PERMEATION

Automatic Relative Humidity Generation

PERMATRAN-W® Model 3/33

The Standard for Water Vapor Transmission Rate Testing
of Flat Films, Finished Packages and Components

MG Plus and SG Plus with automatic relative humidity generation

Easy control of variables such as temperature and humdity

Systems Certified
Traceable to N.I.S.T.

Only MOCON systems comply with the following standards:

ASTM F-1249
TAPPI T557
JIS K-7129

21CFR Part 11 Compliant

mocon®

All Masters include...

Computer, Printer and WinPerm™ Permeability Software

- *High speed Computer & Printer*
- *Up to 10 modules (20 test cells) can be incorporated*
- *Windows® based software control*
- *Computer-determined equilibrium*
- *Double-cell film testing mode for increased sensitivity*
- *RS-232C output*

Package Environmental Chamber (PEC)

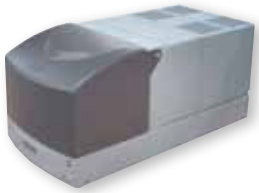
- *Package testing under precise temperature and relative humidity environments*
- *Compatible with any Master or Satellite G or W module*

Direct Measurement System

Consider the PERMATRAN-W® 3/33's flexibility in your application. Choose from three Master Base Control Systems and three Satellite Modules, each providing different test capabilities. Combine a Master Base Control System (which includes a computer, printer and software) with as many as nine Satellite Modules for a maximum of 20 test cells per system.

Master Base Control Systems (each contains 2 test cells)

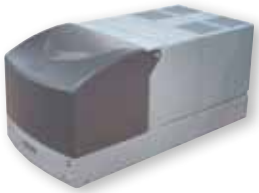
MG Plus



- Dual film test cell module
- Automatic generation of relative humidity
- Temperature control 5 C to 50 C
- Built-in reference cell
- Computer, printer and WinPerm™ Permeability Software

OR

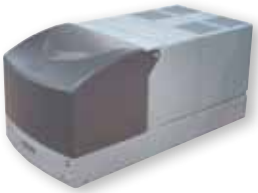
MW



- Dual film test cell module
- Temperature control 5 C to 50 C
- Built-in reference cell
- Computer, printer and WinPerm™ Permeability Software

OR

MA

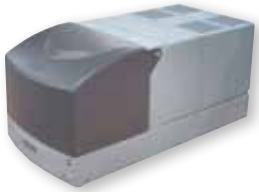


- Dual film test cell module
- Temperature control from 5 C above ambient to 50 C
- Built-in reference cell
- Computer, printer and WinPerm™ Permeability Software

V Add up to 9 application modules - Now or later...

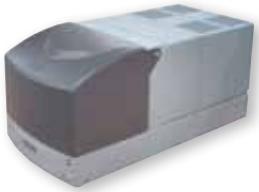
Satellite Application Modules
(each contains 2 test cells)

SG Plus



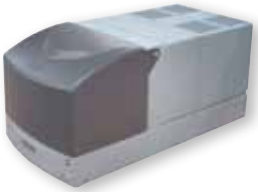
- Dual film test cell module
- Automatic generation of relative humidity
- Temperature control 5 C to 50 C
- Built-in reference cell

SW



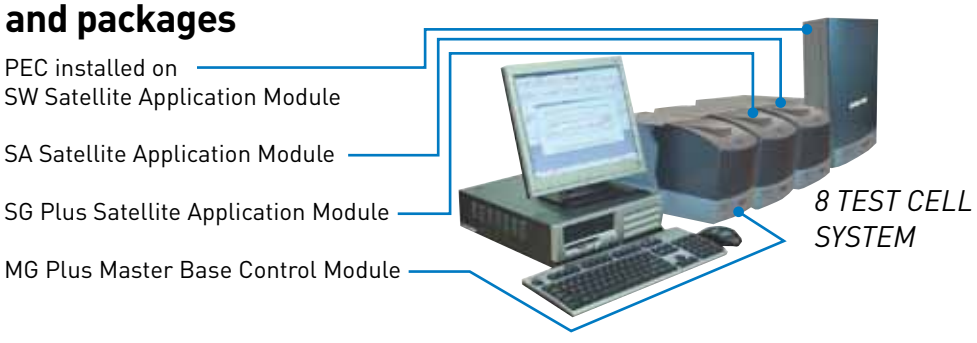
- Dual film test cell module
- Temperature control 5 C to 50 C
- Built-in reference cell

SA

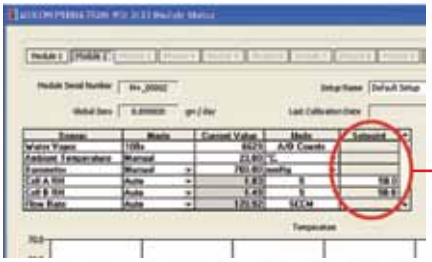


- Dual film test cell module
- Temperature control from 5 C above ambient to 50 C
- Built-in reference cell

Example System Configuration: 8 test cells testing films and packages



The ASTM and JIS Standards on the PERMATRAN-W® 3/33 Provide Maximum Flexibility with a Modular Design



Relative humidity is set via the software

Principles of Operation

MOCON has set the worldwide standard for permeation testing systems for over 40 years. The PERMATRAN-W® 3/33 system uses a patented modulated infrared sensor to detect water vapor transmission through both flat materials and packages. This high performance sensor provides parts-per-million sensitivity.

When testing flat film sample material is placed in a test cell. Test cells are divided into two chambers separated by the sample material. The inner chamber is filled with nitrogen (carrier gas) and the outer chamber with water vapor (test gas).

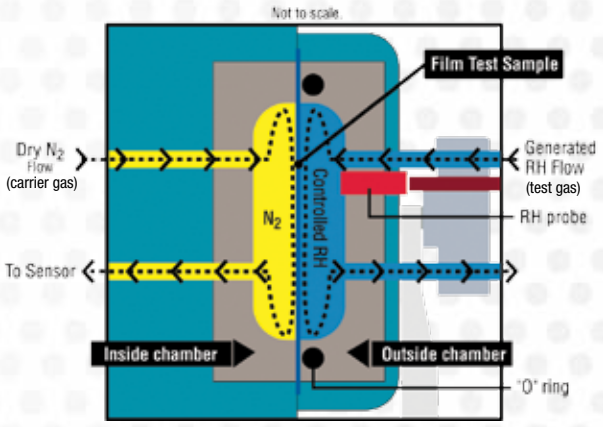
Molecules of water (delivered to the outer chamber by the test gas) diffuse through the film to the inside chamber and are conveyed to the sensor by the carrier gas. The computer monitors the increase in water vapor concentration in the carrier gas and it reports that value on the screen as the water vapor transmission rate.

On the "G Plus" version modules, the relative humidity (RH) of the test gas is generated by the "frequency modulation method (no need for salts to select humidity)".

On the "W" and "A" versions of the modules, absorbent material saturated with distilled water provides a test gas atmosphere of 100% RH.

The RH of test cells is monitored by RH probes inserted into the outside chamber.

Side View of "G Plus" Versions Test Cell Diagram



The G Plus versions of this system allow you to simultaneously condition and test materials over a wide range of temperature and relative humidity conditions similar to a package's actual storage environment. The film test cell in the PERMATRAN-W® 3/33 module incorporates RH probes in both cells to allow for control of the generated RH levels.

SPECIFICATIONS — PERMATRAN-W® Model 3/33 Plus

Module Choices for System Configuration

	MA	SA	MW	SW	MG Plus	SG Plus
WVTR Test Range: Note 1 Below	X	X	X	X	X	X
Test Temperature Range:						
5 C above ambient to 50 C	X	X				
5 C to 50 C			X	X	X	X
Standard RH Testing (No Salts Required):						
Films - 100% RH	X	X	X	X	X	X
Packages -100% RH or Ambient	X	X	X	X	X	X
Generated RH Testing (No Salts Required):						
Films - 100% and 5% to 95% RH					X	X
Packages - 100% and 5% to 95% RH application dependant					X	X
Test Sample Size:						
Films - 4.25 in. x 4.25 in. (10.8 cm x 10.8 cm)	X	X	X	X	X	X
Packages - Up to 3 liters per package	X	X	X	X	X	X
Generated RH - Up to 2 liters per package					X	X
Test Cells per Module, 2 - 50cm^2 Test Cells	X	X	X	X	X	X
Expandable up to 10 modules (20 test cells)	X	X	X	X	X	X
Built-in Reference Cell (Standard), Selectable Zero Compensation (Standard)	X	X	X	X	X	X
Automatic Flow Compensation (Standard)	X	X	X	X	X	X
Computer, Monitor, Printer and WinPerm™ Permeability Software (Standard)	X		X		X	
Automatic Temperature Monitor and Control (Standard)	X	X	X	X	X	X

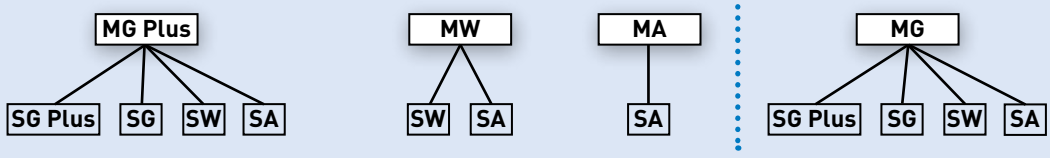
Specifications provided on request.

This instrument is ETL listed, Conforms to UL Standard 1262, is Certified to CAN/CSA C22.2 No. 151, and Complies with CE Product Safety, Electromagnetic Emission & Susceptability

Note#1

Carrier Flow	Sample	g/m^2/day	g/100 in^2/day	g/pkg/day
100 cc/min	Unmasked	0.035 to 100	0.0023 to 6.45	0.00018 to 0.5
	Masked	0.35 to 1000	0.023 to 64.5	—
10 cc/min	Unmasked	0.005 to 10	0.0003 to 0.65	0.00003 to 0.05
	Masked	0.05 to 100	0.003 to 6.5	—

Possible PERMATRAN-W® 3/33 System Configurations starting with a Master Base Control System:



MOCON Commitment

The PERMATRAN-W® 3/33 is another example of MOCON's long-standing commitment to innovation and quality in the design of permeation testing systems for barrier material and package assessment.

Technical Support & Service

MOCON offers a variety of technical services designed to provide you with first class technical support. Whether you require technical support, next-day spare parts delivery, on-site training, N.I.S.T. certification or "turn-key" validation, our technical support 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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Brochure Code 1011A

MOCON also offers the following instruments and services.

Laboratory Instruments

Permeation, Barrier
Leak Detection
Headspace
On-Line Analyzers
Aroma, Flavor, Odor
Seal Strength
Friction
Weighing & Sorting
Gauging

Field Instruments

Indoor Air Quality
Outdoor Air Quality
Oil & Gas Well Logging
Specialty Gases

Consulting and Testing Services

Testing Laboratories
Package Characteristics
Permeation & Barrier Testing
Leak Detection & Headspace
Aroma, Flavor & Odor
Advanced Packaging Solutions