Mobile Moisture Meter for Plastics

AQUATRAC®-3E
Moisture Meter for Plastics

The water content of High-Tech plastic material has a great influence on the quality of the finished product. The test should be made swiftly on an instrument having a simple test procedure.

AQUATRAC®-3E is the result of continual further development of the popular AQUATRAC product, which has been on the market for 20 years now. Developed primarily for the plastics-processing industry, the device measures the moisture content of granular solids. AQUATRAC®-3E is robust, compact and easily transportable thanks to its new mobility! This means there are many different ways to use AQUATRAC®-3E directly at the production site, for example:

- To check incoming granulates
- To monitor and optimise the drying of granulates
- To measure granulates right at the machine
- To take measurements from a finished component, e.g. after conditioning
- To take laboratory measurements
- And many more!

As the principle of operation is an absolute chemical method, no calibration is required for each different substance tested. AQUATRAC®-3E can be used independently of a computer or other peripheral.

With the AQUATRAC®-3E different ranges are obtained by different sample weights. AQUATRAC®-3E is able to detect even the most minute traces of moisture (less than 0.01% H₂O) in large, representative testing samples (up to 100 g). In the case of lower-weight samples, the measuring range can be increased to detect very high degrees of moisture.

Since AQUATRAC®-3E is now able to achieve ultra-precise readings using a single measuring cup, it is no longer necessary to switch from one measuring cup to another.

The measuring volume consists mainly of the sample container, which contains the sample and the reagent.

Weighing the sample there is no need to meet the exact value. The actual weight is fed into the instrument. This simplifies the handling. The sample is placed into the sample container which is then evacuated by the built-in vacuum pump, which takes approx. 30 sec. The pressure obtained is lower than 10 mbar. The sample container is then heated up to the selected temperature (between 60°C to 200°C).

Operating the AQUATRAC®-3E involves only a few simple steps, which are executed via the device’s touch screen. If the user prefers, he can also have the touch screen guide him step by step through the measurement process.
Water and calcium hydride react according the following equation, producing hydrogen:

\[ \text{CaH}_2 + 2 \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + 2 \text{H}_2 \]

This reaction takes place in the sealed reaction vessel of AQUATRAC®-3E. It is evacuated by using a built-in vacuum pump, before the measurement. The container is then heated up to the measuring temperature. The evaporating water reacts with the reagent calcium hydride to generate a gas. The gas produced is hydrogen; the gas pressure is proportional to the water content in the sample and is monitored by means of a piezoelectric transducer. AQUATRAC®-3E calculates the ratio of pressure to sample weight and displays the result in terms of H\text{O} content, either as a percentage or in parts per million (ppm). Volatiles other than water do not react with the reagent and will condense, hence not influencing the reading. The reagent is placed in a mesh based insert above the sample. The partial pressure in the gas system is zero; therefore the water content is selected completely. This, in combination with the heat applied and the vacuum, means results are obtained in a short time. Furthermore the test is not affected by the presence of oxygen and no carrier gas is needed.

The reagent calcium hydride used by AQUATRAC®-3E is in a granular form and is specific to water. It is nonpolluting and nontoxic, so no special disposal is required. By using the dosing spoon, the mesh based insert has to be filled with a certain amount of the reagent. The quantity of one filling is sufficient material for a couple of measurements and the amount of produced hydrogen by each measurement is rather low. The calcium hydride can be supplied in quantities of 250 g, which is sufficient for approx. 1000 tests.

AQUATRAC®-3E contains an extensive product data bank with the required default settings for bulk density and measuring temperature. This allows measurements to be taken quickly, without having to input the necessary parameters each time.

The databank can be expanded or updated at any time, ensuring a perfect fit for individual customer needs!
### Technical data

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Chemical reaction with calcium hydride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample weight</td>
<td>0.1 g - 100 g according to range</td>
</tr>
<tr>
<td>Test temperature</td>
<td>80 °C - 200 °C in 1 °C - steps</td>
</tr>
</tbody>
</table>
| Accuracy            | • Measurement accuracy: ± 2% of reading / ± 1% of range  
                      | • Reproducibility: approx. ± 1% of reading  
| Ranges              | 3 different ranges:                    |
|                     | • lower 0.1%                           |
|                     | • 0.1% - 0.5%                          |
|                     | • higher 0.5%                          |
| Test time           | 10 - 45 min. dependent on material    |
| Display             | % H₂O or ppm                           |
| Power supply        | 100 - 230V (50/60 Hz, 450W) / dependent on version |
| Dimensions (W x D x H) | 51 * 32.5 * 23 cm                |
| Weight              | 13.0 kg / 14.8 kg                     |

### Applications

- Acrylonitrile butadiene styrene (ABS)
- Polybutyleneterephthalate (PBT)
- Ethylene Copolymer (EVA)
- Polyamide 6.6 PA 6.6
- Polyamide 6 PA 6 GF 30
- Polyamide 12 PA 12
- Polycarbonate (PC)
- Polyester (PET)
- Polyester elastomer (TPE)
- Polyether imide (PEI)
- Polyethylene (HDPE)
- Polyethylene (LDPE)
- Polyethylene terephthalate (PETP)
- Polymer blend (PETP/PC)
- Polymethylmethacrylate (PMMA)
- Polypropylene (PP)
- Polyphenylene ether (PPE)
- Polyphenylene sulphide (PPS)
- Polysulphone (PSU)
- Polyurethane (TPU)

### Data storage

The AQUATRAC®-3E's internal hard drive can store up to 500 readings. Measurement results can be easily transferred to a computer for further processing via an USB stick. By connecting a printer, one can even print out the results data directly from AQUATRAC®-3E.

### Calibration

For calibration of AQUATRAC®-3E the standard sodium molybdate dihydrat according DIN EN ISO 15512 is used. Calibration is done like a standard test and could be done onsite.

### Some typical plastics

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