Complete Moisture Analysis

Water Activity Instrumentation



AQUA LAB BY DECAGON

Dew Point Water Activity & Moisture Analysis
Moisture Sorption Isotherms
Accessories

PRODUCT CATALOG 2013-2014

DEW POINT

Water Activity

Use **Aqualab 4TE** for lab quality water activity measurements at the line, receiving dock, processing plant, storage facility— anywhere you need to verify the safety and quality of your products and ingredients.



How it Works

Put a 7.5 ml product sample in a disposable cup, seal the chamber over the sample, and wait for vapor equilibrium. An optical sensor focused on a tiny mirror triggers the precise dewpoint temperature measurement of the sample. That dewpoint temperature is then translated into water activity.

Easy to Clean

The chamber lid lifts up allowing easy access to clean sensors.

Secure Data

The 4TE stores up to 8,000 secure data points including time and date for up to 25 unique users with every measurement and calibration.

Easy to Use

AquaLab 4TE makes water activity measurements quick, accurate, and simple. Using AquaLab, anyone, from a researcher in the lab to an operator at the line can measure water activity in 5 minutes or less to 0.003 a_w specifications.

AQUALAB 4TE SPECIFICATIONS

Sensor Types: Chilled-mirror dewpoint, Infrared temperature
Accuracy: ±0.003 a_w
Range: 0.030 to 1.000 a_w
Repeatability: ±0.001 a_w
Resolution: ±0.0001 a_w
Measurement Time: Less than 5 min (most samples)
Operating Environment: 5 to 50°C (39.2 to 122°F) 20 to 80% Relative Humidity (non-condensing)
Temperature Control: 15 to 50°C (±0.2°C)
Universal Power: 110 V to 220 V AC, 50/60 Hz Less than 0.4 amps
Data Interface: USB & RS232A Compatible
Warranty: Three years, factory parts & labor
Test Result Memory: 8,000 readings (each reading includes water activity, temperature, time, date, operator, and sensor used)
Program Identification: Alphanumeric; Programmable to display product name, lot, or product ID number
Certifications: CE; AOAC Approved Method for Measurement of Water Activity

AQUALAB 4TEV SPECIFICATIONS

Samples Containing Volatiles: All the features of the Series 4TE plus a volatiles sensor for measuring samples containing propylene glycol, ethanol and other volatiles.
Easy Switching: The AquaLab 4TEV comes with both a volatiles capacitance sensor and the standard Series 4 dewpoint sensor. You can switch between sensors using the 4TEV instrument menu.
Volatiles Sensor Accuracy: ±0.015 a_w
Dewpoint: ±0.003 a_w

Moisture Content

The **AquaLab 4TE DUO** uses the "dewpoint method" to measure moisture content and water activity with the same instrument. The result: complete moisture analysis in about five minutes with some big advantages over traditional moisture meters.



How it Works

The dewpoint method doesn't use chemicals or high temperatures. Using it is as easy as sealing the sample in the chamber and waiting for vapor equilibrium. Inside the instrument, a optical sensor focused on a tiny mirror triggers the precise dewpoint temperature measurement of the sample. That dewpoint temperature is then translated into moisture content and water activity readings. Because the instrument is lightweight, portable, and easy to use, it puts precision moisture content readings in the hands of virtually anyone on the production line or in the supply chain.

Testable Accuracy

Standardization issues have often made moisture content more opinion than fact. As one manufacturer said,

"My suppliers quote me what the moisture content was when the ingredient shipped. That number's meaningless. They can say whatever they want because we don't have reliable standards to measure against."

The dewpoint method lets you validate moisture content readings with independently verifiable salt standards. DUO stores time, date, and user information with every calibration and measurement, and includes administrator passwords and access restrictions so you can ensure the integrity of your data.

AQUALAB 4TE DUO SPECIFICATIONS

Sensor Types: Chilled-mirror dewpoint, infrared temperature
Accuracy: ±0.003 a_w
Range: 0.030 to 1.000 a_w
Moisture Content Precision: 0.02%
Agreement to Moisture Content Reference Method: ±0.1% to ±0.5%
Resolution: ±0.01% mc ±0.0001 a_w
Measurement Time: Less than 5 min (most samples)
Results Displayed: Percent moisture and water activity
Temperature Control: 15 to 50°C (±0.2°C)
Temperature Stability: User-selectable range, internal thermoelectric controlled
Test Result Memory: 8,000 readings (each reading includes water activity, moisture content, temperature, time, date, operator, and sensor used)
Program Identification: Alphanumeric; Programmable to display product name, lot, or product ID number
Operating Environment: 4 to 50°C (39.2 to 122°F) 0 to 90% Relative Humidity (noncondensing)
Universal Power: 110 V to 220 V AC, 50/60 Hz Less than 0.4 amps

Moisture Sorption Isotherms

The AquaLab VSA is a powerful formulation tool. It shows how a product's water activity changes as it takes on and loses water. It uses chilled mirror technology to create high resolution moisture sorption isotherms based on hundreds of data points in about 48 hours. An easy to use software program simplifies data collection and analysis.



Isotherms

The relationship between water activity (a_w) and moisture content at a given temperature is called the moisture sorption isotherm. This relationship is complex and unique for each product due to the different interactions (colligative, capillary, and surface effects) between the water and the solid components at different moisture contents. An increase in a_w is almost always accompanied by an increase in water content, but in non-linear fashion. Moisture sorption isotherms are sigmoidal in shape for most foods, although foods that contain large amounts of sugar or small soluble molecules have a J-Type isotherm shape.

USES FOR ISOTHERMS

- Phase Changes
- Texture
- Caking /Clumping
- Shelf Life
- Kinetics
- Packaging

DDI Isotherm Generation

In DDI mode, the AquaLab VSA exposes a sample to saturated wet air for adsorption and desiccated air for desorption. As the sample dynamically takes up or loses moisture, the change in humidity is determined directly using a dewpoint sensor and the weight change is tracked with a precision balance to create a detailed moisture sorption isotherm for the sample.

Isotherms hold the key to understanding moisture in food and pharmaceutical products. Isotherms help you:

Set Specifications

Determine the most stable water activity for your food product and predict reactions and textural changes that end shelf life.

Guide Formulation

Map out how an ingredient or recipe will respond as you change formulation.

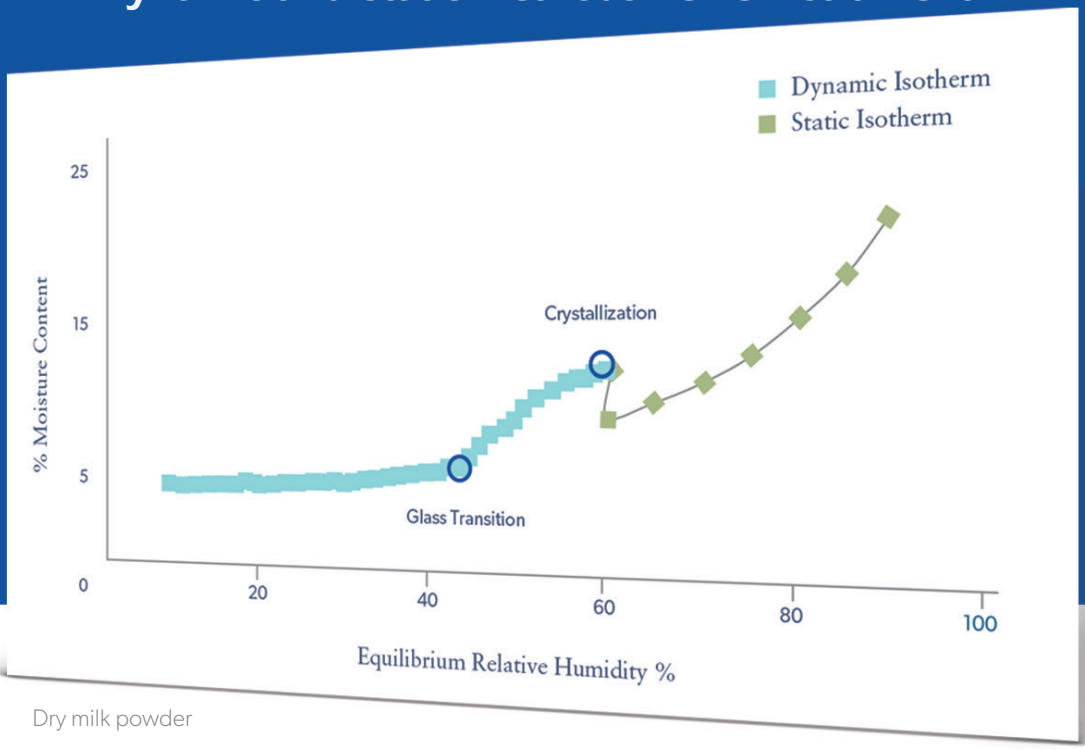
See Details

Typical isotherms have fewer than a dozen data points with DDI Isotherms. AquaLab Vapor Sorption Analyzer generates over 100 data points for each isotherm curve.

Measure Stability

Predict how abuse conditions like high humidity will affect shelf life.

Dynamic and Static Methods - One Instrument



Dry milk powder

DVS Isotherm Generation

The AquaLab VSA also offers traditional DVS isotherm generation. DVS analyzers step humidity to a specified level and hold the sample at that humidity until it comes to vapor equilibrium. In DVS mode, the VSA produces isotherms equivalent to those produced by any existing vapor sorption analyzer.

Use DVS to explore:

- Kinetics of sorption
- Moisture diffusion coefficients
- Product surface area and pore size
- Packaging requirements
- In package desiccant requirements
- Maximum moisture sorption
- Moisture Migration
- Crystallization

AQUALAB VSA SPECIFICATIONS

Repeatability: ±0.003 a_w
Range: 0.030 to 0.950 a_w
Isotherm Methods: Dynamic Dewpoint Isotherm (DDI) and Static (DVS)
External Gas: Not needed, If external gas, no more than 7 PSI
Data Interface: USB
Mass Resolution: ±0.1 mg
Water Activity: Accuracy ±0.005 a_w
Water Reservoir: 20 ml
Sample Cup Volume: 10 cc
Sample Weight: 500 to 5,000 mg
Power: 110 V to 220 V AC, 50/60 Hz
Weight: 28 lbs
Temperature: 15 to 60°C
Temp Stability: ±0.1°C
Dimensions: 10 x 15 x 12 in (25.4 cm x 38.1 cm x 30.5 cm)

"The Vapor Sorption Analyzer has become an invaluable insturment to our R&D lab. The Dynamic Dew point Isotherm (DDI) method allows us to generate an isotherm in 12-24 hours, at a wide range of temperatures. The Dynamic Vapor Sorption (DVS) method provides a fully automated process of obtaining kinetics of moisture uptake in our products. The "Test Wizard" function in the software allows for quick and easy test set-up, and exporting the results is done with one click of a button. The Vapor Sorption Analyzer has provided us with very reliable and repeatable results that have been instrumental to the development or our products. Thanks!"

***Kara Grant**, GMCR Specialty Coffee Business Unit*

Water Activity

The **AquaLab Pre** is a robust entry-level water activity meter with stripped down form, not limited function. It uses the same industry-standard primary a_w method you find in the top-of-the-line AquaLab Series 4TE.

The **Pawkit** delivers ultra-compact ±0.02 a_w measurements in 5 minutes. This sleek device is compact, lightweight, portable, and only 4 inches long. Ideal for rough environments where quick, inline water activity measurements are needed. Staple for safety inspectors, and consultants.



Minimum maintenance

Pre uses the dewpoint method—a primary measurement of water activity. That eliminates the need for lengthy sensor calibration. Just a quick verification check and you're good to go.

Real Water Activity–FAST

No need to sacrifice accuracy for speed. Primary dewpoint measurement allows Pre to deliver top-accuracy readings in 5 minutes or less.

Solid Repeatability

Water activity is temperature dependent; measuring at the same temperature every time assures consistency in your readings. Pre holds the sample at 25°C so temperature fluctuations won't affect your readings.

Reliable Accuracy

Pre's dewpoint method and temperature-stable features mean good agreement between the Pre and the Series 4. Its basic 0.01 a_w accuracy enables many of our customers to add water activity testing at the line, loading dock, or offsite facility.

PRE SPECIFICATIONS

Sensor Types: a. Chilled-mirror dewpoint, b. Infrared temperature
Accuracy: ±0.01 a_w
Resolution: Chilled Mirror ±0.001 a_w
Range: 0.05 to 1.000 a_w
Sample Dish Capacity: 7 ml recommended (15 ml full)
Measurement Time: Less than 5 minutes
Operating Environment: 4 to 50°C (39.2 to 122°F) 0 to 90% Relative Humidity (non-condensing)
Temperature Control: 25°C Sample Temperature
Universal Power: 110 V to 220 V AC, 50/60 Hz Less than 0.4 amps
Data Interface: RS232A compatible, 8-data bit ASCII code, 9600 baud, no parity, 1 stop bit
Warranty: One year, parts & labor
Certifications: CE; AOAC Approved Method for Measurement of Water Activity
Display: 20 x 2 alphanumeric display with backlighting
Accuracy: ± 0.2°C
Case Dimensions: 24.1 x 22.9 x 8.9 cm
Case Material: Powder painted aluminum
Weight: 3.2 kg

PAWKIT SPECIFICATIONS

Sensor: Dielectric humidity sensor
Accuracy: ±0.02 a_w
Resolution: ±0.01 a_w
Range: 0 to 1.0 a_w
Operation environment: 5 to 50°C (41 to 122°F) 0 to 90% relative humidity (non-condensing)
Measurement speed: 5 minutes
Battery life: 3 years typical

Software

AquaLink Software helps users organize, visualize, and track measurement data. AquaLink Software downloads measurements made by AquaLab Dew Point Water Activity Meters and creates Microsoft Excel reports containing user selected pertinent information.

AquaLink Software manages isotherm models on AquaLab Dew Point 4 DUO instruments.

- Part 11 Compatible available
- Now supports Windows® XP/Vista™/7*

BENEFITS:

- Manages multiple AquaLab 4 instruments
- Improved data filtering capabilities
- Easily generate Microsoft Excel files or copy and paste measurements directly
- Now includes graphing system to analyze data
- Simplified isotherm model management
- User configurable annotations and notes



Accessories



Verification Standards

Premixed, certified salt solutions for daily AquaLab performance verifications. Select standards which cover the range of water activities you typically measure. Unopened vials have a one year shelf life.

AVAILABLE STANDARDS:

- Distilled water (1.000 ± 0.003 a_w at 25˚ C)
- 0.5 M KCl (0.984 ± 0.003 a_w at 25˚ C)
- 2.33 NaCl (0.920 ± 0.003 a_w 25˚ C)
- 6.0 M NaCl (0.760 ± 0.003 a_w at 25˚ C)
- 8.57 M LiCl (0.500 ± 0.003 a_w at 25˚ C)
- 13.41 M LiCl (0.250 ± 0.003 a_w at 25˚ C)



Sample Cups

15 ml disposable sample cups and lids. Used in the AquaLab Series 4 (4TE, 4TEV, 4DUO), Pawkit and AquaLab Lite.

AVAILABLE IN BOXES OF 500 & 2,500



Cleaning Kit

Contains all cleaning materials needed to clean a benchtop water activity meter, a portable water activity meter, or a vapor sorption analyzer for one year for most customers.

1 YEAR SUPPLY

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30 Years

WORLD LEADER *in*
WATER ACTIVITY TESTING

Distributed by:

DECAGON ISO 9001:2008 CERTIFIED

AOAC INTERNATIONAL Approved Method 978.18

ASTM INTERNATIONAL ASTM D6836 02(2008)e2

NIST National Institute of Standards and Technology
Your AquaLab is calibrated to a NIST-traceable temperature standard.

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