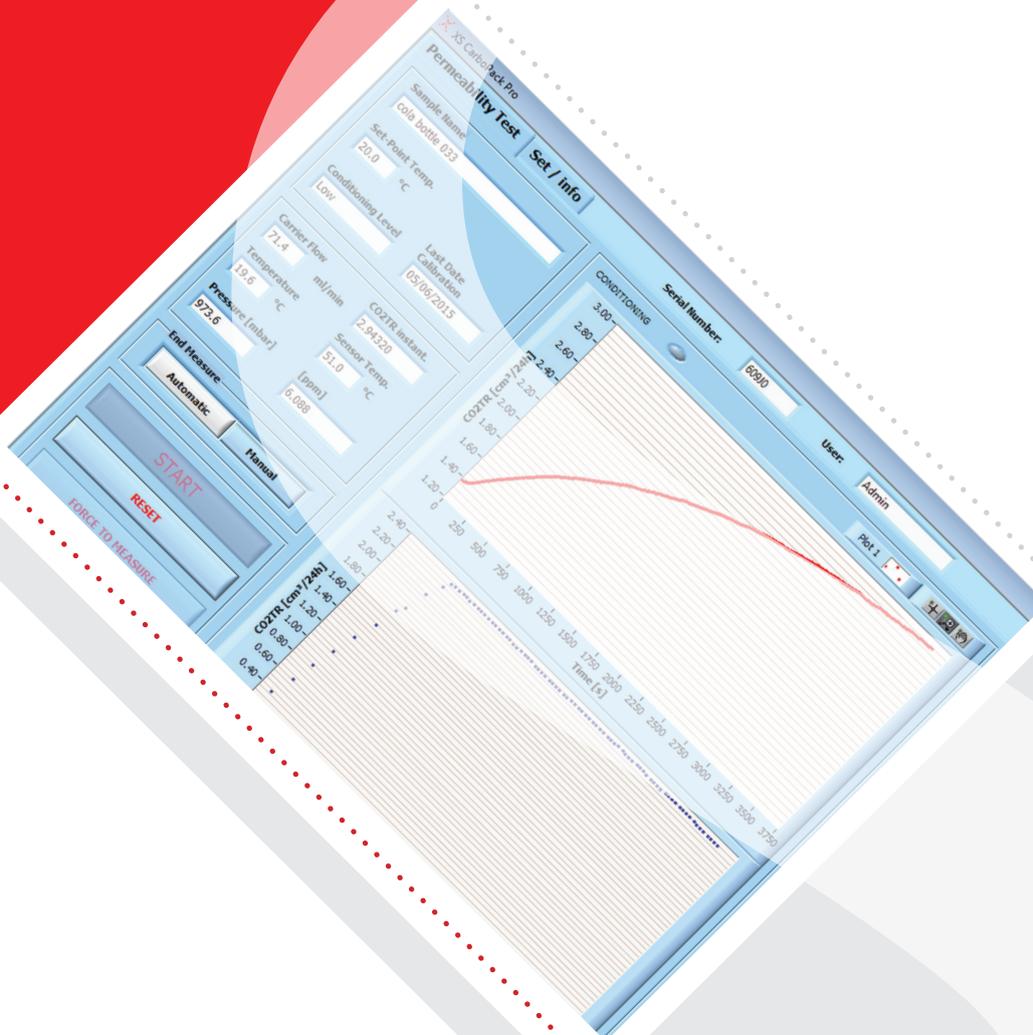
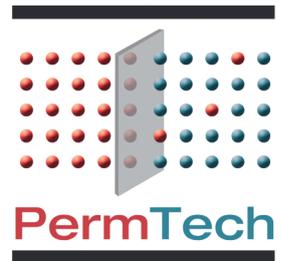


GAS PERMEABILITY MEASUREMENT INSTRUMENTS



TotalPerm

O₂, CO₂ & H₂O

SINGLE CELL

O₂, CO₂ and H₂O permeability tester with embedded controls of temperature and relative humidity.



- 3 sensors inside
- Sequential analysis
- Lowest cost solution
- Broad measuring range
- Long life detectors
- Fully software driven
- Barometric compensation
- Graphic software interface
- Automatic humidity adjustment
- No sample cutting required
- Package analysis accessory

TotalPerm complies with the norms DIN 53380-3, ASTM D3985, F2622, F1927, F1307, JIS K-7126, ISO 15105-2 for OTR measurements, with the norm ASTM F2476 for CO₂TR measurements and with the norms ASTM F1249, TAPPI T557, JIS K-1729, ISO 15106-2 for WVTR measurements.

TotalPerm is the only instrument on the market, based on patented technology, that performs permeability measurements on three different kind of gases. TotalPerm is offered with three different sensors for oxygen, carbon dioxide and water vapour. In this way TotalPerm has the ability to characterize the barrier properties of the film with three different gases testing exactly the same surface, avoiding the need of substituting the sample.

With this instrument it is possible to measure plastic films, monolayer or multilayer barrier films, metallized or with surface coating, laminated or coextruded, especially those used for food, beverage, pharmaceutical and electronics packaging applications.

TotalPerm, as well as performing tests of permeability through thin films, can be equipped with modular accessories to carry out measurements on packaging containers of various types such as bag-in-box, PET bottles and packages.

TotalPerm stands as the ideal solution for companies that produce or use barrier packaging and want the highest performance in a single instrument at competitive prices. The special software TotalPerm ExtraSolution® guarantees maximum simplicity of operation.

You can plan a list of measurements on the same sample using different gases and conditions which are then run automatically by the software.

Choosing TotalPerm is the best choice that makes life in the laboratory easier and reduces both costs and space.

Why buy three different instruments if you can do all the measurements you need using simply one TotalPerm?

For Technical Details see Table at Page 5

MultiPerm

O_2-H_2O , O_2-CO_2 , H_2O-CO_2

1 OR 2 CELLS

O_2 , CO_2 and H_2O permeability tester with embedded controls of temperature and relative humidity.



- 2 sensors inside
 - $O_2 - H_2O$
 - $O_2 - CO_2$
 - $H_2O - CO_2$
- Analysis start independent for each sample
- Automatic generator and humidity controls
- Broad measuring range
- Long life detectors
- Upgradeable with:
 - CO_2 sensor
 - WVTR sensor
 - O_2 sensor
- Fully software driven
- Barometric compensation
- Graphic software interface
- Automatic humidity adjustment
- No sample cutting required
- Package analysis accessory

MultiPerm complies with the norms DIN 53380-3, ASTM D3985, F2622, F1927, F1307, JIS K-7126, ISO 15105-2 for OTR measurements, with the norm ASTM F2476 for CO2TR measurements and with the norms ASTM F1249, TAPPI T557, JIS K-1729, ISO 15106-2 for WVTR measurements.

MultiPerm is the only instrument on the market, based on patented technology, that performs permeability measurements on two different kinds of gases. MultiPerm is offered with two sensors to be chosen by the customer either oxygen, carbon dioxide or water vapour. In this way MultiPerm has the ability to characterize the barrier properties of the film with two different gases testing exactly the same surface, avoiding the need of substituting the sample.

With this instrument it is possible to measure plastic films, monolayer or multilayer barrier films, metallised or with surface coating, laminated or coextruded, especially those used for food, beverage, pharmaceutical and electronics packaging applications.

MultiPerm, as well as performing tests of permeability through thin films, can be equipped with modular accessories to carry out measurements on packaging containers of various types such as bag-in-box, PET bottles and packages.

MultiPerm stands as the ideal solution for companies that produce or use barrier packaging and want the highest performance in a single instrument at competitive prices. The special software MultiPerm-ExtraSolution® guarantees maximum simplicity of operation.

You can plan a list of measurements on the same sample using different gases and conditions that are going to be run automatically by the software. Choosing MultiPerm is the best choice that makes the life in the laboratory easier and reduces both costs and space.

For Technical Details see Table at Page 5

Perme

Oxygen, Water, Carbon Dioxide

1 OR 2 CELLS

Permeability tester with embedded controls of temperature and relative humidity.



- Broad measuring range
- Long life detectors
- Upgradeable with:
 - CO₂ sensor
 - WVTR sensor
- Fully software driven
- Barometric compensation
- Graphic software interface
- Automatic humidity adjustment
- No sample cutting required
- Package analysis accessory

Perme is an instrument for testing the permeability through plastic films, monolayer or multilayer barrier films, metallised or with surface coating, laminated or coextruded used especially for food, beverage, pharmaceutical and electronics packaging applications.

Perme, as well as performing measurements of permeability through thin films, can be equipped with modular accessories to carry out measurements on packaging containers of various types such as bag-in-box, PET bottles and packages.

The software Perme ExtraSolution® allows the user to work with full autonomy after only a few hours of training.

The principal parameters such as temperature, relative humidity, conditioning time and automatic end of measurement, are requested at the start of the software and then it is all automatic.

Moreover it is possible to plan a list of measurements on the same sample at different test conditions that are going to be run automatically by the instrument. In this way any human action is reduced to the minimum and any possible errors eliminated.

The software stabilizes the parameters with high accuracy and precision over all the measurement. Testing conditions (temperature, relative humidity, concentration, ...) are shown both as numeric data and graphical representation and saved in an HTML file and in text file to allow the full compatibility with any other software.

All the gas flows are electronically controlled so that the instrument is immune to changes of pressure both in the gas line and atmospheric.

The single point closure system and the special design of the chamber eliminates the need of cutting the samples to be tested.

TotalPerm complies with the norms DIN 53380-3, ASTM D3985, F2622, F1927, F1307, JIS K-7126, ISO 15105-2 for OTR measurements, with the norm ASTM F2476 for CO₂TR measurements and with the norms ASTM F1249, TAPPI T557, JIS K-1729, ISO 15106-2 for WVTR measurements.

For Technical Details see Table at Page 5

Data Sheet

	Technical Details TotalPerm / MultiPerm / Perme	Technical Details CarboPack BT	Technical Details PackPerm
Test Range O ₂	0.01-7500 cm ³ ·m ⁻² ·24h ⁻¹ ·bar ⁻¹ (unmasked) 0.2-150000 cm ³ ·m ⁻² ·24h ⁻¹ ·bar ⁻¹ (masked)		0.0001-25 cm ³ ·pkg ⁻¹ ·24h ⁻¹
Test Range CO ₂	0.25-18000 cm ³ ·m ⁻² ·24h ⁻¹ ·bar ⁻¹ (unmasked) 50-360000 cm ³ ·m ⁻² ·24h ⁻¹ ·bar ⁻¹ (masked)	0.0013-100 cm ³ ·pkg ⁻¹ ·24h ⁻¹	
Test Range H ₂ O	0.002-100 g·m ⁻² ·24h ⁻¹ (unmasked) 0.04-2000 g·m ⁻² ·24h ⁻¹ (masked)		
Test Sample size	50 cm ² - About 2,5 mm thickness max	Packages, boxes, PET bottles, corks, ...	Packages, boxes, PET bottles, corks, ...
Test temperature range	10-50 °C ± 0.1 °C	10-50 °C ± 0.1 °C	Room temperature monitored by software
Relative humidity (N ₂ side)	30-90%	30-90%	30-90%
Relative humidity (O ₂ side)			with cover: 0%, 5-95% without cover: room RH
Relative humidity O ₂ /CO ₂ (O ₂ /CO ₂ side)	0%, 5-95% ± 1.5%		
Relative humidity H ₂ O (wet side)	5-95% ± 1.5%		
Relative humidity H ₂ O (moist N ₂ side)			
Carrier flow (N ₂)	10-75 ml/min automatically controlled	10-75 ml/min, automatically controlled	10-75 ml/min automatically controlled
Carrier gas	N ₂ 5.0 + 1%H ₂ mix	N ₂ pure (5.0 or 5.5 P.A.)	N ₂ 5.0 + 1% H ₂ gas mixture
O ₂ /CO ₂ purity gas	Purity ≥ 99.95% / ≥ 99.99%		
N ₂ pressure	2.0 bar	2.0 bar	2.0 bar
O ₂ /CO ₂ pressure	1.5 bar		
Gas Connections	1 or 2 or 3 x Standard Ham-Let 1/8"	1 x Standard Ham-Let 1/8"	1 x Standard Ham-Let 1/8"
Software	LabView based with USB interface	LabView based with USB interface	LabView based with USB interface
PC with preinstalled software	Windows™ OS and LCD monitor	Windows™ OS and LCD monitor	Windows™ OS and LCD monitor
Power supply	110-220 AC 50-60 Hz	110-220 AC 50-60 Hz	110-220 AC 50-60 Hz
Apparatus size (cm)	41 W/61 D/31 H	41 W/61 D/31 H	41 W/61 D/31 H

CarboPack BT

Carbon Dioxide

FOR BOTTLES AND PACKAGES

Carbon dioxide permeability tester with embedded controls of temperature.



- High and low carbonated drinks analysis
- PET and Glass bottles (cork leakage)
- Short analysis time
- Fully software driven
- Very low detection limit 0.0013 cc/24 h
- Peltier heating / cooling system
- High IR sensor resolution 0.1 ppm (CO₂)
- Custom size double chamber
- Barometric compensation
- Sequential analysis
- Graphic software interface
- Points saved
- Data logging

CarboPack BT is an instrument that performs measurements of carbon dioxide permeability for accurate shelf life forecast useful in the beverage and general packaging (bread, cheese, coffee, etc) applications.

CarboPack BT can be used for testing carbon dioxide permeability of carbonated beverages through PET bottles and also through corks (natural and synthetic), crowns of glass bottles filled with sparkling wines or drinks.

Measurements of CO₂TR performed with CarboPack BT are non-destructive and really quick. Usually a measurement takes less than 1 hour and not several weeks or months like other conventional methods need.

CarboPack BT is suitable for testing both the smallest permeations (best detection limit on the market) through materials forming the package and macroscopic leakages caused, for example, by breaks or faulty weldings.

The extreme sensitivity has been reached using a non-dispersive infrared gas sensor based upon a dual wavelength IR detection subsystem, thermostatically controlled and pressure compensated.

Thanks to this and to the proprietary electronic board, CarboPack BT can determine the CO₂TR also in the presence of high values of relative humidity (optional) . In this way it is possible to perform measurements in conditions as close as possible to the real ones and evaluating also the influence of moisture on the CO₂ permeability of the materials or coatings used for producing the bottles. CarboPack BT is equipped with a cooling-heating thermal control system that verifies the changes of the barrier properties along with temperature. All the functions are software controlled.

CO₂ is revealed by measuring the spectrum of absorbance at the wavelength of 4.3 μm so as claimed in the ASTM F2476 norm.

PackPerm

Oxygen

FOR PACKAGES

Oxygen permeability tester for flexible packages, stiff containers and PET bottles.

PackPerm is an instrument that measures oxygen permeability through packages used in Food, Beverage, Pharma and Healthcare applications.

PackPerm can be used for testing the barrier to oxygen (O_2TR) both of pouches, packages, small containers, tubes and PET bottles with new barrier or multilayers polymers, new bottles made of biodegradable plastic turning caps, Easy Cap, or Pull & Push and crowns, corks (natural and synthetic) of glass bottles as well.

PackPerm is suitable for testing both the smallest permeations through materials forming the package and any microscopic leakages caused for example by bad coupling of the closures.

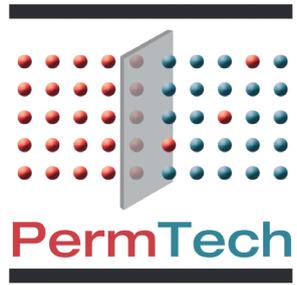
The measurement of O_2TR performed with PackPerm are non-destructive in case of open packages; otherwise for closed packages only two small holes are required in the sample to carry out the test. The extreme sensitivity has been obtained using a coulometric type sensor. Measurements can be performed with several oxygen concentrations and at different values of relative humidity, both inside and outside the samples at room temperature. All these parameters are plotted by the software. In this way the user can easily evaluate the influence that such factors have on the measurement.



Pack Accessory for Perm Instruments line

This accessory allow customer to analyze also packages with Perm instruments.

PackPerm complies with the norms DIN 53380-3 and ASTM F1307 for OTR measurements through packages.



EXTRASOLUTION
made by PermTech