

precise simple safe robust

aboni

HydroTracer

Water Content Analyzer for Solids



Detection of Residual Water in Solids

The HydroTracer type FMX is a moisture analyzer designed for 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, granules and films can be tested. The HydroTracer is used primarily for testing the residual moisture of plastics.

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

A calibration is not necessary before the measurement.

The compact design and the easy operation allow the use in the production site. Even untrained staff members are able to handle the HydroTracer without problems. The robustness and the low weight recommends the device for mobile use, e.g. for acceptance tests of dryers or for intake inspections.

Principle of Operation

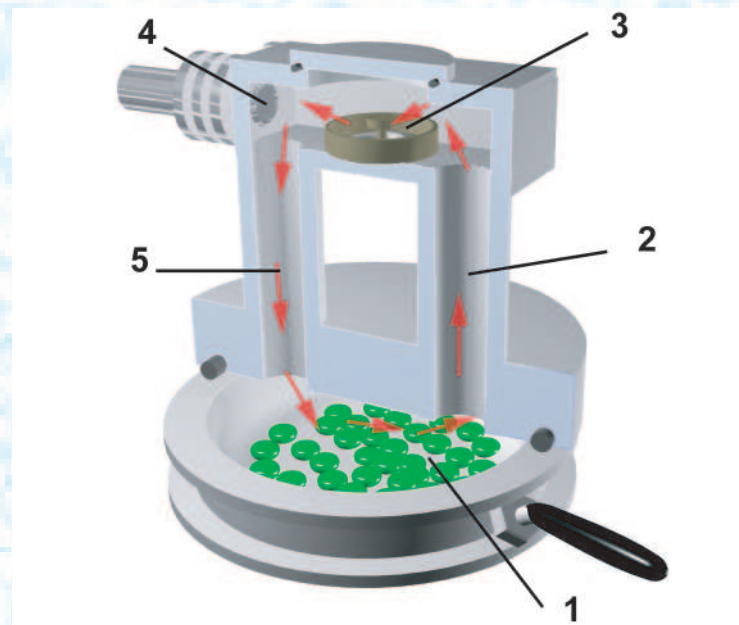
The sample material is weighed and filled into the sample tray. The sample tray itself is part of a reactor integrated within the HydroTracer. A heater warms the sample to a temperature chosen by the operator. The heat forces the water to evaporate. The gaseous water reacts with the powdery reagent in 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 unique method allows the precise analysis of the water content of the test material.

The Reagent

The reagent calcium hydride is a powder which can be handled without special precautions. The life time is nearly unlimited if kept airtight. Each test costs a few cent only. Calcium hydride reacts with water to calcium hydroxide which can be easily disposed without environmental hazards.

The Performance of a Test

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. The test performs in a few steps only, consuming about 2 minutes of working time.



Cutaway View Of The Reactor Scheme

1. Sample material is heated in the sample tray.
2. Hot humid gas rises.
3. Test reagent absorbs water and releases hydrogen.
4. Sensor measures the concentration of hydrogen gas.
5. Cooled, dry gas descends and can absorb more water vapor.

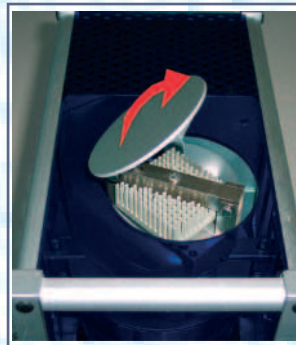
Optional input		
Name of operator		Input new operator
Bruno Dreier Miller JH. Nash, W. Thurnbull Tsao Sen-Chi		<input type="text"/>
List of materials		Input new material
Material	Densit	Heating temperatur
EVA Ethylen-Vinylacetat	1.15	130
Hytrel	1.1	175
PA 6 Polyamid 6	1.10	160
PA 6 GF 30 Polyamid 6/GF	1.50	160
PA 6.6 Polyamid 6.6	1.10	160
PA12 Polyamid 12	1.04	150
PAEK Polyaryletherketon	1.30	175
Density new material		<input type="text"/>
Heating temp. new mat. °C		<input type="text"/>
comments		
Batch 123		
Path and name of data-file		
Data: \FMX280910-1019		

First the test parameters are acquired in a short menu

The loading procedure is advised by picture supported instructions of the software. This way handling errors are reduced to a minimum.



1. Lift the side handles



2. Open the reactor lid



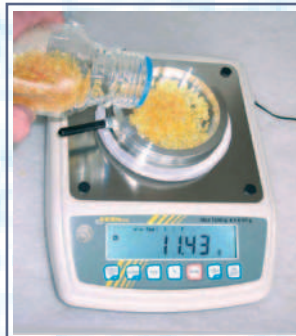
3. Lift reagent tray



4. Change reagent



5. Remove sample tray



6. Load and weigh sample



7. Clean the rim of the tray



8. Insert sample tray



9. Insert reagent tray



10. Clean seal surface



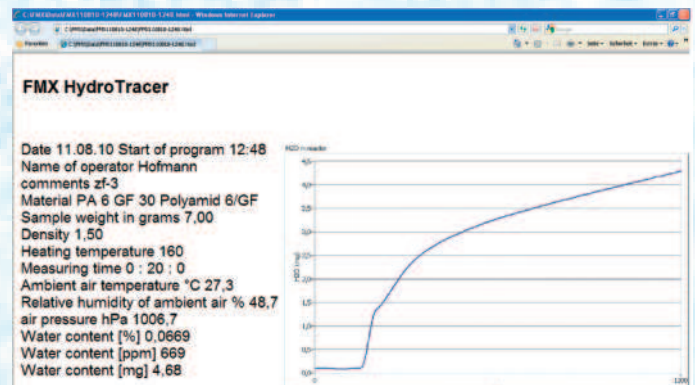
11. Close reactor lid



12. Close side handles

The rest is automatic and is controlled by a pc running the software. A typical test can take from 15 to 30 minutes to complete, depending upon the moisture level of the resin. An integrated fan cools the reactor to 50 °C afterwards.

The HydroTracer is ready for the next test then.



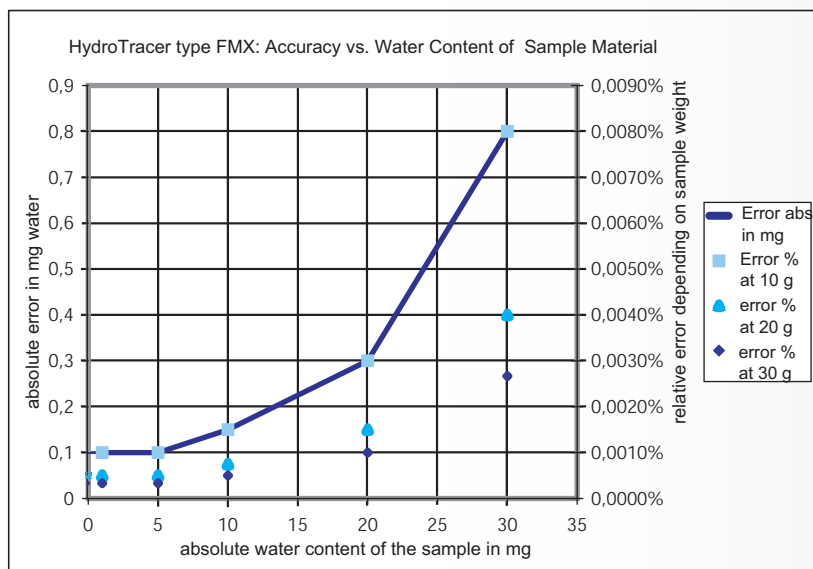
The test data is saved into a spread sheet file and as a html-report

Comparison With Karl-Fischer-titrator

Material	HydroTracer [% H ₂ O]	KF- Titrator [% H ₂ O]
ABS	0.0351	0.0372
PA6	0.0195	0.0217
PA66	0.0160	0.0150
PA12	0.0280	0.0300
PBT	0.0252	0.0270
PC	0.0203	0.0189
PE	0.0442	0.0403
PEI	0.0099	0.0087
PET	0.0029	0.0031
PMMA	0.0430	0.0418
PS	0.0520	0.0563
TPE	0.0097	0.0090

Technical Data HydroTracer Type FMX

Sample weight:	0,01 g to 50 g (100 g) , depending on density and moisture
Sample volume:	approx. 40 cm ³
Repeatability:	±0,1 mg H ₂ O (1 mg water content) to ±0,3 mg H ₂ O (20 mg water content)
Absolute measuring range:	0.2 mg - 30 mg water
Relative measuring range:	0.0005% - 5 % water content
Display via PC:	water content in mg, % and ppm, add. amb. air data: temperature, relative humidity and pressure
Accuracy:	see chart
Test temperatures:	50°C up to 210 °C
Reagent:	CaH ₂ powder approx. 0.1 g per test
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:	USB, RS 232 on demand
PC requirements:	Windows® XP, Vista, 7



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Technical data subject to alterations

OPTIONS

HydroTracer Type FLV

with enlarged sample tray (depth 30 mm instead of 10 mm). Suitable for test materials with a low bulk density, e.g. fibres, thin flakes or film chips, also for moulded parts with a small wall thickness.



Gold-coated reactor

for enhanced protection against water adhesion and corrosive media. All reactor parts in contact with sample material are gold-coated.



Automatic transfer of the sample weight to the control software.

