

Trace moisture in solids

An easy and accurate measurement

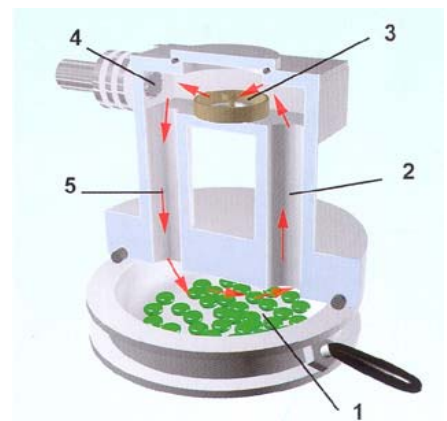
The FMX HydroTracer is a precise instrument measuring low water contents in solids. The precision of the method combined with high sample weights allows the determination of very low water contents with an accuracy of a few ppm.

A great variety of powders, granulates and films can be tested. The HydroTracer is used primarily for testing the residual moisture of plastics, where the water content determines the product quality.

The absolute water content of the sample material is analysed by a chemical method - not by using the weight loss during heating -, a method giving only a prognosis of the relative moisture content.

Calibration before a measurement is not required. The compact design, in combination with an easy operation, allow for using the HydroTracer in a production environment. Production operators are able to use the HydroTracer without problems.

The robustness and the low weight recommends the device to be transported for use on-site, e.g. for acceptance tests of dryers or for incoming goods control.



Reactor principle in a cutaway view

1. The sample material is heated in the sample tray, water evaporates
2. The hot humid gas ascends
3. The reagent exchanges water by hydrogen
4. The sensor measures the concentration of hydrogen
5. The cooled gas descends and can absorb water again

Measuring Procedure

The sample is weighed and filled into the sample tray. The sample tray itself is part of a reactor integrated within the HydroTracer. A heater warms the sample to a temperature chosen by the operator. The heat forces the water to evaporate.

The gaseous water reacts with the powdery reagent in a cooled area. Water is transformed into hydrogen. The concentration of hydrogen within the reactor atmosphere is a measure of the water content within the reactor. A gas sensor detects the hydrogen concentration.

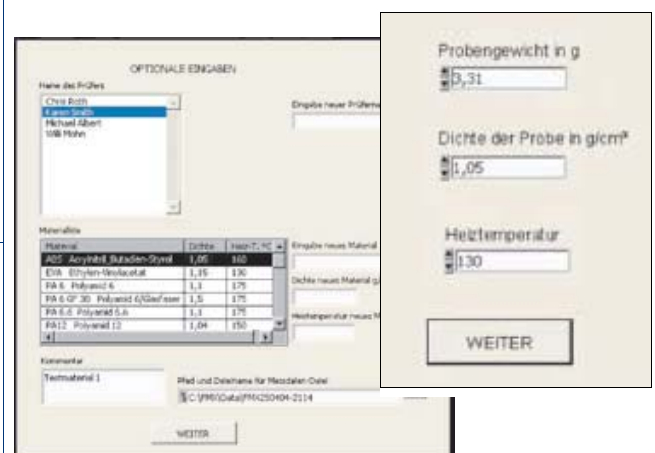
The moisture of the ambient air, which comes into the reactor at the beginning of the measurement, is detected by separate sensors and considered in the calculation of the water content of the sample. This method allows the precise analysis of the water content of the test material.

Reagent

The reagent calcium hydride powder can be handled easily. If kept airtight, it can be stored for a very long time. Each test requires approx. 0,1 g . Calcium hydride reacts with water to calcium hydroxide which can be easily disposed without environmental hazards

Operation

The HydroTracer is controlled by a program on an external PC. The operator is led through the sequence of manual test preparations by a picture-supported menu, thus avoiding handling errors. This preparation procedure takes about 2 minutes.



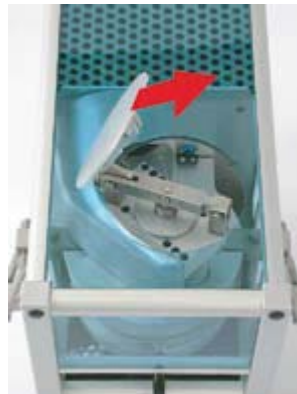
Test parameters are entered through a short menu guided procedure

Filling

The test preparation is guided by picture-supported instructions in the program. This method reduces the learning phase. Even inexperienced operators can perform a measurement without errors.



1. Lift lateral handles



2. Open reactor lid



3. Take out reagent bed



4. Change reagent



5. Take out sample tray



6. Fill in weighed sample



7. Clean seal face



8. Insert sample tray



9. Insert reagent bed



10. Clean seal & seal face



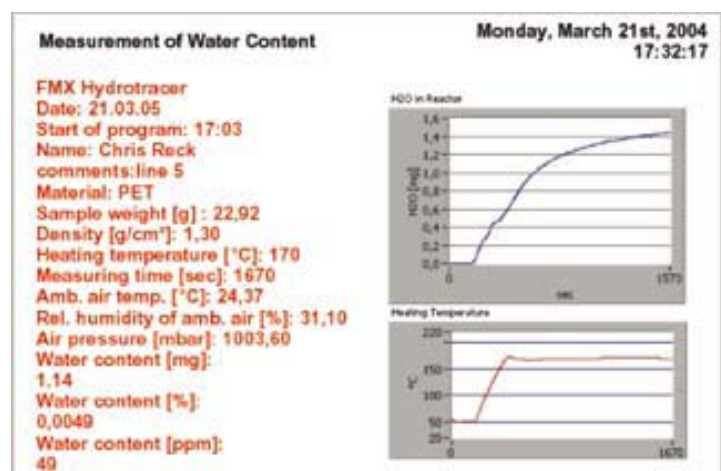
11. Close lid



12. Push down handles

The further process runs automatically. At the end of the test the test results are saved and the test procedure stops. An integrated fan cools the reactor to a stand-by temperature of 50 °C.

The HydroTracer is then ready for the next measurement. Depending on sample type or material, a test requires about 15 - 30 minutes.



The report is saved into a HTML-file and a spreadsheet

Comparison FMX HydroTracer vs. other methods

Material HydroTracer	FMX [% H2O]	Karl-Fischer Titrator [% H2O]	Manometric [% H2O]
ABS	0,0351 0,0422	0,0372	0,046
PE	0,0442 0,0278	0,0403	0,026
PA	0,1276 0,0351	0,1314	0,035
PET	0,0029 0,0042	0,0031	0,003
PET (flakes)	0,2779	0,2770	
PC	0,0203	0,0189	
PS	0,0520	0,0563	

TECHNICAL DATA

Sample weight:

0,01 g to 50 g (100 g) , depending on density and moisture

Sample volume: approx. 50 cm³

Reproducibility:

±0,1 mg H2O (1 mg water content) up to
±0,3 mg H2O (20 mg water content); see diagram

Display via PC:

absolute water content of sample in x.xx mg
relative water content in % and ppm
additional ambient air data: temperature, relative humidity
and pressure

Absolute measuring range: 0.2 mg to 30 mg H2O

Relative measuring range: 0.0005 % - 5 % moisture content

Accuracy: see diagram

Test temperatures: 50°C up to 210 °C in 1°C-steps

Reagent: CaH₂ powder, each test consumes approx. 0.1 g

Ambient air temperature: in °C in 0.1 °C steps

Ambient air pressure: 700-1100 mbar in 1 mbar-steps

Relative air humidity: 10 to 100 % in 0.1 % -steps

Power supply: 230 VAC or 115 VAC or 100 VAC

Weight: 4.6 kg

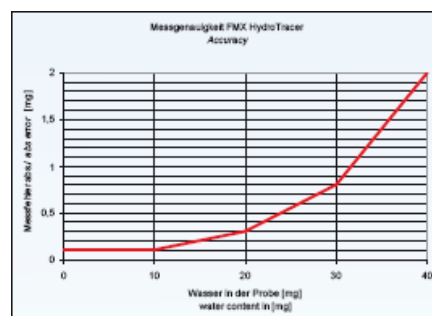
Dimensions: 285 mm x 170 mm x 250 mm (h x w x d)

Interface: Bi-directional RS 232 interface

Required PC:

Windows® 98, ME, 2000, NT, XP
Pentium® 233 or equivalent, 64 MB RAM minimum, 128 MB
recommended. serial interface RS 232 or USB via adapter

Technical data subject to alterations



Some applications:

Inorganic Salts, Calcium carbonate
Caprolactam, Sand, Carbon black

Plastics:

-ABS	-PC	-POM
-PA 6	-PE	-PP
-PA 6.6	-PE Talcum	-PS
-PA 12	-PEI	-PS expanded
-PAA	-PETa	-PVC
-PAI	-PETc	-TPE
-PBT	-PMMA	

Artec Testnology

Titaniumlaan 100, NL-5221 CK, 's-Hertogenbosch
P. O Box 12, NL-5330 AA, Kerkdriel
Tel. + 31 (0)73 6395080
Fax + 31 (0)73 6314625

E-mail info@artec.nl
Web www.artec.nl
KVK 20089339
BTW NL226577338B01