

# OTR TESTING IN A CLOSED BOTTOM REMOTE TEST CELL AT HIGH TEMPERATURES

Instrument / accessory setup and test procedures.

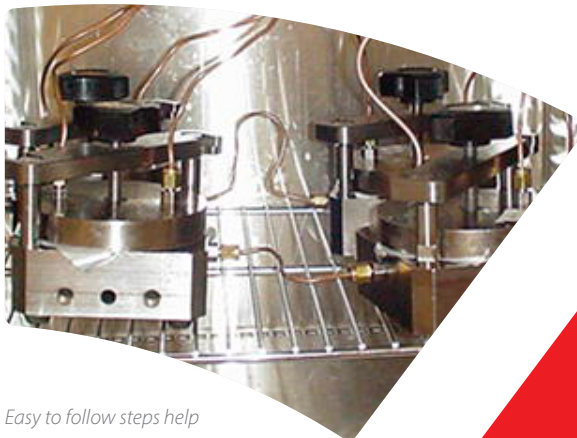
## Summary

This purpose of this procedure is to provide instruction on how to use Remote Film Test Cell for dry OTR test at high temperatures in an Environmental Test Chamber with the MOCON<sup>®</sup> OX-TRAN<sup>®</sup> 2/22 and OX-TRAN 2/12. The O<sub>2</sub> test gas source is supplied by a dry tank gas such as 20.9%, 100% or other concentrations.

Note: Some companies may limit the use of 100% O<sub>2</sub> as a test gas for safety concerns.

## Equipment and Accessories

1. MOCON OX-TRAN 2/22 or OX-TRAN 2/12
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 analysis or a 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 (part number 051-014, Fig. 2): Closed bottom for OTR with dry O<sub>2</sub>
4. Environmental Test Chamber: Chamber which controls precise temperature and precise RH. Product suggestion: One independently sourced environmental chamber is the MEMMERT Chambers:  
[www.memmert.com/products/climate-chambers](http://www.memmert.com/products/climate-chambers)



*Easy to follow steps help you with setup and test procedures.*

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## Equipment and Accessories, continued

5. Copper tubing, nuts and ferrules. (Additional quantity could be ordered at the time of the instrument accessory purchase.)
6. Oxygen tank with regulator
7. Flow valve and flow meter

## Procedures

- Trim the film sample to fit within the Remote Film Test Cell (about 93mm x 93mm).
- Load the sample into the Remote Film Test Cell and clamp the top of the cell in place.
- Place the Remote Film Test Cells inside the Environmental Test Chamber (Fig. 3).
- Install two pieces of copper tubing at the lower portion of each Remote Film Test Cell to allow test gas ( $O_2$ ) to flow throughout every connected cell; while having longer tubing on the last connected cell to exit outside of the chamber.
- To supply the dry oxygen test gas, use an external Oxygen source (Example:  $O_2$  tank with pressure regulator) along with a flow control valve, adjust the flow rate about 10 cc/min.
- Load and engage the Package Adapter Cartridges into the Instrument (Fig. 1 or see MOCON OX-TRAN 2/22 Operator's Manual).
- Connect the carrier gas side (upper portion) of the Remote Film Test Cell and the Package Adapter Cartridge via copper tubing (Fig. 3 and Fig. 4).
- Close the chamber.
- Adjust the chamber to desired temperature. Refer to independent environmental test chamber manual for guidance.
- Verify the Chamber temperature by using a thermal couple or other temperature meters.



Figure 1 - Package Adapter Cartridge

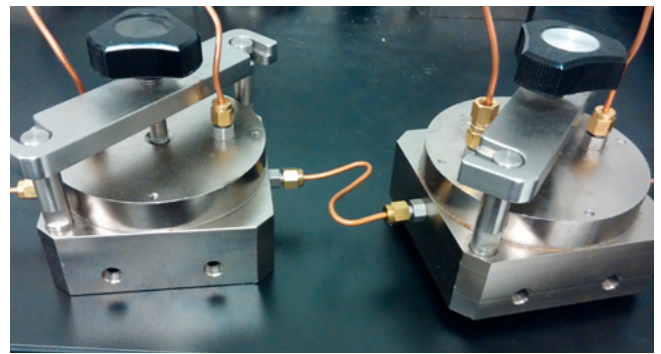


Figure 2 - Remote test cell (closed bottom)



Figure 3 - Remote cells in chamber

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- The following steps are for instrument parameter setup on the OX-TRAN 2/22 Test Setup Screen (for example):
  - Select "Advanced Test".
  - Under "Cell", enter the test "Sample ID", "Thickness", "Area" and "Thickness", etc. Select "OFF" for High Purge and Conditioning.
  - 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 is 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.

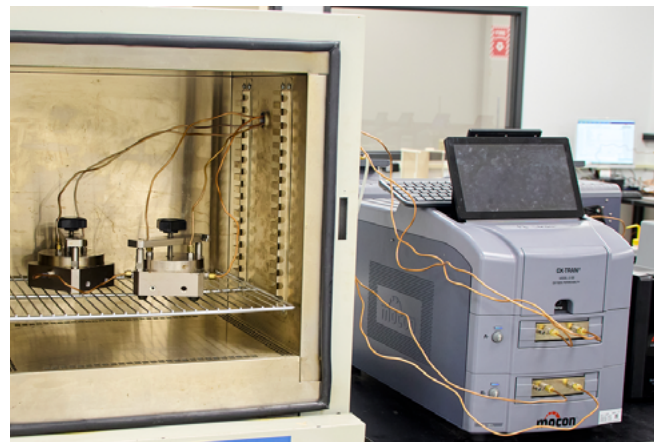


Figure 4 - Remote cells and instrument are connected

## Important Notice:

- Do not perform Individual Zero when the sample and oxygen are in the bottom of the Remote Film Test Cell. Instead, perform an OTR test for an aluminum foil separately. Subtract the aluminum foil OTR value when it is necessary (such as when the sample's OTR is very low).
- Make sure O<sub>2</sub> test gas is not released inside the chamber. Instead, release the oxygen outside of the chamber via copper tubing.