

4211 Determination of Moisture Adsorption Rate of Desiccants in Moisture-proof Combinational Caps

This standard applies to the determination of moisture absorption rate of desiccants in moisture-proof combinational caps with silica gel, macromolecular sieve, or a mixture of both, such as silica gel mixes macromolecular sieve (4:6), with paperboard as a barrier material.

Moisture adsorption rate The percentage of weight gained over initial desiccant sample after being placed under specified temperature and relative humidity conditions for a specified period.

Saturation moisture adsorption rate Moisture absorption rate measured after the weight gained by the desiccant sample reaches equilibrium.

Short-term moisture adsorption rate Moisture adsorption rate measured after the weight gained by the desiccant sample for a specified short period.

Environment The test shall be conducted at a temperature of $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$.

Apparatus Analytical balance, precision of 0.1mg. Temperature-humidity chambers capable of controlling temperature $\pm 2^{\circ}\text{C}$ and relative humidity $\pm 5\%$.

Determination

I Saturated moisture adsorption rate

Samples and methods In the environment with relative humidity not exceeding 75%, take out 5 finished caps from a sealed bag and weigh it precisely (W_0), place them in a temperature-humidity chamber at $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and relative humidity of $75\%\pm 5\%$, weigh them precisely (W_1) at regular intervals (every 24 hours or multiples thereof) until this reach equilibrium when two successive consecutive weighings do not differ by more than 3 mg/g of substance taken. Take out the desiccant which has absorbed moisture, wipe the paperboards and caps clean and weigh them together precisely (W_2). Calculate the saturated moisture adsorption rate according to the following formula, and take arithmetic mean value of the two parallel measurements.

$$\text{Saturated moisture adsorption rate} = \frac{W_1 - W_0}{W_0 - W_2} \times 100\%$$

Results and conclusions The saturated moisture adsorption rate of silica gel shall not be less than 30%, macromolecular sieve shall not be less than 19%, and silica gel mixes macromolecular sieve (4:6) shall not be less than 24%. The relative deviation of parallel measurements shall not be greater than 10%.

II Short-term moisture adsorption rate

Samples and methods In the environment with relative humidity not exceeding 75%, take out 5 finished caps from a sealed bag and weigh it precisely (W_0), place them in a temperature-humidity chamber at $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and relative humidity of $60\%\pm 5\%$ for 1 hour and then take them out to weigh precisely (W_1). Take out the desiccant which

38 has absorbed moisture, wipe the paperboards and caps clean and weigh them together
39 precisely (W_2). Calculate the short-term moisture adsorption rate according to the
40 following formula, and take arithmetic mean value of the two parallel measurements.

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$$\text{Short-term moisture adsorption rate} = \frac{W_1 - W_0}{W_0 - W_2} \times 100\%$$

42 **Results and conclusions** The short-term moisture adsorption rate of silica gel
43 shall not exceed 3%, macromolecular sieve shall not exceed 4.5%, and silica gel mixes
44 macromolecular sieve (4:6) shall not exceed 3.5%. The relative deviation of parallel
45 measurements shall not be greater than 10%.

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