

Product Description – OmniTek AVM-3000 Moisture Analyzer

Preface

Water in plastics is a highly unwanted substance that may cause problems in further processing like extruding or injection moulding. Effective drying is an essential process that requires accurate analysis of water content.

Three alternative analysis methods are specified in International Standard ISO 15512:

- A. Method A is an extraction method using anhydrous methanol followed by a Karl Fischer titration of the extracted water. It can be used for all plastics and is applicable to granules having a maximum size of 4 mm ×4 mm ×3 mm.
- B. Method B is a vaporization method using heated, dry air or nitrogen gas to evaporate the water, followed by a Karl Fischer titration of the collected water. It can be used for all plastics and is applicable to granules smaller than 4 mm ×4 mm ×3 mm.
- C. Method C is a manometric method. The water content is determined from the increase in pressure which results when the water is evaporated under a vacuum. This method is not applicable to plastic samples containing volatile compounds, other than water, in amounts contributing significantly to the vapour pressure at room temperature.

The temperature settings for the vaporization method described in International Standard ISO 15512 are not specified (both method B and C). For the manometric method, a temperature of 200 °C is often used. However, for some condensation materials this might be too high and could e.g. cause generation of water due to a condensation reaction. The heating temperature should be optimized concerning the material to be tested, the equipment in use and the practical circumstances. If the temperature is too low, the total amount of water in the material to be tested will not be evaporated completely, whereas too high temperatures cause water generation due to effects like degradation and condensation reactions.

System Characteristics OmniTek AVM-3000

The AVM-3000 fully complies with the respective requirements in ISO 15512, method C and related specifications for moisture determination in plastics. The system consists of a compactly designed table top instrument with a movable oven, control buttons (only used in manual mode) and a central touch screen LCD. The inside consists of a glass/metal vacuum system, connected through pneumatic valves, with a high-resolution pressure cell attached.



The major advantages of the system are :

- Very easy to use
- No need for chemicals
- Does not require highly trained laboratory operators
- Can be deployed in a production environment just as easily as in the laboratory
- Hardly uses any consumables
- Very robust, extremely low on maintenance
- Reliable and repeatable results deep into the PPM range

The system itself features a clearly readable touch screen LCD-display, which constantly gives information to the user about the status of a measurement and can be used to access and change all system parameters. The user has the option to perform measurements in manual or automatic mode.

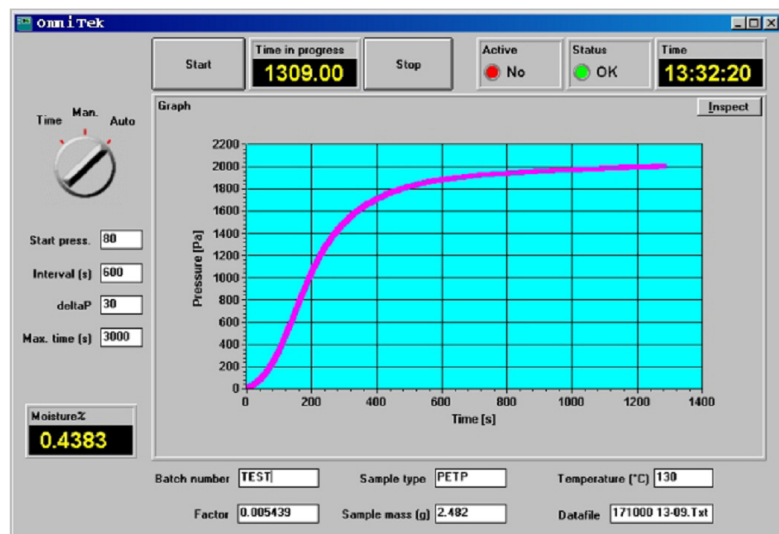
Although the system can optionally be connected to a pc, it offers full functionality as a stand-alone unit. No pc is required for automated measurement. An optional external printer can be connected as well to print out measuring results.

Measuring Procedure

The user takes a sample, weighs it and inserts it into the sample tube, connecting it to the AVM-3000. After pressing the start button, he can enter the sample ID and weight, after which the AVM-3000 will start the measurement. At this point, there is no need for the operator to remain present. The instrument will evacuate the sample tube to a pressure < 100 Pa (ISO requirement), after which the oven will be lifted, heating up the sample. Under influence of vacuum and heat,

moisture will evaporate from the system, which is registered by the pressure cell inside. Depending on the measurement mode (time or drift), the measurement is ended as soon as the measurement time has expired, or the pressure drift has reached the limit specified by the operator.

During the measurement, the moisture content is continuously shown on screen. When the AVM-3000 has ended the measurement, it will automatically evacuate the internal vacuum system, readying itself for the next measurement. The result is retained on screen for recording by the user, and printed to the optional printer. A typical measurement from start to end takes between 20 and 45 minutes, of which only 2 require the operator's presence.



Omnitek AVM-3000 description

1. Features

- 1.1 This instrument meets the requirements for automated determination of moisture content in plastics.
- 1.2 The instrument conforms to ISO 15512, method C, for the determination of moisture content in plastics.

2. System configuration

- 2.1 AVM-3000 automated moisture analyzer 1 set
- 2.2 Standard accessories for normal operation (see §4) 1 set
- 2.3 Vacuum pump capable of pressures < 100 Pa (see §7) 1 set
- 2.4 Optional spare parts (for period of 2 years, see §6) 1 set
- 2.5 Optional printer, including power supply and cable 1 set
- 2.6 Optional PC software for instrument control and data acquisition, see §8) 1 set

3. Specification

- 3.1 Bench top automatic moisture analyzer, 460 x 300 x 760 mm. (l x w x h), 25 kg.
- 3.2 Measuring range : 30 ppm – approx. 5%
- 3.3 Detection method : high resolution pressure cell
 - 1) Non-linearity : < 0.1% of the measuring span
 - 2) Long term stability : error < 0.1% per year
- 3.4 Sample tube : laboratory grade borosilicate, reusable.
- 3.5 Automated :
 - 1) Measurement cycle, time based / drift based
 - 2) Moisture content calculation
 - 3) Print out of results
- 3.6 General
 - 1) Display and data entry : high resolution graphical touch screen LCD
 - 2) Measuring units : Pa (pressure), % / ppm H₂O
 - 3) Temperature range : 20 – 220°C
 - 4) Temperature stability : better than ± 1°C
- 3.7 Data communication : RS-232C, 1 channel
- 3.8 Compressed air connection : 6 mm. compression fitting
- 3.9 Optional external printer : speed 2 lines/sec, 9-pin serial impact dot matrix
- 3.10 Configurable system / measurement parameters
 - 1) Calibration factor, temperature set point, starting pressure
 - 2) Timer mode : measurement time
 - 3) Drift mode : drift, interval, maximum measurement time
 - 4) Communication (none/printer/PC software), date, time
 - 5) Sample ID, sample weight, measuring unit (% / ppm), temperature unit (°C/F)
- 3.11 Safety
 - 1) Overtemperature protection on oven
 - 2) Sample tube detector (prevents exposure of the system to outer air)
- 3.12 Electrical characteristics : AC 110-230 V, 50-60 Hz., 600 W.

4. Standard accessories for normal operation (included)

- 1) Sample tube, 10 pcs.
- 2) Calibration salt, 1 carton (10 grams)
- 3) 3m. pressure hose Ø6 mm. (to connect to compressed air line)
- 4) Power supply cable, 2 m.
- 5) Operation manual, English, 1 pce.

5. External Requirements (not included unless specified in quotation) :

- 1) Compressed air supply 5-6 Bar (filtered)
- 2) Vacuum pump capable of pressures < 100 Pa
- 3) Analytical weighing scales, recommended resolution : 0.1 mg Specification sheet AVM - 3000

6. Spare parts for 2 years normal operation (not included unless specified) :

- 1) Viton O-ring for KF-10 centering ring, 10 pcs. (4 in system)
- 2) Viton O-ring for KF-16 centering ring, 10 pcs. (2 in system)
- 3) Viton O-ring for KF-25 centering ring, 5 pcs. (1 in system)
- 4) Viton O-ring for pneumatic valves, 12 pcs. (6 in system)
- 5) Viton O-ring for sample tube sealing, 10 pcs. (1 in system)

7. Vacuum pump (not included unless specified)

- 1) End pressure (without gas ballast) : 3 x 10⁻²mBar
- 2) Nominal air movement 50/60 Hz : 4 / 4,8 m³/ hour
- 3) Complete with oil filter and aeration valve
- 4) Electrical power : 180 W
- 5) Dimensions : 330/132/220 (l x w x h)
- 6) Weight : 11.7 kg.

8. PC software (not included unless specified)

The PC software application is entirely optional but offers substantial added value : with one PC you will be able to control and gather data from up to 4 instruments, optionally using state-of-the-art Bluetooth technology. Running under Windows 2000 / XP, it has the following main features :

8.1 Main features :

- 1) Real-time measurement graph (pressure vs. time)
- 2) Option to halt measurement upon exceeded moisture value
- 3) Easy access to all system and measurement parameters : changing a setting within the application will automatically update the instrument.
- 4) Store material profiles for easy retrieval (test temperature, max. moisture content etc.)
- 5) Storage of all measurement data, including graph
- 6) Quickly search and filter specific measurement data
- 7) Export data to various file formats such as .tab (tab separated), .csv (comma separated) and .xls (MS Excel)

8.2 System requirements :

- 1) Operating system : Windows® 2000 / XP
- 2) Processor : 1.800 Mhz, 256 MB RAM
- 3) Interface : RS-232, one available COM-port for each system connected.
- 4) Optional : bluetooth sender/receiver, contact us for more information

9. Additional remarks

- 9.1 Warranty will be granted for 1 year on construction faults and parts failure
- 9.2 Installation, operation, test-run, maintenance and warranty replacement shall be carried out by the designated representative at the end-user's site.