NOVATRON SCIENTIFIC
A division of Rhopoint Metrology

RHOPOINT METROLOGY

Water Activity & ERH% Precision Instruments

The LabTouch-aW

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- Reduce cost & wastage
- Absolute confidence
- Maintain high product quality
- Maintain product shelf life & safety

novasina
The Art of Precision Measurement

What is water activity?

Water activity (also known as 'aW' or ERH%) specifies the unbound water available in your product. It's an important measurement to determine product quality and safety, especially microbial stability.

Water activity is the measurement of the equilibrium relative humidity of a material, that is the humidity that a hygroscopic material generates when it comes into balance with the air surrounding it in a sealed headspace. This "Available Water" is the unbound water able to come and go from a material by adsorption / desorption.

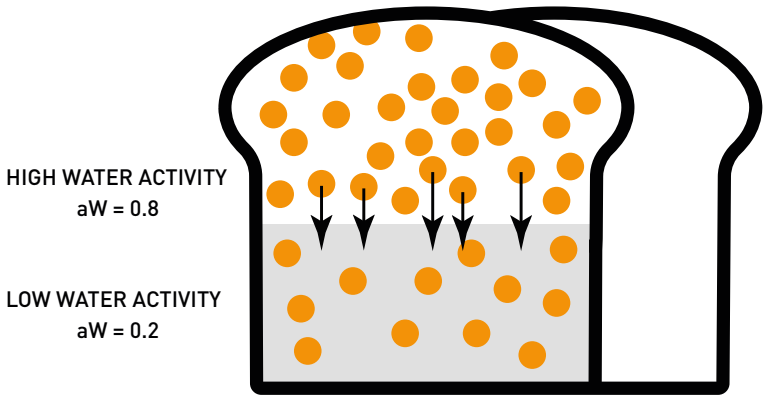
The water activity of the sample is equal to the relative humidity of air surrounding the sample in a sealed measurement chamber, normally at controlled temperature 25°C.

Water activity can be expressed as either: –
Equilibrium Relative Humidity (ERH) scaled 0-100% ERH units
or
Water activity (aW) scaled 0-1 aW units. Most microbiologists tend to use aW units.

Air relative humidity is influenced by temperature so it follows that equilibrium relative humidity (water activity) will be too. The higher the aW value, the greater the influence of temperature on the stability of water activity.

For most samples, temperature control of 25°C is essential above 0.85 aW units.

The aW value of a product may be critical to ensure microbial stability and safety, it may even be a legal parameter, often measured as part of Critical Control Point (CCP) validation, monitoring or verification. Water activity can be used for microbiological growth control, shelf-life, the stability of product composition (moisture migration), general product quality (texture, taste, potency & colour) .



Free water moving to a low aW area

The higher the aW value, the greater the influence of temperature on the stability of water activity.

Why measure water activity?

Water activity measurement is important to maintain high product quality safety and shelf life. By measuring water activity, it is easier to predict which micro-organisms will be possible sources of spoilage.

Measuring water activity makes it possible to control and improve the manufacturing process to ensure mechanical, physical, chemical and microbiological stability. The measurement of water activity is critical for the quality and health safety of a product.

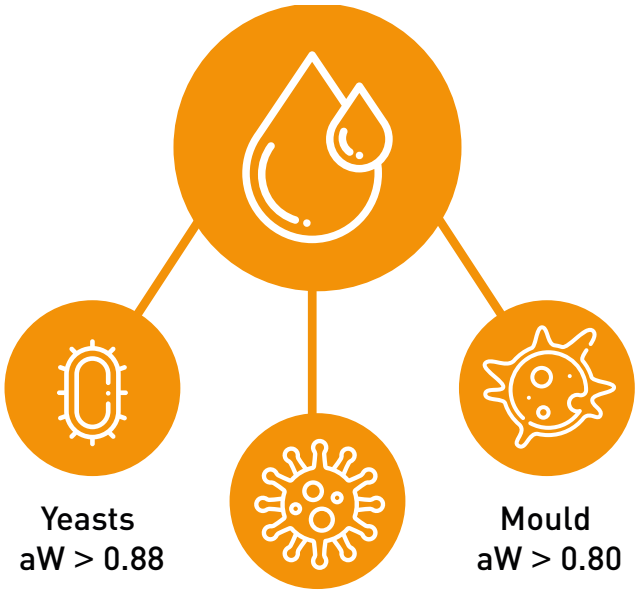
Water activity shows the amount of water which is available to micro-organisms for reproduction. Each type has a minimum water activity value. Below this aW value, the growth of that species isn't possible.

Water activity influences:

- Texture abnormalities
- Flavour abnormalities
- Microbiological stability
- Protein and vitamin content
- Chemical stability
- Enzymatic stability
- Water migration
- Enzymatic reactions
- Browning reactions
- Oxidation reactions
- Powder caking
- Shelf life
- Storage
- Packaging

Water activity value	Type of Micro-organism
aW = 0.91...0.95	Most bacteria
aW = 0.88	Most yeasts
aW = 0.80	Mildew
aW = 0.75	Halophile bacteria
aW = 0.70	Osmiophile yeasts
aW = 0.65	Xerophile mildew
aW = 0.6	Most moulds

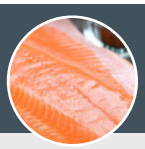
Water activity has a direct impact on growths of moulds, yeast and bacteria.



Left: Simple traceable calibration with RFID re-useable salt capsules. By swiping the salt over the chip reader, the calibration is automatically started.

Applications

Water activity is measured in a wide range of industries including;



Food

Meat, fish, cheese, grains, flours, pet food

- Texture abnormalities
- Flavour abnormalities
- Microbiological stability
- Protein and vitamin content
- Shelf life
- Storage
- Packaging
- Browning reactions

Pharmaceutical

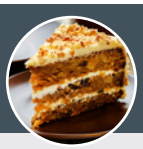
Pills, liquid medicines

- Microbiological stability
- Chemical stability
- Enzymatic stability
- Water migration
- Oxidation reactions
- Powder caking
- Shelf life
- Storage
- Packaging

Confectionery

Sweets, chocolates

- Texture abnormalities
- Flavour abnormalities
- Shelf life
- Storage
- Packaging



Bakery

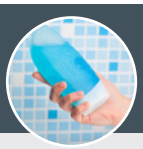
Breads, cakes, pastries

- Texture abnormalities
- Flavour abnormalities
- Microbiological stability
- Water migration
- Shelf life
- Storage
- Packaging

Cosmetics

Eye shadow, lipstick, foundation

- Oxidation reactions
- Powder caking
- Shelf life
- Chemical stability
- Enzymatic stability



Hygiene

Shower gel, liquid soap

- Chemical stability
- Enzymatic stability
- Shelf life
- Storage
- Packaging

Petrochemical

High ethanol, drilling muds and fluids

- Chemical stability
- Enzymatic stability
- Oxidation reactions
- Shelf life
- Storage
- Packaging

Tobacco

Cigars, cigarettes, rolling tobacco

- Flavour abnormalities
- Water migration
- Shelf life
- Storage
- Packaging

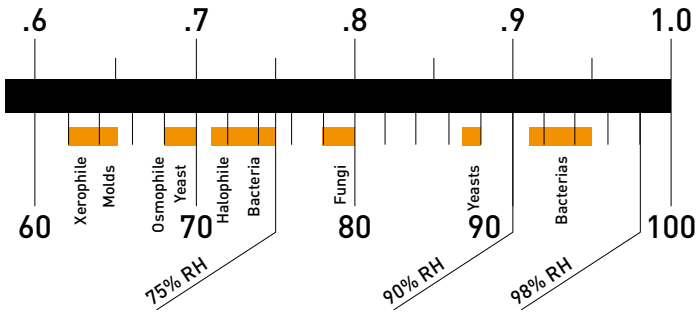
The LabTouch-aW is suitable forprocess / quality control on the production line or laboratory analysis and product development.

Case study

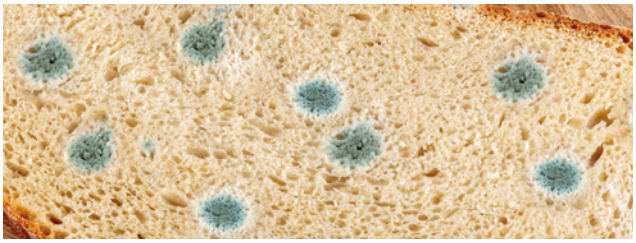
Water activity is measured in a wide range of industries and also at various stages of production and packaging.

CASE STUDY: BAKERY PRODUCTS

Water activity and ERH%
Water activity, or ERH%, is widely used as a quality control measure in bakery products to predict mould-free shelf life and the stability of composite products like layer cakes or filled croissants.



Mould growth prevention
Mould-free shelf life may be determined by using the water activity value in combination with other factors such as pH and preservative environments created within packaging. Mould may begin at water activity of 0.6 aW upwards, but below this level products are generally free from mould-growth.



The LabTouch-aW

The LabTouch mid-range water activity meter features fixed sample temperature control.

Fast and precise aW-measurement thanks to the worldwide unique "Novalyte"measurement technology CM2 sensor

The Labtouch readings

The LabTouch-aW with its compact and robust design offers the possibility for precision measurements with a semi-temperature controlled chamber.

Readings can be as fast as 5 minutes equilibrium time and all the data of a measurement, including the desired protocols, can be stored on a SD card and can be transferred to a PC or printer.

A special program is available for the analysis of this data. The evaluation can also be done by a spreadsheetusing Excel, this assures full quality assurance and traceability of all measurement data.

Recomended for:

- A range of 0.11 up to 0.95 aW
- Sample temperature control, limited to heating at + 2°C above ambient only
- Self-adjusting calibration against re-useable salts with optional UKAS certification

Fast equilibrium times as low as 5 mins, powders, solids or liquids

The LabTouch-aW benefits

The LabTouch-aW excels with speed, high measurement accuracy, reproducibility and robustness.

For more than 40 years Novasina has been the leader in the production of precision instruments for water activity measurement in food products as well as drugs, chemical products and cosmetics.

Thanks to a longstanding experience in research and development, we are able to offer today reliable, high quality "Swiss made" products that set new standards in the water activity measurement.

Consequently, this system sets new standards for aW-value measurement.

Benefits	
Sample temperature control at +2°C above ambient	✓
High reliability and long term stability of CM2 sensor cell	✓
Standardised sample volume EPW sample cup	✓
Easy handling and user-friendly menu structure	✓
Ergonomic housing design	✓
Large LCD - Display	✓
Factory calibration at 7 aW-value points	✓
Checking, testing and adjusting possibilities (SAL-T humidity standards)	✓
Low maintenance costs / simple cleaning	✓
Outstanding cost-performance ratio	✓
Unique Novasina CM2 precision sensor system; resilient to volatiles, fast response within 10 mins	✓

View LabTouch-aW online

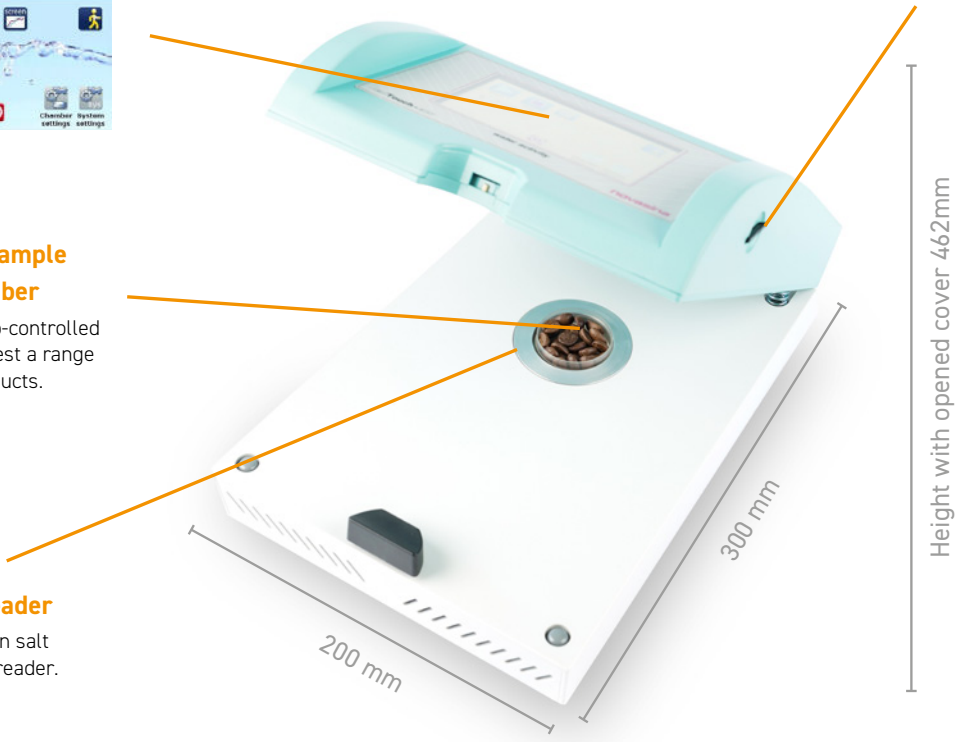
The LabTouch-aW features

Touch-screen
Intuitive operation with in-built operating guide on-screen.

SD card
Data logging function SD card.

Large sample chamber
Large thermo-controlled capacity to test a range of products.

RFID Reader
Calibration salt RFID chip reader.



Resistant and durable
Made from steel to be strong and durable

Portable
Easy to move in the laboratory or production line

Stand-alone instrument
Small footprint reduces space required in laboratory

Dual measurement
Humidity equilibrium detection

Fully compliant with ISO 18787: 2017 water activity testing standard

Included Accessories

- SD Card
- Calibration standards/certificates
- EPW sample cups

Specifications

LabTouch Instrument	
Size	105mm (H) x 200mm (W) x 300mm (D)
Current supply	4W Li-Ion battery 1700 mAh / 5Vdc ±6% Lithium ion battery 1700 mAh with protection control & "auto load"
Weight	2.8 kg
Power supply/mains	90 to 264VAC (50/60Hz)
Display	4.3" touch sensitive colour LCD display
Communication	SD card interface type: SD / SD HC data system: FAT-16 / FAT-32
Housing	Two-part PVC design housing, measurement chamber aluminium/ABS housing
Volume measurement chamber	Volume 21.1 ml standardised sample dishes
Dimensions Sample Cup	Spring-loaded measurement head (diameter 40 x 12 mm)
Protection Class	IP 22
21CFR 11 compliance	Partial

Measurement Specifications	aW value	Sample Temperature
Calibration points (%rH)	11%, 33%, 53%, 58%, 75%, 84%, 90%, 97%	Surface Infra-red + NTC
Measurement Range	0.11 aW to 0.95 aW (11 to 92% rh)	5°C to 45°C
Calibration Range	0.11 aW to 0.97 aW	N/A
Resolution	0.001 aW	0.1°C
Accuracy	± 0.005 aW (programmed temperature must be at least 2°C above ambient)	±0.1°C
Precision	±0.003 aW *	±0.1°C
Repeatability (typically)	±0.002 aW *	N/A
Temperature Control (programmable)	Programmable measurement temperature in the range of 15°C to 30°C (59°F to 86°F)	

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