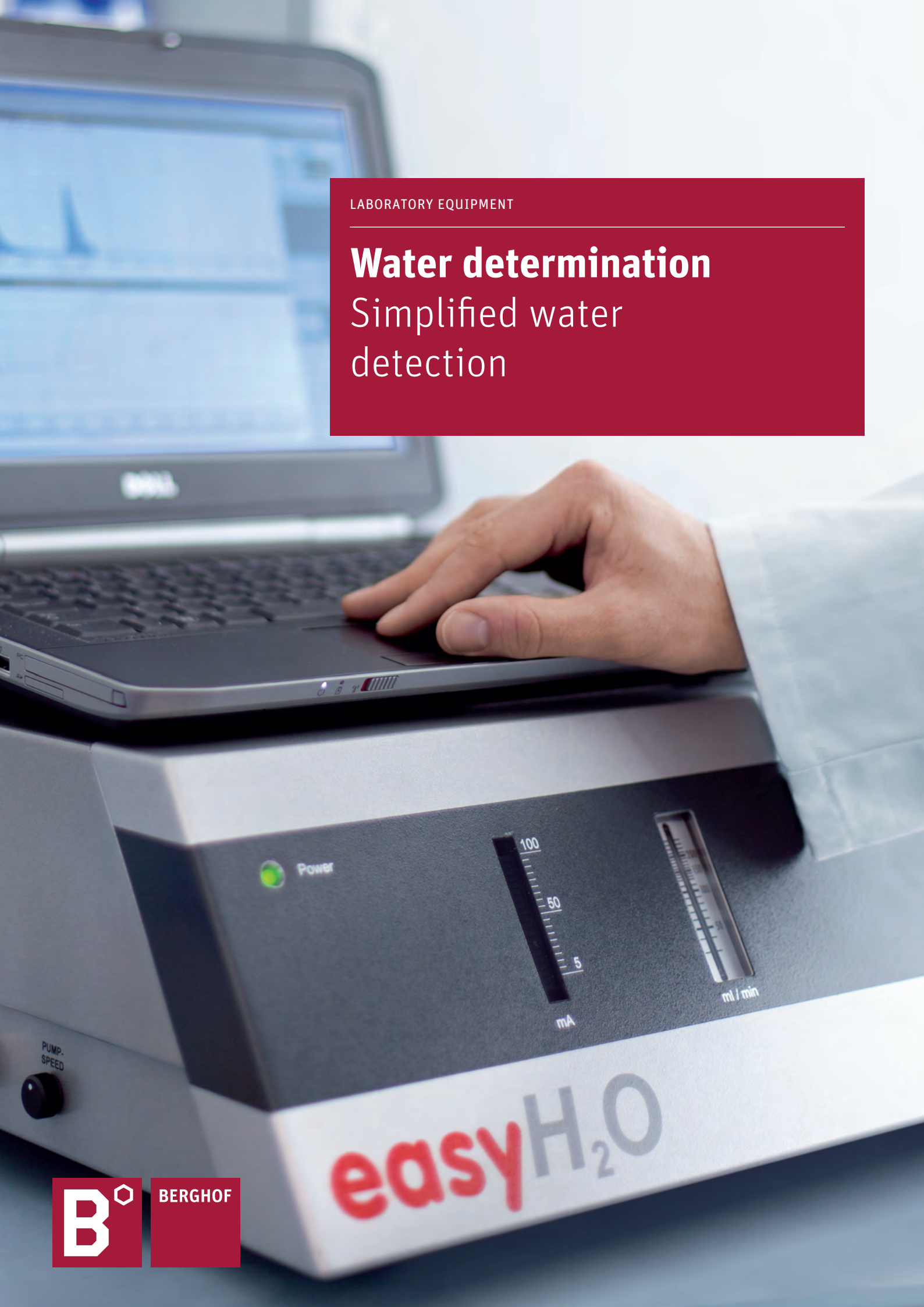


LABORATORY EQUIPMENT

Water determination

Simplified water
detection



BERGHOF

Easy to handle, low operating costs



01



02



03

- 01 The Berghof EasyH₂O is extremely simple to operate.
- 02 The weight can be automatically transferred.
- 03 The sample is placed in the EasyH₂O.

EasyH₂O[®] one

Thermo-coulometric water determination

1. Measuring principle

The Berghof easyH₂O combines the thermal evaporation of water with a selective, electrochemical water sensor in a new and innovative procedure for water detection. The water is evaporated from the test sample in a programmable oven and passed over the sensor in a stream of carrier gas. Since this gas is simply ambient air which is sucked in and dried no special chemicals are required for operation. Controlled by software, the whole process runs automatically.

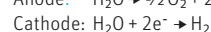
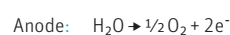
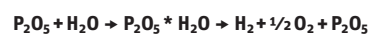
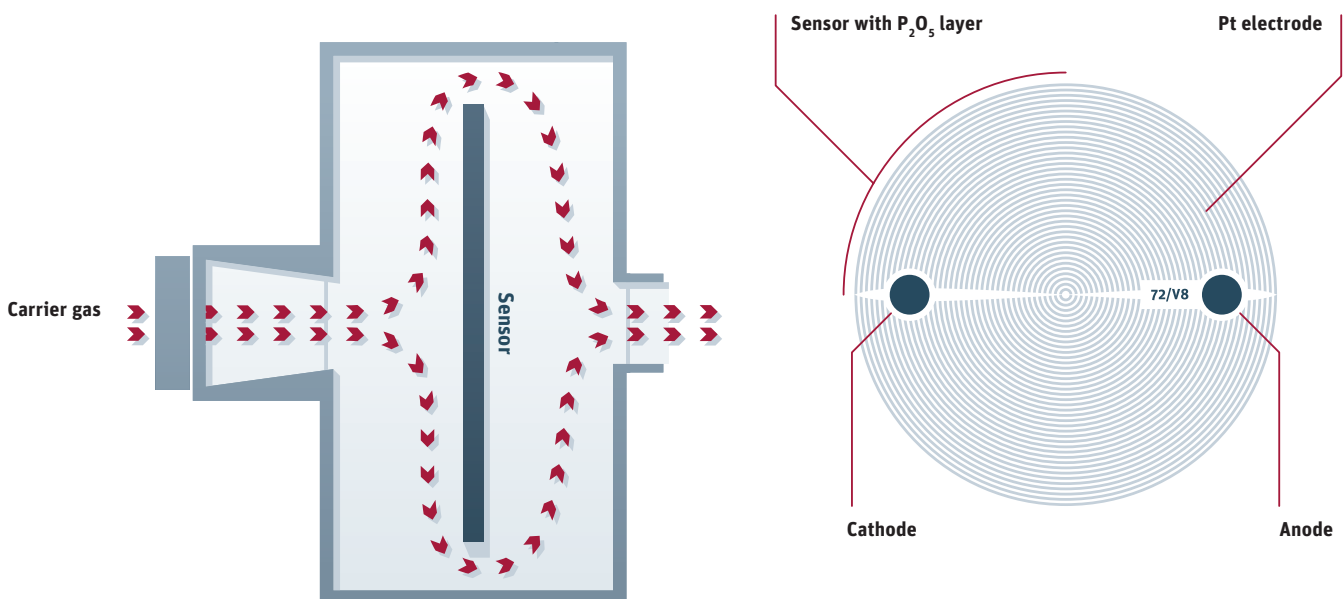
2. Coulometric P₂O₅ sensor

The sensor's layer of hygroscopic phosphorus pentoxide (P₂O₅) binds the water carried in the stream of carrier gas. The water is broken down electrolytically into hydrogen (H₂) and oxygen (O₂). The charge required for this is proportional to the quantity of water and is determined by Faraday's Law. The sensor is self-regenerating by reforming the P₂O₅ layer during the measurement. The unit thus remains ready for operation at all times.

3. Selective water determination

The Berghof EasyH₂O registers the water in the sample selectively. The result is not (as is the case with gravimetric water analysis techniques) falsified by materials evaporated from the sample along with the water. It therefore delivers reproducible and precise results and makes it possible to separately verify surface and capillary water as well as bound water. Even strongly bound water is released by temperature programs up to 400°C.

Sensor-Schema



Chemical-free water determination



Ready for operation at all times

The Berghof EasyH₂O measuring cell self-regenerates during measurement and is not used up. Chemicals are not required and the system is permanently cleaned with dried air, making blank value entries from the environment impossible. The analyser is ready for operation at all times.

PC-controlled procedures

The Berghof EasyH₂O is controlled by a PC. If the analysis is started a dialogue is initiated that prompts the user to carry out the next steps in the process. The

weight of the sample is automatically communicated by the connected balance.

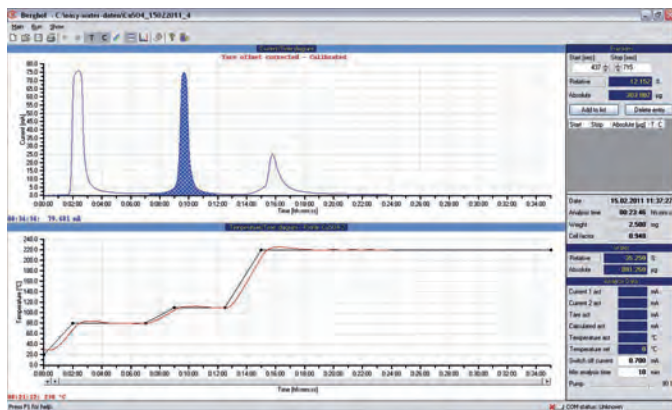
During the measuring procedure the sensor current and the actual and target temperature profiles are displayed graphically. The cumulative water content, sensor current and other specifications are indicated numerically in real time. The measuring process is under control at all times; the user can intervene where necessary. All data, temperature programs etc. are registered in accordance with ISO and GLP and can then be printed out or reimported.

Environmentally-friendly analyses

For the operation of the phosphorus pentoxide measuring cell no special or toxic chemicals are required, making the system environmentally-friendly. The user benefits to a considerable degree.

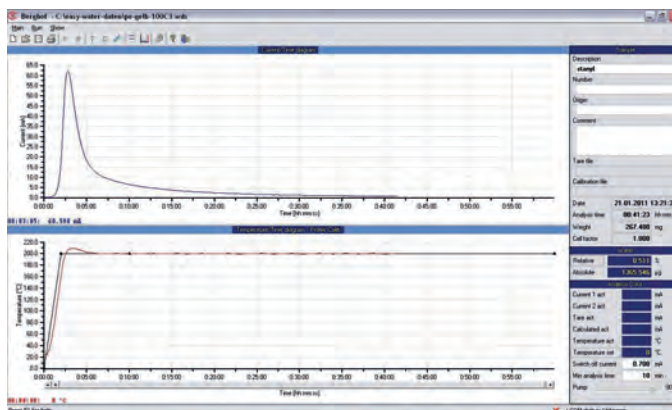
- reduced operating and disposal costs
- operating personnel do not need to be specially trained
- reduced blank value entry with chemicals

The phosphorus pentoxide sensor represents a standard procedure for water detection in gases such as hydrogen, oxygen, nitrogen, argon and helium. These procedures have been described and standardised since 1987 in DIN 50450-1. The sensor principle is also related to the detection of water in natural gas (ASTM D 5454 and ISO 11451:1997).



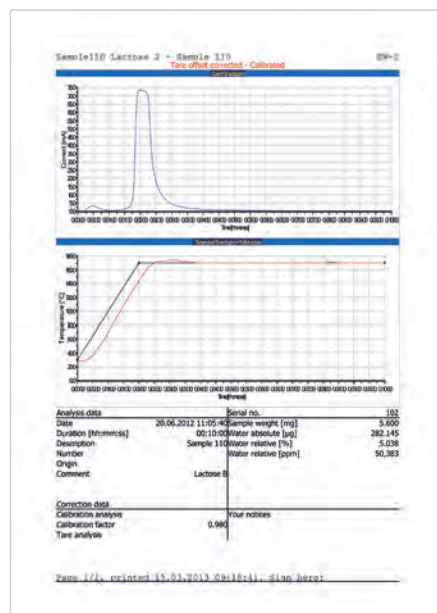
Distinction between free and bound water

The evaporation of the water can be controlled via the programmable temperature profile up to 400°C. Slower heating rates – if necessary in steps with lower evaporation temperatures – make it possible to discriminate between the different bonding forms of the water in the sample. Evaluation and quantification of the peaks is carried out by the software.



Reliable results

All measuring sequences, calculations and evaluations are conducted autonomously and deliver a quantitative and graphic representation of the water content of the sample substance once measurements have been completed. In this way the EasyH₂O provides rapid, dependable and reproducible results, contributing to a more efficient production flow.



Complete documentation

All measurement data, temperature programs etc are recorded and saved during each measurement activity, after which the data can be reimported and also printed out. Data logging conforms to GLP and ISO guidelines.

EasyH₂O[®] one

Technical specifications



High sensitivity

Knowledge of the quantity and bonding forms of water, coupled with knowledge of the releasing temperature of unknown or previously uninvestigated substances, results in a headstart in knowledge. The Berghof EasyH₂O features a high sensitivity.

For example the detection limit of samples with water content of 0.01 % and net weight of 2,000 mg is 0.0001 %. In contrast, the highly sensitive P₂O₅-sensor also makes the reproducible determination of samples with just a few milligrams of weight possible. With 10 mg the detection limit is 0.02 %.

As well as developmental laboratories that can only use small sample quantities due to the synthesis turnover, also those laboratories benefit, which examine expensive raw materials during the incoming inspection test.

EasyH ₂ O [®] one	
Voltage	115 / 230 V ±10 %
Frequency	50 – 60 Hz
Max. power consumption	400 W
Fuse	4A
Protection class	1
Oven temperature	Room temperature – 400°C
Max. heating rate	40°C/min
Measuring time	5 – 600 min
Sensitivity	1 µg water
Reproducibility	≤ 2% (at maximum current flow)
Water content of sample	0.01 – 15 %
Display	ppm – 99.99 %
Max. sample volume	3 cm ³
Ambient temperature	10 – 35°C
Air humidity	10 – 90 % non-condensing

EasyH ₂ O [®] one	
Dimensions	500 x 180 x 500 [mm] (w x h x d)
Weight	approx. 20 kg
Carrier gas	Indoor air via built-in pump, Option: nitrogen (4.0 or 5.0) or argon (4.0 or 5.0)
Gas flow rate	50 mL/min
Initial gas pressure	0.5 bar
Conformity	CE, EN 61326-1, EN 61326-2, EN 61010
Balances	Sartorius, Kern, with serial interface
Accessories	PC inclusive software, sodium tungstate calibration standard, coating solution, Ni sample boats, pincers, brush, particle filter, spatula
PC requirements	1 x RS 232
Software requirements	Windows 7

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