Moisture vapor transmission

A moisture vapor transmission rate (MVTR) is a measure of the passage of water vapor through a material at a specified temperature and relative humidity.

In many industries, protection against moisture is a basic requirement when evaluating packaging alternatives. Controlled MVTR helps to achieve the required quality, safety and shelf life.

There are various methods to measure MVTR, ranging from gravimetric techniques that measure the gain or loss of moisture by mass, to very sophisticated instrumental techniques that can measure extremely low transmission rates. There are numerous standard methods described in ISO, ASTM, BS, DIN and other institutes, quite often industry specific.

Most critical MVTR guidelines can be found in the pharmaceutical industry. The recently revised USP Chapter <671> Containers Performance Testing describes a.o. a method for testing Multiple-Unit Containers for Solid Oral Dosage Forms. This applies to finished drug product packed in bottles for consumers. Therefor this recently revised USP chapter only covers performance testing for multiple-unit containers with an opening up to 132 mm. CurTec bulk packaging have diameters up to 400 mm.

Since there is no standard guideline for MVTR in industrial bulk packaging, CurTec made a declaration for moisture vapor transmission for each product line.

Tests are performed according to ASTM standard D 4279-95 Method B:
Containers are filled with desiccant (anhydrous calcium chloride) and closed according to manual. For duration of 35 days the containers are placed in a controlled 40o C, 90% RH environment. During that period the weight of the containers is measured on a weekly basis. From that data the average MVTR in mg/day/liter capacity is calculated.

According to USP <671> containers are ranked as 'tight containers' if results are < 100 mg / day / liter, which is the best performing defined level.

CurTec performs MVTR tests in the final phase of product development before market introduction and before approving any change in geometry, material or production process of packaging products. MVTR tests are not applied as standard quality measurement for individual production batches. Therefore results are to be seen as indications.

Small differences may occur due to tolerances in seal, wall thickness, exact point of closure, position in the climate chamber and so on. Based on many tests over a variety of different containers during many years CurTec products have proven to offer a very high level of protection to moisture.
Data from the original test reports per product line is available on request.

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