WVTR TESTING IN A CLOSED-BOTTOM REMOTE TEST CELL UP TO 85°C 100% RH WITH PERMATRAN-W® 3/34

Instrument / accessory setup and test procedures.

Summary

Detailed instructions are provided for using the Remote Film Test Cell to conduct WVTR (Water Vapor Transmission Rate) tests at 100% relative humidity and elevated temperatures within an environmental test chamber, utilizing the MOCON PERMATRAN-W® 3/34 G system.

Equipment and Accessories

1. MOCON PERMATRAN-W 3/34
2. Package Adapter Cartridge (P/N: 054-030, Fig. 1): 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. Remote Film Test Cell (P/N: 050-655, Fig. 2): Closed bottom for WVTR with 100% RH
4. Environmental Test Chamber: Chamber, which generates precise temperature and precise RH.
   Product Suggestion: One independently sourced environmental chamber is the MEMMERT Chambers: www.memmert.com/products/climate-chambers

Easy to follow steps help you with setup and test procedures

REMOTE CELL TESTING AT AMBIENT OR IN AN ENVIRONMENTAL CHAMBER

Equipment and Accessories, continued

5. Copper tubing, nuts and ferrules. (Additional quantity could be ordered at the time of the instrument accessory purchase).
6. HPLC grade water

Procedures

- Trim the film sample to fit within the Remote Film Test Cell (about 93mm x 93mm).
- Add HPLC water into the bottom of the test cell to create 100% RH test gas (Fig. 3).
- Make sure two pieces of curled tubing are installed at the lower portion of the Remote Film Test Cell (The curled tubing releases the pressure built-up during the test cell initial heating).
- Load the sample into the Remote Film Test Cell and clamp the test cell into place.
- Place the Remote Film Test Cell inside the environmental test chamber (Fig. 2).
- Load the Package Adapter Cartridge into the Instrument (Fig. 1 or see PERMATRAN-W 3/34 Operator's Manual). Leave the tray open for the next step.
- Connect the Remote Film Test Cell and the Package Adapter Cartridge via copper tubing (Fig. 4).
- Close the Chamber and the trays on the instrumentis used as test gas.
- Adjust the chamber to desired temperature(e.g. 40˚C. Refer to independent environmental test chamber manual for guidance.
- Verify the chamber temperature by using a thermal couple or other temperature meters.
- The following steps are instrument parameter setup for PERMATRAN-W 3/34 (just an example for reference):
  - Select "Advanced Test"
  - Under "Cell", enter the test "Sample Id", "Thickness", test "Area" and "Thickness", etc. Select "OFF" for High Purge and Conditioning

Figure 1. Package Adapter Cartridge

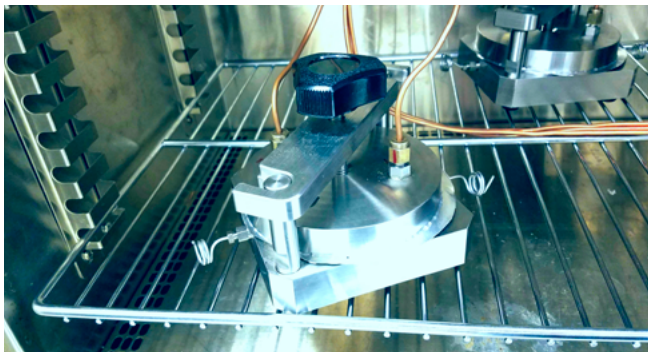

Figure 2 - Remote test cell (closed bottom)

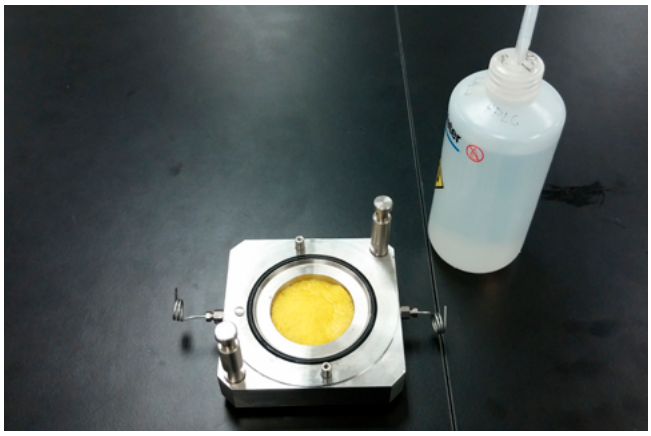

Figure 3 - Water added into the remote cell

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- Under "TEST", select "Continuous" for Test Mode, "OFF" for individual zero, Exam Time for 45 mins (or whatever is proper depending on the barrier level).
- Under "Instrument", enter Cell Temperature 40°C (your samples' actual temperature are controlled by the chamber. Add notes regarding actual Temperature). Enter "On" for ReZero, Frequency "2" (or other number if your samples have higher TR). Enter "OFF" for Sequential Test 11
- Press "Start All" to initiate the testing

• Continuously test until equilibrium

• MOCON encourages the use of external temperature/RH probes to verify the chamber settings

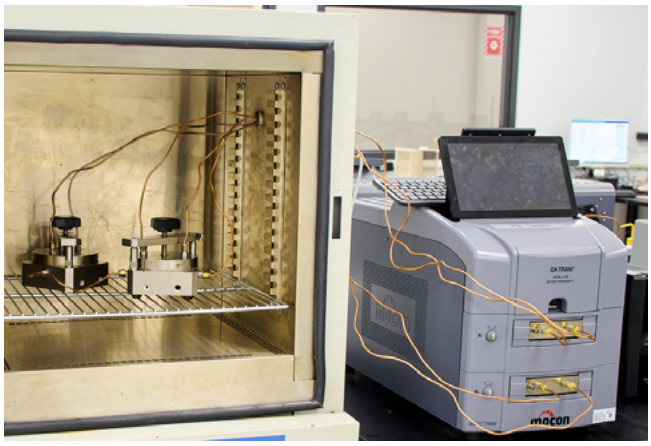

Figure 4 - Remote cells and instrument are connected

Important Notice:

• Do not perform individual zero when the sample and water are in the remote test cell. Instead, perform a WVTR test for a perfect sample (e.g. aluminum foil) separately. Subtract the Aluminum Foil WVTR value when it is necessary (such as when the sample's WVTR is very low). WVTR (or OTR) value when it is necessary (such as when the sample's TR is very low).

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TN-PPS-5013-WVTR at High Temp with closed bottom cell-0325-1.1

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