OTR & WVTR Test

The barrier properties of packaging are critical to the preservation of pharmaceutical products, and these properties depend on the transmission rate of gases through the material. Among the gases that have the greatest impact on the shelf life of packaged products are oxygen and water vapor.

What is OTR?

Oxygen transmission rate (OTR) is a measure of the amount of oxygen that passes through a substance in a given time period. OTR for plastic film materials is the steady-state rate at which oxygen passes through the film under specific conditions (temperature and relative humidity.) OTR is measured for different medical packaging material solutions, such as aluminum, plastics (rigid and flexible), etc. In food packaging, oxygen penetration through the package over time can lead to a food spoilage process called oxidation, so reducing the rate at which oxygen penetration occurs through customized material barrier structures that extend product shelf life is critical to maintaining food safety and quality.

What is MVTR?

Moisture (water) vapor transmission rate (MVTR/WVTR) is a measure of the amount of water vapor that passes through a substance in a given time period. Similar to OTR,

MVTR is measured under specific conditions, such as temperature and relative humidity, to replicate actual use conditions or to run accelerated tests to calculate shelf life.

OTR Measurement

To perform an OTR test, a barrier membrane or component is sealed in a chamber containing oxygen and a location free of oxygen, and a coulometric sensor measures the oxygen transported through the material at a selected temperature and humidity. The test is completed at the equilibrium or steady state point when the sensor detects a constant amount of oxygen in the empty chamber.

MVTR Measurement

For MVTR testing, the barrier film or part is sealed in a high humidity chamber between the contents (wet chamber) and the dry chamber, and a pressure modulated sensor then measures the moisture transported through the material at the selected temperature and humidity. The test is completed at the equilibrium or steady-state point when the infrared sensor detects water molecules leaving the drying chamber at a constant rate.

Selection of Test Conditions

The selection of test conditions is critical because results can vary greatly depending on temperature and humidity, so it is important to keep in mind the expected storage conditions of the product when making your selection. To determine the transport rate of a material to a specific gas, we can use a variety of methods. The sensor used allows the detection of only the molecules of the gas being measured without interfering with the rest of the gases present in the environment.

Testing Instruments

Permeation analyzers are used to test the permeability of packaging films and entire finished packages. Our analyzers provide oxygen transmission rate (OTR) and water vapor transmission rate (WVTR) testing for a variety of materials and packaging. Our permeation analyzers offer the highest repeatability and lowest detection limits for

OTR and WVTR measurements. This means better quality control of your packaging process and more confidence in your R&D results.

Source: https://www.formulationbio.com/otr-wvtr-test.html