ASTM D3985/F1927

OXYGEN TRANSMISSION RATE (OTR) TEST METHODS

Equivalent to ISO 15105-2, JIS K7126-2, GB/T 19789 and DIN 53380-3

Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using a Coulometric Sensor in Dry/Controlled Relative Humidity Environments

Where Used

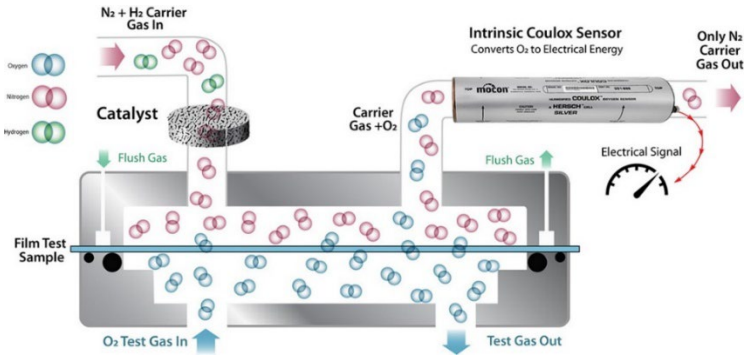
Evaluate materials for their barrier characteristics to oxygen gas. The method is used to optimize a product's shelf-life or use-life and helps with choosing the most appropriate materials.

Description

This test method analyzes the amount of oxygen (at steady state) that is permeating through a flat film (such as sidewall of a pouch) under dry (D3985) or humidified conditions (F1927).

- One side of the sample is challenged by an oxygen test gas (usually 100% O_2), while the other side of the sample is swept by a nitrogen carrier gas.
- Any transmitting oxygen gas through the sample is swept by the nitrogen gas to a coulometric detector, where the transmitting oxygen is measured.
- The common units for OTR are cc/(m^2 • day) or cc/(100in^2 • day).
- *For more details about ASTM D3985, please see Standard Test Method for Oxygen Gas Transmission Rate Through Plastic Film and Sheeting Using a Coulometric Sensor on the ASTM website.*
- *For more details about ASTM F1927, please see Standard Test Method for Determination of Oxygen Gas Transmission Rate, Permeability and Permeance at Controlled Relative Humidity Through Barrier Materials Using a Coulometric Detector on the ASTM website.*

Method Schematic (for both dry and humidified film testing) and Corresponding Instrument



OX-TRAN® 2/22

AMETEK MOCON 7500 Mendelssohn Ave N. Minneapolis, MN 55428 USA
info.mocon@ametek.com | www.ametekmocon.com
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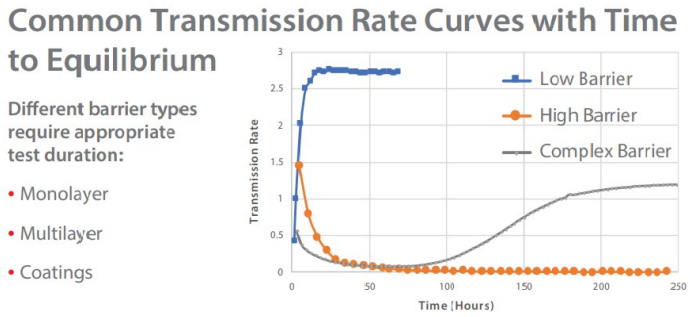
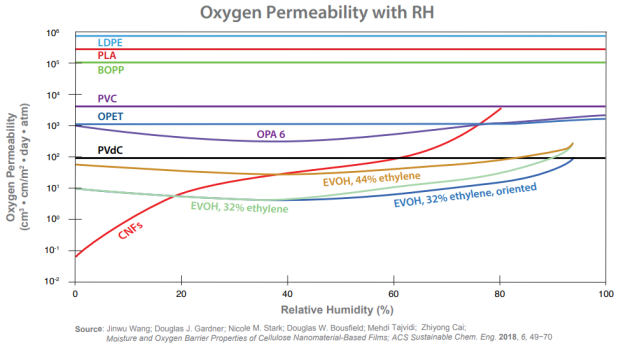
Note

MOCON® pioneered this test method and our patented Coulox® sensor is the most sensitive oxygen sensor for permeation testing. With our precise temperature, humidity, flow controls and calibration films, our instruments are the global standard for this test method. Learn more about OTR Permeation Analyzers by visiting our website.

Results

The transmission rate output is a graph of OTR vs time (which is key to verifying equilibrium) and data report. Transmission rate test duration can range from a few hours to a few weeks, depending upon the material's barrier characteristics. High temperatures lead to higher transmission rates and faster tests, while low temperatures yield lower transmission rate values and longer test durations. Additionally, moisture sensitive samples (e.g., EVOH, Polyimides and Coated Paper) have OTRs that are impacted by humidity. Knowing your product's need is important for optimizing the appropriate test environment.





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