Brugger

FEINMECHANIK

WDDG

Water Vapour Permeability Tester

The Water Vapour Permeability Tester (WDDG) determines the transmission of water vapour through packaging material using the electrolytic detection sensor method according to the ISO 15106-3:2003 standard. The WDDG tests the **W**ater **V**apour **T**ransmission **R**ate (WVTR) with a value of up to 10 g/m^2 d of materials laid flat. The Water Vapour Transmission Rate (WVTR) describes the amount of water vapour (in grams) that permeates within 24 hours through the area of one square meter according to defined test conditions regarding temperature and relative humidity. This WVTR is a very important quality of packaging material, for example polymer films, laminates produced thereof, and coated papers.
Especially for food or pharmaceutical packaging a reliable determination of the WVTR is absolutely essential for the quality control.

Our WDDG prove successful in the following applications:

- Inline quality control
- Process control
- R & D tests

WDDG Features

- **Easy handling Installation:** Connect the WDDG to your carrier gas support and the water circulator using the provided action rapid couplings. Now all you need is an electrical outlet.
- **Flexible temperature range:** Using an external water circulator the water vapour permeability of your specimen can be determined within a temperature range of -25°C through +60°C.
- **Flexible humidity settings:** Using a sintered glass disc, you can set any humidity gradient needed to meet different testing conditions according to the standards.
- **Wide testing range:** The WDDG can determine the water vapour permeability of most materials used in packaging industry for example. Using masking techniques you can enhance the testing range up to 200 g/m^{2}d.
- **No calibration needed:** The testing method applied in the WDDG makes a calibration for different testing ranges redundant. For equipment monitoring you can easily use the provided reference film at anytime.
- **Optional evaluation using a PC:** Using an external A/D converter with USB interface you can evaluate and store the test data on any PC.

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Principle

The specimen to be tested is inserted into a bipartite permeation cell, which temperature can be controlled. A saturated sintered glass disc is placed in the top part of the permeation cell. This saturated disc provides a constant water vapour pressure at the top side surface of the specimen. At the bottom side of the specimen the permeated water vapour is transported by the dry carrier gas into the electrolytic cell. Inside the electrolytic cell, the water vapour is absorbed by a phosphorous pentoxide coating. Quantitatively the water vapour is electrolyzed in hydrogen and oxygen, while the humidified carrier gas flows through the electrolytic cell. The electrolytic current flow inside the electrolytic cell depends directly on the absolute amount of the permeated water vapour per time.

International Standards

The WDDG is in accordance with the international standard ISO 15 106 – 3:2003 (prior DIN 53 122, Part 2).

Specification

Test method:	Quantitative determination of the WVTR using an electrolytic cell with dry nitrogen as carrier gas
Measuring range:	0.01 g/m^2 d uo to 10 g/m^2 d
Tolerance:	<5% of the test range, not less than 0,005 g/m^2 d
Measuring ranges:	0.1 g/m^2 d , 1 g/m^2 d , 10 g/m^2 d
Resolution measuring ranges:	0.001 g/m^2 d, 0.01 g/m^2 d, 0.1 g/m^2 d
Analogue output for connecting a flatbed recorder or an A-D converter	Measuring range 0.1 g/m^2 d: 0 - 16 V Measuring range 1 g/m^2 d: 0 - 1,6 V Measuring range 10 g/m^2 d: 0 - 0,16 V
Specimen dimensions using using the top permeation cell:	Circular, diameter 112 mm
Specimen dimensions using the special fixing device:	115 mm x 115 mm or in any shape
Specimen temperature range:	-25°C to +60°C (with external water circulator)
Carrier gas:	Nitrogen 3.5 (purity at least 99.95 % Vol.), dry
Gas flow of the carrier gas during the measurement:	50 to 70 cm^3/min
Secondary drying:	Molecular sieve 0.4 nm, pearl diameter 2 mm
Cell voltage:	50 V, max. 16 mA
Dimension:	50 x 35 x 74 cm
Weight:	30 kg
Storage temperature:	10°C to 40°C
Operating temperature:	Ambient temperature (23°C)
Relative humidity (RH):	80% max, non-condensing
Electrical connection WDDG:	230 V/50 - 60 Hz, power consumption approx. 50 W
Electrical connection flat bed recorder:	230 V/50 - 60 Hz, power consumption approx. 50 W
Electrical connection A/D converter	5 V via USB port
Electrical connection water circulator	230 V/50 - 60 Hz, power consumption approx. 2300 W