

The standard for oxygen  
transmission rate testing of  
flat films & finished packages.  
Only MOCON instruments comply  
with ASTM D-3985

OX-TRAN® Model 2/21



**mocon**®

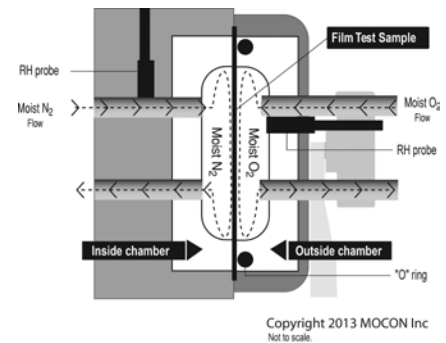
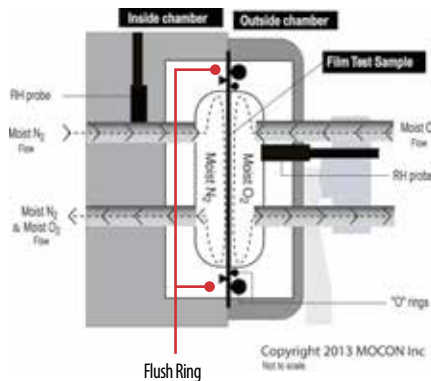
# Principle of Operation

Setting the worldwide standard for permeation testing, the OX-TRAN Model 2/21 system uses a patented coulometric sensor (Coulox®) to detect oxygen transmission through both flat materials and packages. This high performance sensor provides parts per-billion sensitivity even in the presence of water vapor. The Coulox sensor is an intrinsic or absolute sensor that does not require calibration. N.I.S.T. films are available to ensure the entire system is performing to the highest MOCON standards in precision and accuracy. Flat film samples are clamped into the diffusion cell, which is then purged of residual oxygen using an oxygen-free carrier gas. The carrier gas is routed to the sensor until a stable zero has been established. Pure (99.9%) oxygen is then introduced into the outside chamber of the diffusion cell. Molecules of oxygen diffusing through the film to the inside chamber are conveyed to the sensor by the carrier gas.



TruSeal Test Cell (10x module only)

Standard Test Cell









Only MOCON systems comply with the following standards:  
 ASTM D-3985 films  
 ASTM F-1927 films  
 DIN 53380-3 films  
 JIS K-7126-B films  
 ASTM F-1307 packages  
 ISO CD 15105-2  
 CFR21 Part 11 Compliant  
 validation services are available

# Master Control Systems to fit your application and budget.

Consider the OX-TRAN Model 2/21's flexibility for your application. Choose from six Master Control Systems and six Satellite Modules, each providing different test capabilities. Combine a Master Control System with as many as nine Satellite Modules for a maximum of 20 test cells per system. Each module contains the Coulox® oxygen sensor for high accuracy and maximum throughput.







START WITH ONE...

## Master Control Systems (each contains two test cells)

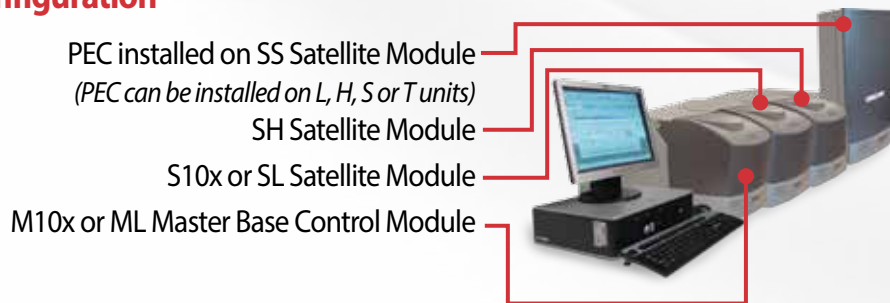
 <p><b>M10x</b></p> <p><small>New 10 times greater sensitivity</small></p>	OR	 <p><b>ML</b></p>	OR	 <p><b>MH</b></p>	OR	 <p><b>MS</b></p>	OR	 <p><b>MD</b></p>	OR	 <p><b>MT</b></p>
<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 1</li> <li>• Precise control of relative humidity</li> <li>• Temperature control 10 C to 40 C</li> <li>• Computer and printer</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 2</li> <li>• Precise control of relative humidity</li> <li>• Temperature Control 10 C to 40 C</li> <li>• Computer and printer</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 3</li> <li>• Precise control of relative humidity</li> <li>• Temperature Control 10 C to 40 C</li> <li>• Computer and printer</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 4</li> <li>• Temperature Control 5 C to 50 C</li> <li>• Computer and printer</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 4</li> <li>• Temperature Control 20 C to 50 C</li> <li>• Computer and printer</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 5</li> <li>• Computer and printer</li> </ul> <p><small>*Currently not available with N.I.S.T. Certification</small></p>

AND FROM THE CHOICES BELOW, UP TO 9 SATELLITE MODULES CAN BE ADDED— NOW OR LATER...

## Satellite Modules (each contains two test cells, up to nine modules per Master Base)

 <p><b>S10x</b></p> <p><small>New 10 times greater sensitivity</small></p>	OR	 <p><b>SL</b></p>	OR	 <p><b>SH</b></p>	OR	 <p><b>SS</b></p>	OR	 <p><b>SD</b></p>	OR	 <p><b>ST</b></p>
<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 1</li> <li>• Precise control of relative humidity</li> <li>• Temperature control 10 C to 40 C</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 2</li> <li>• Precise control of relative humidity</li> <li>• Temperature Control 10 C to 40 C</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 3</li> <li>• Precise control of relative humidity</li> <li>• Temperature Control 10 C to 40 C</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 4</li> <li>• Temperature Control 5 C to 50 C</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 4</li> <li>• Temperature Control 20 C to 50 C</li> </ul>		<ul style="list-style-type: none"> <li>• Dual film test cell module</li> <li>• O<sub>2</sub>TR Test Range 5</li> </ul> <p><small>*Currently not available with N.I.S.T. Certification</small></p>

## Sample Module Configuration



# Plus additional Satellite Modules allow you to design and E-X-P-A-N-D your own system.

**WinPerm™ and optional PERM-NET™ software further speed analysis, assure accuracy and incorporate more data handling capabilities.**

MOCON's OX-TRAN systems are the only OTR systems that comply with ASTM D-3985. For more information go to [www.astm.org/Standards/D3985.htm](http://www.astm.org/Standards/D3985.htm)

## **WinPerm Features:**

- Quickstart for fast test initiation using standard or user defined test conditions
- Automatic conversion of test data to Excel® format
- Ability to print detailed single test results or summary report of the current test

## **Integrated Software**

- Sophisticated Windows® based software control with high speed computer & printer (WinPerm included in system)
- Up to 10 modules (20 test cells) can be incorporated
- Computer-determined equilibrium and barometric pressure compensation
- Double-cell film testing mode for increased sensitivity
- Linkable to PERM-NET™, MOCON's optional test and data management system





# From the leader in permeation testing for almost 50 years.



## RH Control with Sensor at Test Site

Digital pressure and flow controls allow for simple “set and forget” relative humidity generation. A single setting achieves critical “real world” RH conditions quickly and precisely with minimal operation involvement – and the RH sensor is directly at the sample site to assure accurate, error-free testing conditions.



## 2 Test Cells in every Module

Test in duplicate, increase throughput and verify results.



## TruSeal™

TruSeal ensures a perfect leak-free seal between film and instrument every time by incorporating a nitrogen flush ring at the perimeter of the seal. Just one part of the technology that enables the 10x module to be 10 times more sensitive than any other module. (10x modules only)



## Indicator Lights

Enables you to determine the status of the test cycle at a glance.



## Patented Coulox® Sensors

The 2/21 family offers 5 distinct levels of sensitivity with patented Coulox sensors.

Coulox sensors are absolute sensors that follow Faradays law and require no calibration. The proprietary design of the Coulox sensor allows 100% of the oxygen transmitting through the film to be read by the sensor, assuring precision and accuracy over the entire usable range. For this reason only MOCON's OX-TRAN systems comply with ASTM D-3985.

For more information go to [www.astm.org/Standards/D3985.htm](http://www.astm.org/Standards/D3985.htm)



## Package Environmental Chamber (PEC)

- Package testing under select environments
- Compatible with any Master or Satellite L, H, S, or T module

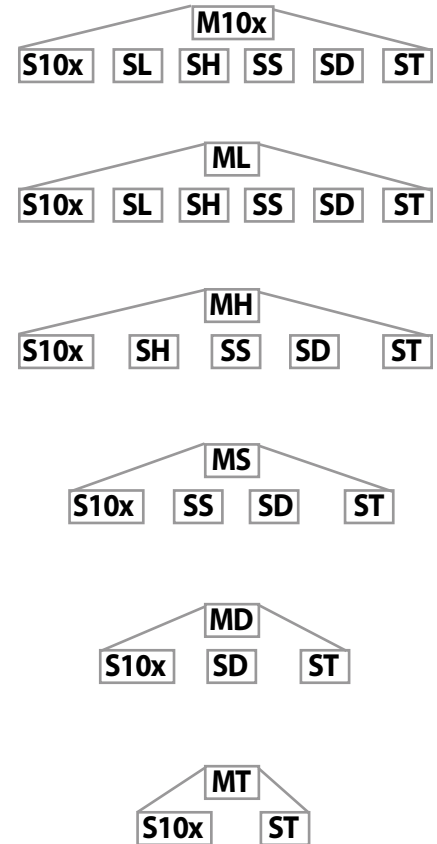
# OX-TRAN® Model 2/21 Specifications

	M10x	S10x	MD	SD	MS	SS	MH	SH	ML	SL	MT	ST
<b>O<sub>2</sub>TR Test Range:</b>												
O <sub>2</sub> TR Test Range 1*	X	X										
O <sub>2</sub> TR Test Range 2*									X	X		
O <sub>2</sub> TR Test Range 3*							X	X				
O <sub>2</sub> TR Test Range 4*			X	X	X	X						
O <sub>2</sub> TR Test Range 5*											X	X
<b>Test Temperature Range:</b>												
20 C to 50 C			X	X								
5 C to 50 C					X	X						
10 C to 40 C	X	X					X	X	X	X		
10 C to 35 C											X	X
<b>Standard Testing:</b>												
Films – Dry or Ambient	X	X	X	X	X	X	X	X	X	X	X	X
Packages – Dry or Ambient	X	X	X	X	X	X	X	X	X	X	X	X
Films of Packages at unknown wet RH											X	X
<b>Controlled RH Testing:</b>												
Films – 0%, and 35% to 90% RH ±3%	X	X					X	X	X	X		
Packages – 0%, and 35% to 90% RH ±3%	X	X					X	X	X	X		
<b>Test Sample Size:</b>												
Films 5 in. x 5 in. (12.7 cm x 12.7 cm)											X	X
Films 4.25 in x 4.25 in. (10.8 cm x 10.8 cm)	X	X	X	X	X	X	X	X	X	X		
Packages – Up to 3 liters per package	X	X	X	X	X	X	X	X	X	X		
Controlled RH – Up to 2 liters per package	X	X					X	X	X	X		
RH Plus Easy RH Control	X	X					X	X	X	X		
Test Cells per Module – 50 cm <sup>2</sup> Test Cells	X	X	X	X	X	X	X	X	X	X	X	X
Expandable up to 10 modules (20 test cells)	X		X		X		X		X		X	
Computer, Monitor, Printer and WinPerm™ Software	X		X		X		X		X		X	
Automatic Temperature Monitor & Control	X	X	X	X	X	X	X	X	X	X	X	X
Barometric Pressure Compensator (optional)	X	X	X	X	X	X	X	X	X	X	X	X

## \*O<sub>2</sub>TR Test Ranges

		cc/(m <sup>2</sup> · d)	cc/(100 in <sup>2</sup> · d)	cc/(pkg · d)
O <sub>2</sub> TR Test Range 1	Unmasked	0.0005 to 200	0.00003 to 13	0.0000025 to 1.0
	Masked	0.005 - 2,000	0.0003 to 130	N/A
O <sub>2</sub> TR Test Range 2	Unmasked	0.005 to 200	0.0003 to 13	0.000025 to 1.0
	Masked	0.05 to 2,000	0.003 to 130	N/A
O <sub>2</sub> TR Test Range 3	Unmasked	0.05 to 200	0.003 to 13	0.00025 to 1.0
	Masked	0.5 to 2,000	0.03 to 130	N/A
O <sub>2</sub> TR Test Range 4	Unmasked	0.1 to 200	0.006 to 13	0.00050 to 1.0
	Masked	1.0 to 2,000	0.06 to 130	N/A
O <sub>2</sub> TR Test Range 5	Unmasked	775 to 155,000	50 to 10,000	7.75 to 1,550

## Module Combinations



This instrument is ETL listed. Conforms to UL Std 61010A-1. Certified to CAN/CSA C22.2 No. 1010.1. Complies with CE Product Safety, electromagnetic emission & susceptibility.

## MOCON® Commitment

These analytical instruments are another example of MOCON's long-standing commitment to innovation and quality in the support of our customers.

## Technical Support & Service

MOCON offers a variety of technical services designed to provide you with first class support. Whether you require technical support, next-day spare parts delivery, on-site training, N.I.S.T. certification or "turn-key" validation, our staff can tailor a service program to fit your needs. Our goal is to provide the best in product support services.

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