

# ABSOLUTE WATER VAPOR PERMEATION MEASUREMENT REDUCES OLED R&D CYCLE

Testing the WVTR of your ultra-barrier material is critical to provide adequate and reliable water vapor protection of moisture sensitive electronics such as OLEDs and other flexible displays. We discuss an application solution for this process.

## Challenge

Organic light-emitting diode (OLED) display manufacturers are transitioning from glass, which is impervious to water vapor, to high tech polymer technology in order to reduce cost and increase durability while building smaller, lighter weight and flexible OLED displays.

However, the electronic components within OLED displays are extremely sensitive to water vapor. The slightest exposure to humidity can cause a series of problems that significantly decrease a display's usable life. These problems include the formation of metal oxides that separate cathode or anode from the organic in a matrix, resulting in the formation of dark, non-emitting spots or edge-shortening that reduces the illuminating potential of a display device.



# EXPOSURE TO HUMIDITY CAN CAUSE A SERIES OF COSTLY PROBLEMS

Using ultra-barrier materials to provide adequate water vapor protection is crucial. A water vapor transmission rate (WVTR) through the protective layer of  $1 \times 10^{-6}$  g/(m<sup>2</sup> · day) has become the accepted industry target to achieve a device lifetime of at least 10,000 hours.

Alternative “calcium testing” techniques used to measure WVTR in the OLED display industry are qualitative, and do not differentiate between oxygen and water permeation. Calcium testing also takes a long time to obtain results, causing delays for OLED display manufacturers in developing new products.

## Solution

The MOCON AQUATRAN® Model 3 conforms to ISO 15106-3, and features an absolute Coulometric sensor (AQUATRACE® Gold) that has been proven to measure a WVTR level down to  $5 \times 10^{-5}$  g/(m<sup>2</sup> · day).

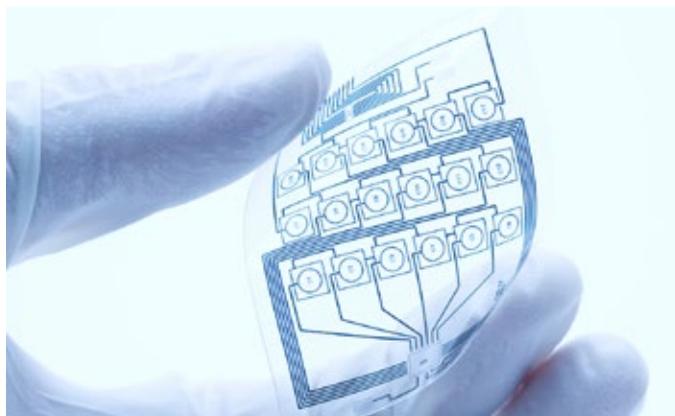
The AQUATRAN Model 3 measures each molecule of water vapor that passes through the sensor, and requires no calibration. The response is linear throughout the entire measurable range of the sensor, so measurements of ultra-barrier materials are guaranteed to be highly accurate and repeatable.

## Benefits

The absolute quantitative WVTR measurements that the AQUATRAN Model 3 provides are objective and much more accurate than subjective, manual methods. In addition to its smart feature designs, the AQUATRAN Model 3 also provides faster measurement results with reduced labor involvement.

This enables OLED display manufacturers to develop their products more quickly and bring products to market faster than competitors.

**For more information on absolute WVTR permeation measurement, contact your MOCON representative.**



*Flexible electronic circuit*



*Flexible OLED displays*

