PACKAGE TESTING AT AMBIENT OR IN AN ENVIRONMENTAL CHAMBER

Instrument and accessory setup and test procedures.

Background

This Technical Note will provide instruction on how to test package OTR and/or WVTR at ambient condition or inside an environmental test chamber with the MOCON® OX-TRAN® 2/22, 2/12 and PERMATRAN-W® 3/34 G.

Equipment and Accessories

1. OX-TRAN 2/22, 2/12 and PERMATRAN-W 3/34 G
2. Package Adapter Cartridge (P/N: 054-030, Fig. 1 below): The adapter is used to connect the instrument to a remote test cell for film or package mounting fixture for package testing. The removable cover is for easy interchange between film testing (cover on) and attached package testing (cover off).
3. Environmental Test Chamber: Chamber that generates for precise temperature and precise RH. One independently sourced example is the MEMMERT HPP 260, web link: www.memmert.com/products/climate-chambers
4. Copper tubing, Package Mounting Plates (P/N: 110-559 or 034-285), nuts and ferrules (additional quantity could be ordered at the time of the instrument accessory purchase).

Figure 1.
Package Adapter Cartridge.

Procedures

- Prepare the package test samples per traditional methods described in OX-TRAN Model 2/22, 2/12 or PERMATRAN-W 3/34 Operator's Manual (Fig 2).
- Alternatively, prepare package sample with special cartridges and PackRack® (Fig 2.) if ambient test condition is desired. Call for details about PackRack and related package test cartridges.
- For tests requiring controlled temperature and RH conditions, connect the assembled package samples in a chamber (Fig 3.) with the package adapter cartridge via copper tubing. Tubing will need to be routed through an entry port on the side wall of the chamber.
- Adjust the chamber settings to desired temperature and RH (example 70°C with 60% RH). Refer to independent Environmental Test Chamber Manual for guidance.

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TECHNICAL NOTE

- Test gas for OTR Testing: Room air of 20.9% O_2 with ambient temperature, or ambient air in the chamber with chamber generated RH used as test gas.
- Test Gas for WVTR Testing: 100% RH (water source in a bag to generate 100% RH), or chamber-generated RH used as the test gas.
- Example instrument parameter setup
  - Select “Advanced Test”
  - On the "Cell" screen, enter the "Sample ID" and the "Material ID" if applicable. Enable "Package" testing by checking the box. Turn "Conditioning" ON. Conditioning time will depend on the volume of your package. In general, purging at least 5x the package volume will remove the room air inside the sample to prevent saturating the detector. For example, with a package volume of 500 ml, 2.5 liters of gas should flow through the sample. Since the OX-TRAN® 2/22 uses a flow rate of 10 cc/min, the conditioning time should be approximately 4 hours. Users may choose the '"High Purge" function (having a flow rate of 200 cc/min) instead of "Conditioning".
  - On the "Test" screen, select "Continuous" for Test Mode and "None" for Individual Zero. Use an exam time of 20 – 60 minutes depending on the sample barrier level.
  - On the "Instrument" screen, enter the ambient or environmental chamber temperature and check the "Manual" box. This indicates that the test temperature was not instrument controlled. Enter the ambient RH, or chamber generated RH in the Test Gas RH field. Select "100% RH" if 100% RH is used for a WVTR test. Ensure the Instrument ReZero is "ON". Enter 2 for ReZero Frequency and the same number of minutes for the ReZero Exam time as entered for each sample.

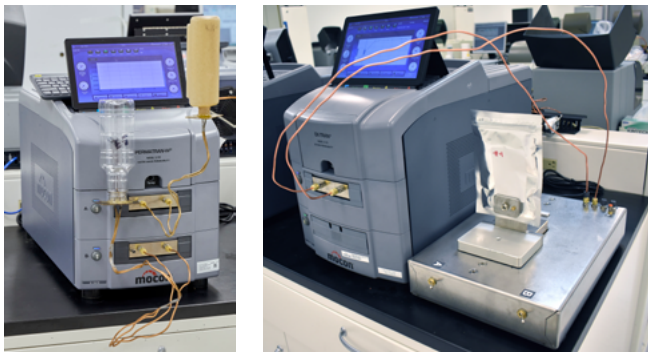

Figure 2. Samples are testing with ambient air.

Figure 3. Connect samples in a chamber.

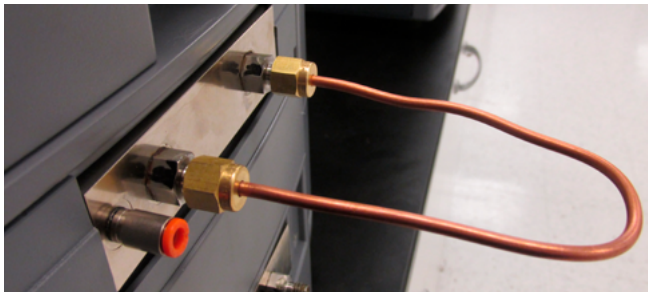

Figure 4. Attach a loop for testing baseline.

Important Notice:

- Do not perform Individual zero when the sample is surrounded by test gas such as ambient air, with generated RH or with 100% RH. Instead, perform a WVTR (or OTR) test for a copper tubing loop separately (Fig 4). Subtract the Loop WVTR (or OTR) value when it is necessary (such as when the sample’s TR is very low).
- N_2 carrier gas is always dry for above tests.

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TN-PPS-PPS-5011 Package OTR-WVTR Testing 0425-1.4

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