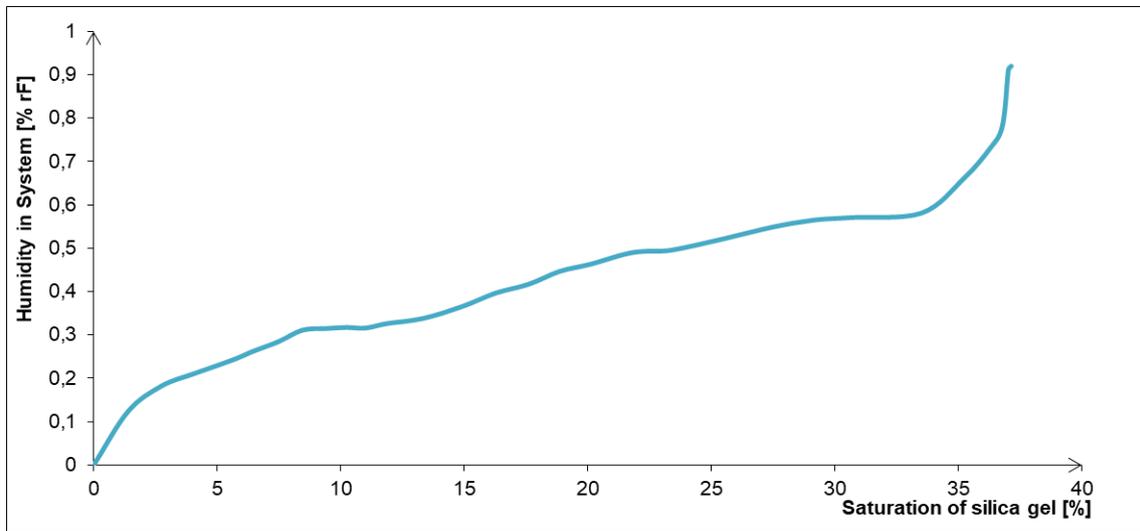


Figure 2: Air humidity after flowing through the adsorber (residual air humidity), with increasing loading of the adsorber.

In combination with the relative air humidity, which increasingly passes through the adsorber and penetrates into the system, the absolute water content also increases. Here, too, it can clearly be seen that the system is very well protected at the beginning with a fresh adsorber and that water is let into the system as the load increases.

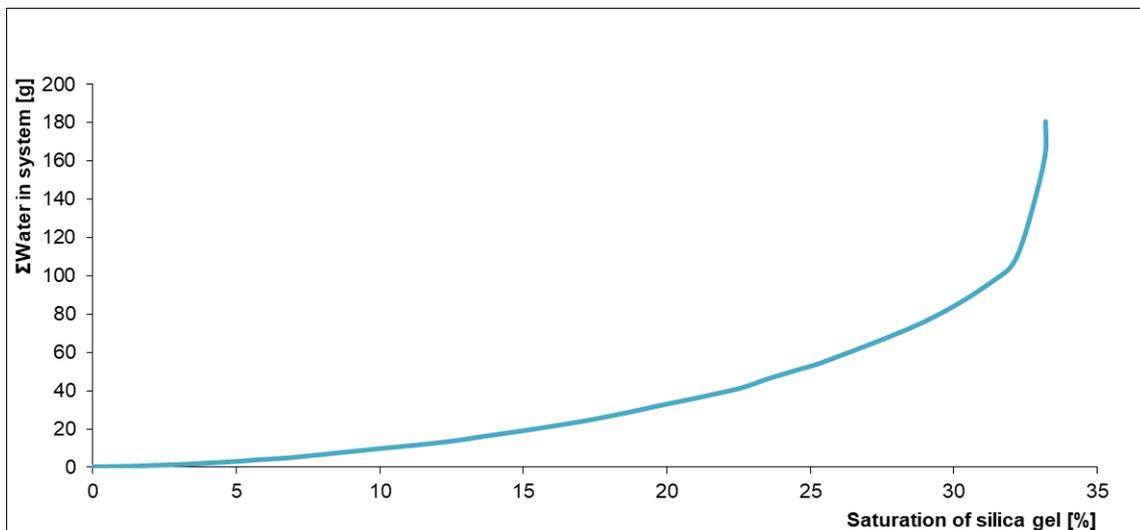


Figure 3: Water entry into the system after flowing through an adsorber, depending on the adsorber load.



Recommendations and handling

After installing an adsorber, residual air humidity of approximately 0% RH is achieved. This means that the **dew point at the beginning is approx. -40 ° C**. With a full load, i.e. a saturation of approx. 33% of the dry silica gel mass, the residual air humidity is approx. 40% RH and thus has a **dew point of approx. 6 ° C** (depending on the temperature).

When using a ventilation dryer, the time of the change is decisive. The sooner the adsorber is exchanged and fresh desiccant is used, the lower the dew point and the lower the amount of water entered.

For use on hydraulic units, gearboxes, storage tanks, drums and IBC containers, the change of an adsorber with complete discoloration, i.e. 33% loading, is the right time. **Up to this point, the entered amount of water and the dew point have no significant negative impact on the system.**

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