

## Modular systems for precision water vapor analysis of packaging film barriers



### Applications

Barrier films    PET bottles    Containers    Closures    Flexible Pouches    Bags

### Features & Benefits

- Analytical Systems Manufactured traceable to NIST.
- System validation with certified gas or film for speed and convenience.
- Over 25 yrs experience of Proprietary Coulometric  $P_2O_5$  sensor.
- Absolute moisture measurement - No calibration required.
- Wide measurement range.
- Flow, temperature and humidity control for ultimate responsiveness and repeatability.
- Intuitive Windows based software.
- For medical and pharmaceutical permeation testing, we can now offer software which conforms to 21CFR Part 11.
- No liquid coolants, catalysts or special gas mixtures required.

## Manufacture traceable to NIST

All Systech Illinois analyzers are certified traceable to NIST. In addition, analytical performance is validated using NIST certified gases and NIST traceable films. A set of validation films and a spare P<sub>2</sub>O<sub>5</sub> sensor comes as standard with all of the water vapor permeation analyzers.

## P<sub>2</sub>O<sub>5</sub> Sensor Technology

The two most common sensor types for measuring moisture are IR (infra-red) and P<sub>2</sub>O<sub>5</sub> (phosphorous pentoxide). The P<sub>2</sub>O<sub>5</sub> sensor is more sensitive and stable than IR and does not require calibration. P<sub>2</sub>O<sub>5</sub> is the primary method for absolute moisture measurement. Illinois have over 25 years experience of using P<sub>2</sub>O<sub>5</sub> and IR sensor technology.

\*The Systech Illinois 7000 series analyzers comply with ASTM standard F-1249 with the exception of the sensor technology. The standard relates to an infrared sensor whilst the Systech Illinois analyzer uses a coulometric sensor - a dedicated method of moisture analysis.

## Wide measurement range

The 7000 series offer a wide measurement range providing research grade flexibility.

- Measurement range of 0.002-1000 g/m<sup>2</sup>/day for films with masking.
- Quality Assurance oriented speed and agility.
- Up to five expansion modules available to increase testing throughput.



## Precision control

These analyzers offer precision temperature and humidity flow control providing ultimate responsiveness and repeatability.

- Test gas and carrier flow gas controlled by premium electronic mass flow controllers.
- Accurate relative humidity range from 20% to 90%.
- Wide sample temperature range of 41 to 122°F (5 to 50°C).

## Laboratory Testing Services

Our test laboratory will perform your Permeation Testing Analysis. Whether you are developing innovative materials and packages or validating that your supplier is meeting specification. We can exceed your expectations with:

- Competitive Prices
- Independent non-biased results
- Fast Turnaround
- 30 Years Experience

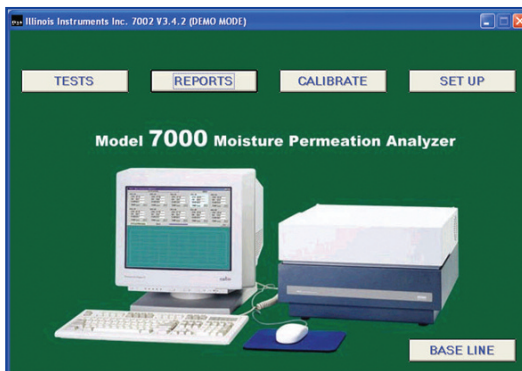


## Software

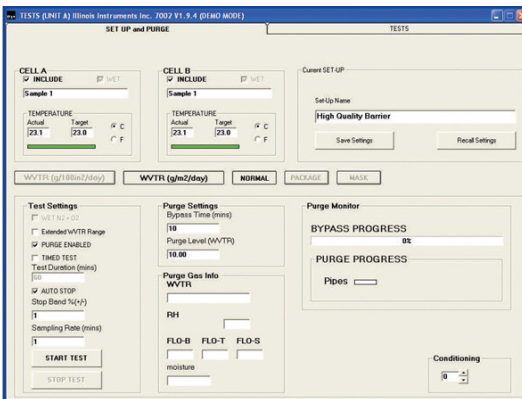
The intuitive Windows based software offers:

- Easy input and recall of operating parameters and test protocols.
- User-friendly data tracking, searches, sorts, storage and output capabilities.
- Graphical representation of measurement data in real time.
- Auto-stop feature stops test when samples have reached equilibrium or by user entered elapsed time value.
- Complete system diagnostics.

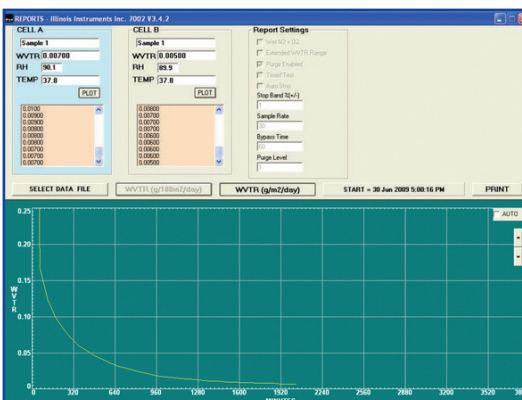
## Start up



## Set up



## Actual data

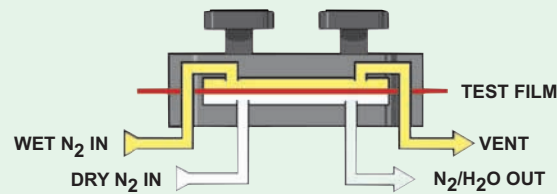


## Principle of Operation

Utilising our proprietary sensor technology to detect water vapor transmission rates, samples are clamped or attached to a diffusion chamber. Wet nitrogen is then introduced into the upper half of the chamber while a moisture-free carrier gas flows through the lower half.

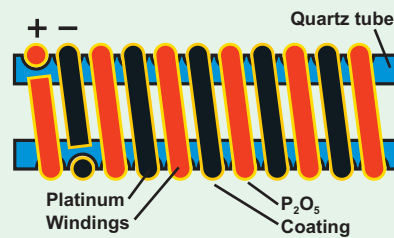
Molecules of water diffusing through the sample into the lower chamber are conveyed to the sensor by the carrier gas.

### Sample Test Chamber



This allows a direct measurement of the water vapor without using complex extrapolations. Water vapor transmission rate of the test sample is displayed as either  $\text{g/m}^2/\text{day}$  or  $\text{g}/100\text{in}^2/\text{day}$ .

### P<sub>2</sub>O<sub>5</sub> Sensor



To achieve an absolute measure, the technology draws upon a fundamental principle of physics.

The phosphorous pentoxide ( $\text{P}_2\text{O}_5$ ) moisture sensor consists of a dual platinum winding formed around a quartz tube.

The change in the resistance across the windings creates a change in the measured current. According to Faraday's Law this is directly proportional to the amount of moisture in the gas stream.

## 7000 Series - Water Vapor Permeation Analyzers

System Illinois' range meets the requirement for the testing of any application.



Systech Illinois' 7002 Water Vapor Transmission Analyzer delivers the same high performance as the 7001 but with an extended measurement range for more demanding applications.

### Technical Specifications

#### Measurement Range

7001	Film Unmasked	0.002 to 10 g/m <sup>2</sup> /day
	Film Masked	0.02 to 70 g/m <sup>2</sup> /day
	Package	0.00001 - 0.05 g/pack
7002	Film Unmasked	0.002 to 70 g/m <sup>2</sup> /day
	Film Masked	0.02 to 1000 g/m <sup>2</sup> /day
	Package	0.00001 - 0.05 g/pack at 10 cc flow, up to 0.5 g/pack at 50 cc flow
Test Temperature Range		41°F to 122°F (5°C to 50°C)
Test RH Range		20 to 90% RH
Sample Size		50cm <sup>2</sup> , adapters available for smaller samples

#### Operating Conditions

Operating Conditions	Standard laboratory environment
Power Requirements	100-240 VAC, 50/60Hz, 840 VA (max)
Supply Pressure	1.7 bar regulated
Gas Fittings	1/8 in. Swagelok (supplied)
Enclosure	Epoxy coated heavy gauge steel
Dimensions	20.98 x 20.98 x 12 (inches)
Weight	52 lbs

#### Options

Expansion Modules 7011 (Up to 5 modules can be linked)	Available for simultaneous WVTR analysis of up to 12 samples
Environmental Chambers	For finished package testing under special conditions

Systech Illinois have over 30 years experience of providing analysis solutions for a wide range of industries. From our manufacturing plants in the U.S and UK we produce gas analyzers for industrial process industries, headspace analyzers for monitoring gas flushing of food products, and our range of permeation analyzers.

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