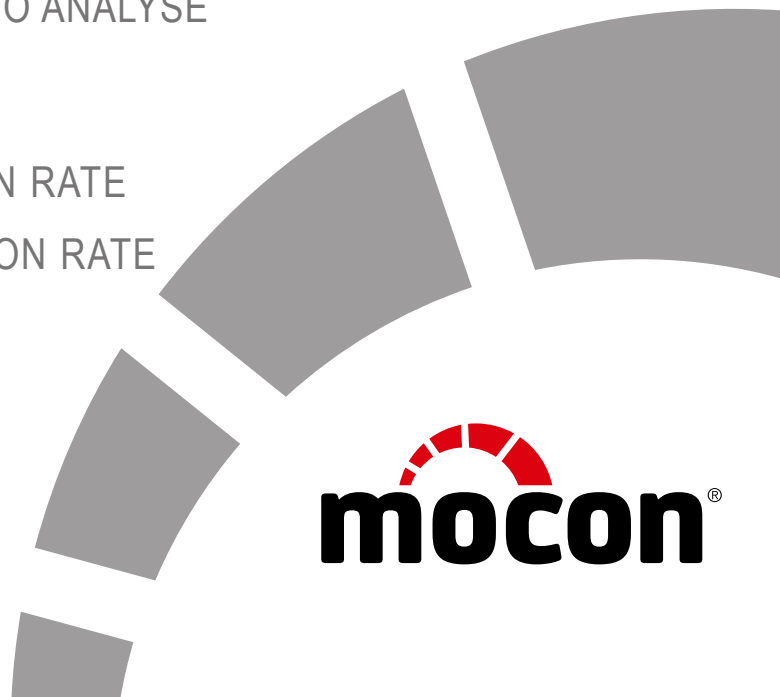




MEASURING DEVICES TO ANALYSE

- **OXYGEN TRANSMISSION RATE**
- **WATER VAPOUR TRANSMISSION RATE**
- **CARBON DIOXIDE TRANSMISSION RATE**
OF FILMS AND PACKAGES ETC.



**mocon**[®]

WORLD OF PERMEATION

In the world of permeation a material has to meet many different requirements regarding barrier properties. A baby diaper for example should keep baby's skin dry. This only works with a very high water vapour transmission rate of the material used. Electronics of photovoltaic cells, however, are very sensitive to moisture. Therefore, these electronics have to be protected by films with excellent water vapour barrier properties.

MOCON offers a complete range of measuring devices for oxygen, water vapour and carbon dioxide transmission rate testing to provide the best solution for each application.



CARBON DIOXIDE TRANSMISSION RATE MEASUREMENT

PERMATRAN-C® 4/41

The PERMATRAN-C® 4/41 is a two cell model that determines the CO₂ transmission rate through films and packages. It is equipped with an infrared sensor which operates according to ASTM F 2476. The PERMATRAN-C® 4/41 is available in two versions with different measuring ranges.

Test Ranges (cell area 50 cm²):

- 1 – 10.000 cm³/(m² • day)
- 500 – 155.000 cm³/(m² • day)

PERMATRAN-C® 10

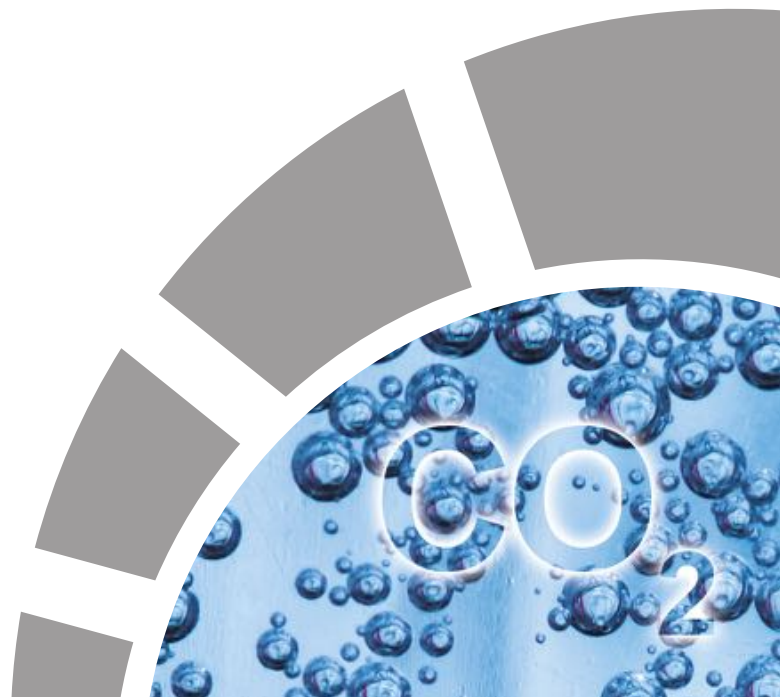
The PERMATRAN-C® 10 is a non-destructive carbon dioxide analyser which has been specially developed for testing plastic bottles. By measuring the CO₂ loss of plastic bottles filled with carbonized drinks the system automatically calculates the shelf-life of the beverage.

Test Range:

- 1 – 80 cm³/(bottle • day)



PERMATRAN-C® 4/41



OXYGEN TRANSMISSION RATE MEASUREMENT



OX-TRAN® 2/22

OX-TRAN® 2/22

The OX-TRAN® 2/22 represents the latest generation of MOCON's oxygen transmission rate measurement systems. This system is much more user-friendly due to various improvements compared to the previous model OX-TRAN® 2/21. In addition this two cell measuring device is faster, easier to use, with improved repeatability and better results.

The system is equipped with MOCON's Coulox® absolute oxygen sensor which requires no calibration. It complies with the following standards: ASTM D 3985, F-1927, DIN 53380, JIS K-7126, ASTM F-1307 and ISO 15105-2.

Test Ranges (cell area 50 cm²):

- OX-TRAN 2/22 L 0,005 – 200 cm³/(m² • day)
- OX-TRAN 2/22 H 0,05 – 200 cm³/(m² • day)

OX-TRAN® 2/21 10X

The OX-TRAN® 2/21 10x is the module of the OX-TRAN series with the highest sensitivity. It measures barrier films down to 0,0005 cm³/(m² • day). The Coulox® sensor is a patented MOCON development. It is a long-life and intrinsic or absolute sensor that does not require calibration. Beside others the OX-TRAN® 2/21 complies with ASTM D 3985.

The OX-TRAN® 2/21 10x is a modular system. Combine a Master Control System with as many as nine Satellite Modules, also with different functionality, for a maximum of 20 test cells per system.

Test Range (cell area 50 cm²):

- 0,0005 – 200 cm³/(m² • day)



OX-TRAN® 2/22

OX-TRAN® 2/61

The six test cells are designed for maximum throughput. All cells may be combined to enlarge the test area and provide greatest sensitivity. With the optional package adapter the OX-TRAN® 2/61 is a great solution for measuring complete packages of various shape and size.

The system is equipped with MOCON's Coulox® absolute oxygen sensor which requires no calibration. It therefore meets the same standards like the OX-TRAN® 2/21 and OX-TRAN® 2/22.

Test Range (cell area 10 cm²):

- one cell: 0,5 – 1.000 cm³/(m² • day)
- all cells combined: 0,1 – 200 cm³/(m² • day)

OX-TRAN® 2/10

The OX-TRAN® 2/10 with two test cells and a calibration-dependent electrochemical sensor is a cost effective system for oxygen transmission rate measurement of flat films and finished packages. The sensor has a huge test range but must be calibrated.

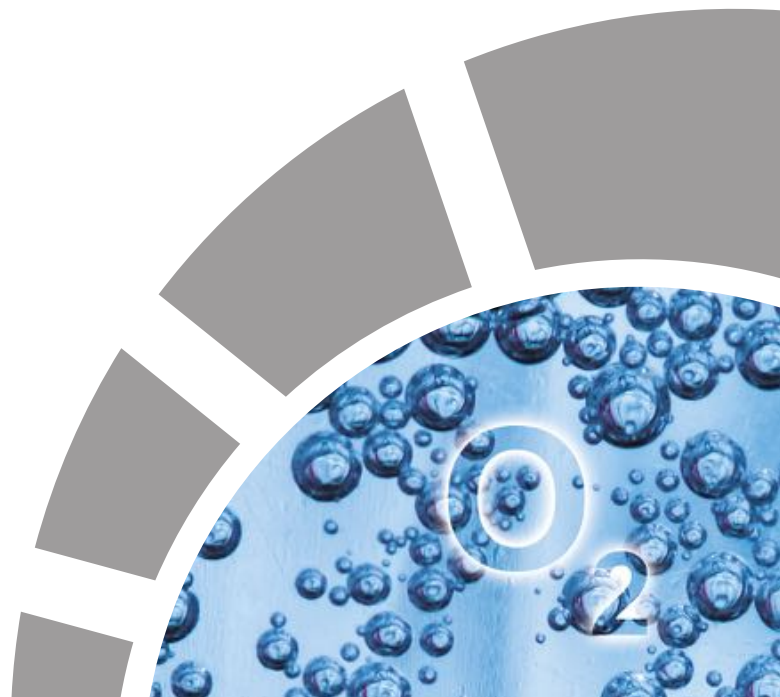
The structure of this system corresponds with the OX-TRAN® 2/21, the predecessor of the OX-TRAN® 2/22. However, it does not meet the ASTM D 3985 but complies with the ASTM F-2622.

Test Range (cell area 50 cm²):

- 0,1 – 144.000 cm³/(m² • day)



OX-TRAN® 2/22



OXYGEN TRANSMISSION RATE MEASUREMENT



OX-TRAN® 702

OX-TRAN® 702

The OX-TRAN® 702 is the module with the highest capacity and throughput in the OX-TRAN® product range because of seven independently working test cells. The test cells are designed to carry out package and film measurement in any combination simultaneously. The unique cell design with pneumatic push-button closure is designed to accommodate standard 50 cm² samples. The removable cell structures allow easy sample preparation.

The system is equipped with MOCON's Coulox® absolute oxygen sensor which requires no calibration. It therefore meets the same standards like the OX-TRAN® 2/21 and OX-TRAN® 2/22.

Test Range (cell area 50 cm²):

- 0,01 – 200 cm³/(m² • day)



Test Cell OX-TRAN® 1/50

OX-TRAN® 1/50

The OX-TRAN® 1/50 is a low cost "starter model" for oxygen transmission rate measurement. It is a standalone system with one test cell. All parameters can be entered directly via the module's keypad, no computer is required. Just like the OX-TRAN® 702 the OX-TRAN® 1/50 allows easy film placement because of the lift out cell with pneumatic clamp for consistent clamping force. The system is designed for film measurement only and meets the ASTM D-3985.

Test Range (cell area 50 cm²):

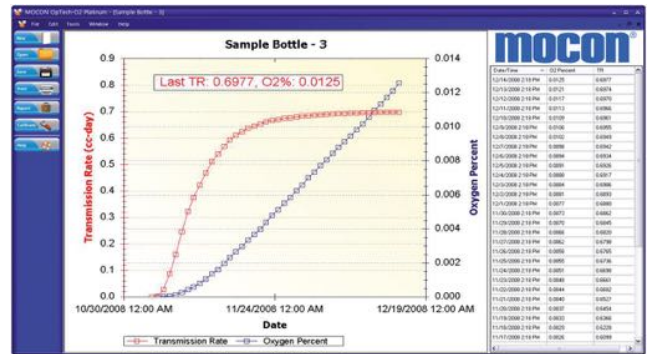
- 0,1 – 200 cm³/(m² • day)

OPTECH®-O₂ P

The OpTech®-O₂ P is an alternative for the oxygen transmission rate measurement of filled packages. The adhesive fluorescent platinum sensor will be inserted into a transparent package before this will be filled. Then the oxygen content in the package is measured optically. The rate of decay of the fluorescence is directly proportional to the concentration of oxygen present. This is read by the OpTech detector and reported as a percentage of oxygen present in the package. This type of measurement also considers interactions with the packaging content. The OpTech® -O₂ P in combination with a remote cell, is designed to measure the transmission rate of barrier films and of porous or breathable materials. The OpTech®-O₂ P complies with the standards ASTM F-2714 and ASTM F-3136.

Test Range:

- 0,001 – 25 % oxygen



OpTech®-O₂ P-Software



Permeation Measurement Cell OpTech®-O₂ P



WATER VAPOUR TRANSMISSION RATE MEASUREMENT



PERMATRAN-W® 3/34

PERMATRAN-W® 3/34

The PERMATRAN-W® 3/34 represents the latest generation of MOCON's water vapour transmission rate measurement systems. This system is much more user-friendly due to various improvements compared to the previous model PERMATRAN-W® 3/33. In addition this two cell measuring device is faster, easier to use, with improved repeatability and better results.

The system complies with the following standards: ASTM F-1294, TAPPI T 557, JIS K-7129, and ISO 15106-2.

Test Ranges (cell area 50 cm²):

- 0,005 – 100 g/(m² • day)

AQUATRAN® 2

The AQUATRAN® 2 is the instrument for ultra-high barrier water vapour transmission rate (WVTR) measurement. MOCON's Aquatrace® Gold Sensor is a unique coulometric phosphorous pentoxide sensor which does not require calibration. The test range of this high-end unit is down to $5 \cdot 10^{-5}$ g/(m² • day).

The measuring principle of the AQUATRAN® 2 complies with ISO 15106-3.

Test Range (cell area 50 cm²):

- 0,00005 – 5 g/(m² • day)

PERMATRAN-W® 3/61

The six test cells are designed for maximum throughput. All cells may be combined to enlarge the measurement area and provide greatest sensitivity. With the optional package adapter the PERMATRAN-W® 3/61 is a great solution for measuring complete packages of various shape and size. Like the PERMATRAN-W® 3/34, the PERMATRAN-W® 3/61 is equipped with an infrared sensor. It therefore meets the same standards.

Test Range (cell area 10 cm²):

- 0,01 – 85 g/(m² • day)



Test Cell PERMATRAN-W® 3/34

PERMATRAN-W® 700

The PERMATRAN-W® 700 is the module with the highest capacity and throughput in the PERMATRAN® product range because of seven independently working test cells. The test cells are designed to carry out package and film measurement in any combination simultaneously. The unique cell design with pneumatic push-button closure is designed to accommodate standard 50 cm² samples. The removable cell structures allow easy sample preparation. Like the PERMATRAN-W® 3/34, the PERMATRAN-W® 700 is equipped with an infrared sensor. It therefore meets the same standards.

Test Range (cell area 50 cm²):

- 0,005 – 100 g/(m² • day)

PERMATRAN-W® 1/50

The PERMATRAN-W® 1/50 is a low cost “starter model” for water vapour transmission rate measurement. It is a standalone system with one test cell. All parameters can be entered directly via the module’s keypad, no computer is required. Just like the PERMATRAN-W® 700, the PERMATRAN-W® 1/50 allows easy film placement because of the lift out cell with pneumatic clamp for consistent clamping force. The system is designed for film measurement only. The system is suitable to measure medium barriers and complies with the ASTM E-398.

Test Range (cell area 50 cm²):

- 0,1 – 100 g/(m² • day)

PERMATRAN-W® 101K

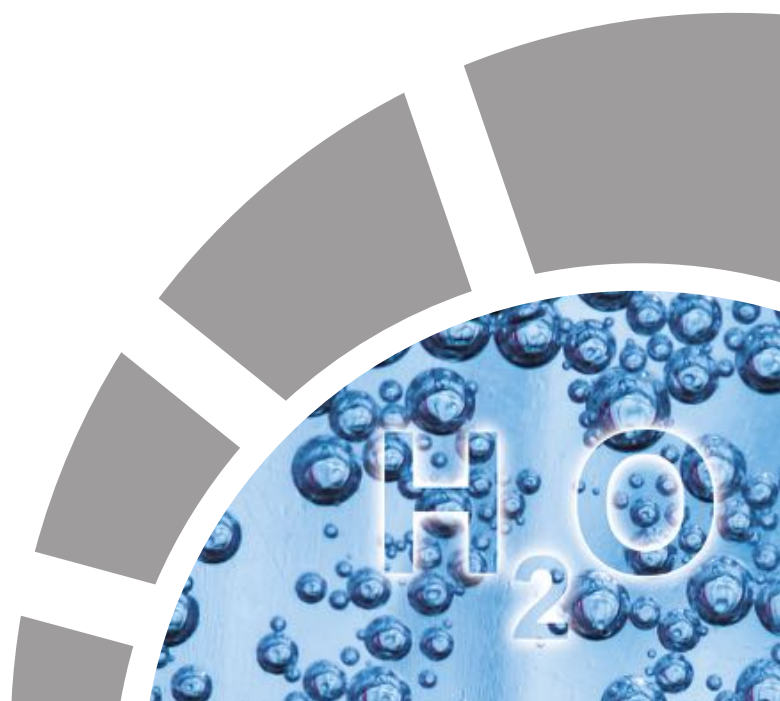
The PERMATRAN-W® 101K was developed to measure high transmitters such as non-wovens (films for baby diapers) fabrics, textiles breathable membranes and paper. The unit has 6 cells for maximum throughput with precise temperature measurement and control. It complies with ASTM D-6701.

Test Range (cell area 10 cm²):

- 500 – 100.000 g/(m² • day)



PERMATRAN-W® 1/50



SERVICE

Apart from high quality systems we provide the following range of services:



■ COMMISSIONING & TRAINING

We are happy to carry out the installation and start-up of your equipment on site. If necessary, the site preparation instructions will be provided prior to installation. The detailed operator training can be carried out during commissioning or in our premises.

■ HOTLINE & REMOTE ACCESS

Who has not experienced this already? Commissioning and operator training have been carried out and afterwards the questions occur. Our Technical Assistance Support Team is at your disposal to answer basic questions by phone or troubleshoot instrument issues via phone, e-mail or remote access, and all this free of charge – also after the warranty period.

■ MAINTENANCE & CALIBRATION

Annual validations and certified Quality Management Systems often require a preventive maintenance or calibration. Preventive maintenance also ensures the optimum availability and precision of your equipment.

Ask for one of our service technicians or send your device to us. It is even easier and cheaper if you conclude a maintenance contract with us.

■ REPAIR & TECHNICAL SERVICE

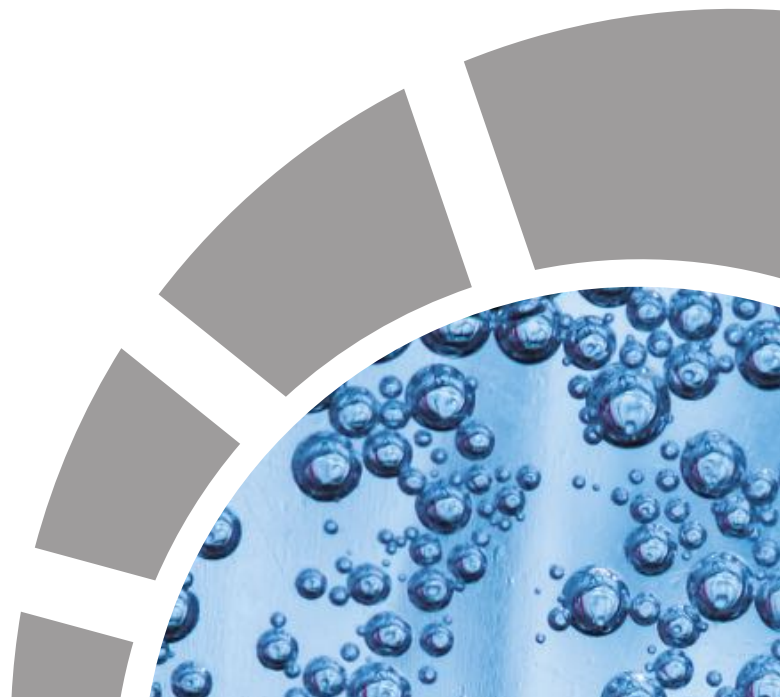
Should your device not work anymore we will check and repair it. Of course, you will receive a cost estimate before. We maintain a comprehensive stock of spare parts, which ensures rapid availability of all major consumables and spare parts. Our specialists will also be happy to visit you, even throughout Europe.

■ LABORATORY SERVICES

Our air-conditioned laboratory is constantly equipped with the latest MOCON instruments. We offer the following measurement services:

Oxygen, Water Vapour and CO₂ transmission rate measurement as well as other gases

- Mono- and co-extruded films, laminates, coated papers. Test temperature and relative humidity of the test and carrier gases are adjustable. Measurements on flat samples will be performed in duplicates to ensure reproducibility.
- Bottles, tubes, blisters, pouches, cups or other hollow bodies.
- Measurements are carried out according to ASTM, ISO and DIN





ABOUT US

The MOCON GmbH is a subsidiary of the worldwide operating US group MOCON Inc. From Neuwied in Germany we serve our steadily growing range of European customers in the packaging, pharmaceutical, health care, food and electronic industry as well as in the institutional research and development. Our core business is the sales and service of MOCON systems for measuring oxygen, water vapour and CO₂ transmission rates.

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