NOVATRON SCIENTIFIC
A division of Rhopoint Metrology

RHOPOINT METROLOGY

Water Activity & ERH% Precision Instruments

LabSwift-*aw*

www.novatron.co.uk sales@novatron.co.uk

LabSwift-*aw*

- Portable, lightweight design
- Absolute confidence
- Maintain high product quality
- Maintain product stability

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.

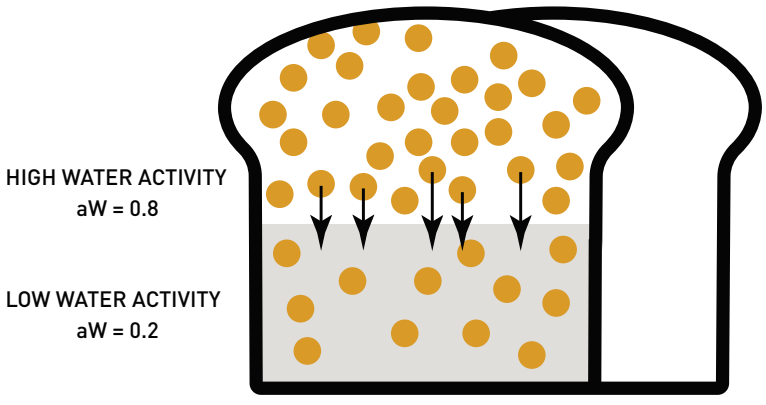
The water activity of the sample is equal to the relative humidity of air surrounding the sample in a sealed measurement chamber.

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.

For most samples, temperature control of 25°C is essential above 0.85 aW units. The Labswift is for sample testing at non-controlled temperatures for up to 0.85 aW

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

Moisture moves from areas of high to low water activity, impacting composite samples like layer cakes, where layers may exchange moisture over time.

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.

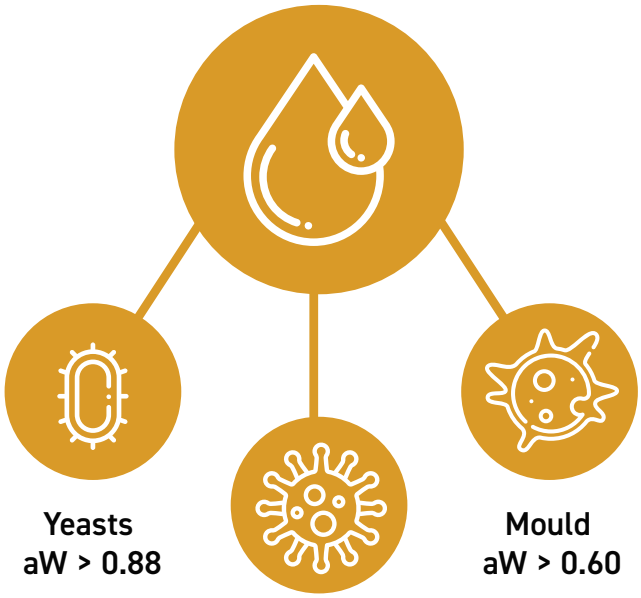
Water activity shows the amount of water which is available to micro-organisms for reproduction. Each type has a minimum water activity value. Below this aW value, the growth of that species isn't possible.

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

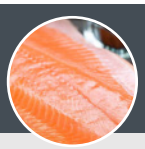
Water activity value	Type of Micro-organism
aW > 0.91-0.95	Most bacteria
aW > 0.88	Most yeasts
aW > 0.80	Fungi
aW > 0.75	Halophile bacteria
aW > 0.70	Osmiophile yeasts
aW > 0.65	Xerophile yeast
aW > 0.6	Most mould

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



Applications

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



Food

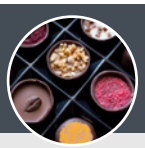
Meat, fish, cheese, grains, flours, pet food

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

Pharmaceutical

Tablets, liquid medicines

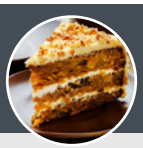
- Microbiological stability
- Chemical stability
- Enzymatic stability
- Water migration
- Oxidation reactions
- Powder caking
- Shelf life
- Storage
- Packaging



Confectionery

Sweets, chocolates

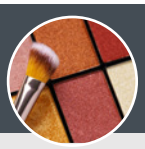
- Texture abnormalities
- Flavour abnormalities
- Shelf life
- Storage
- Packaging



Bakery

Breads, cakes, pastries

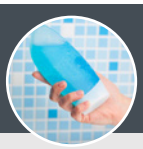
- Texture abnormalities
- Flavour abnormalities
- Microbiological stability
- Water migration
- Shelf life
- Storage
- Packaging



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 LabSwift-aW is suitable for process / quality control on the production line or laboratory analysis and product development.

The LabSwift-*aw*

The LabSwift-aw is a high-precision water activity meter, perfect for routine water activity measurements up to 0.85 aW when sample temperature control is not required.

For more than 60 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 these reliable, high quality “Swiss-made” products that set new standards in the water activity measurement.

The LabSwift-aw with its ergonomic design offers the possibility for portable measurements thanks to the optional lithium-ion battery. All data of a measurement, including the desired protocols are 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 spreadsheet using Excel, this assures full quality assurance and traceability of all measurement data.

The LabSwift-aw excels with speed, high measurement accuracy, reproducibility and robustness. Consequently this system sets new standards for the portable aw-value measurement. Supplied complete with calibration standards, sample cups and a hard carry case.

Benefits	
High reliability and long term stability of CM2 sensor	✓
Easy handling and user-friendly menu structure	✓
Portable, and long life battery powered option	✓
Data logging function with SD card	✓
Factory calibration at 5 aW-value points	✓
Widely maintenance-free / simple cleaning	✓
Standardised sample volume ePW sample cup	✓

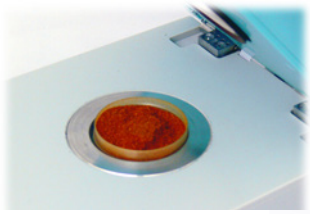
Key benefits:

- Portable, light-weight design supplied with sample cups and calibration standards
- Fast equilibrium times for powders, solids or liquids
- Calibration against re-useable salts with optional UKAS certification
- For recommended aW range 0.11 up to 0.85 aW
- 2 x UKAS certified calibration standards included with every new instrument

The LabSwift-*aw* features

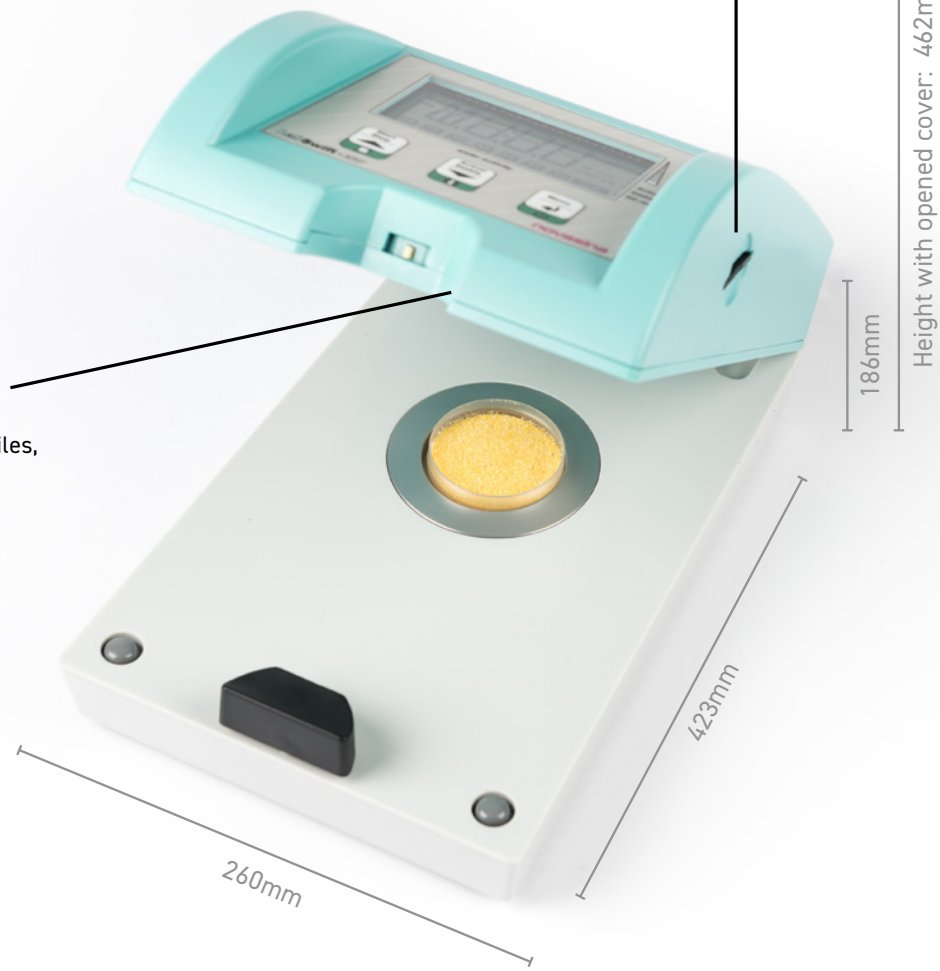
SD card

Audit trail export output card.



Sensor

Unique Novasina CM2 precision sensor system; resilient to volatiles, fast response.



Resistant and durable

Made from high quality materials

Portable

Easy to move in the laboratory or production line

Stand-alone instrument

Small footprint reduces space required in laboratory

Dual measurement

Humidity temperature equilibrium detection

Specifications

LabSwift-*aw* instrument		
Specific LabSwift-*aw*		
	AW-value	**Sample temperature**
Measuring principle:	Resistive - electrolytic	Surface Infrared- measurement + NTC
Accuracy:	+/- 0.010 a	+/- 0.3 °C
Range:	0.11 ..... 0.85 aw (11 ...85% rh)	5....45 °C (41.....113°F)
Resolution:	+/- 0.001 aw	+/- 0.1°C
Accuracy of control:	No temperature control available	
Mains supply:	5 VDC +/- 6% max power requirement : 4 W Lithium ion battery 1700 mAh with protection control & "auto load" (optional)	
Power supply:	90....264 VAC, 50 / 60 Hz, output -> 5 VDC	
Display:	Reflective, high contrast LCD - display, dimension: 35x69 mm	
Operating:	3 multi-function keys including On / Off	
Communication:	SD card interface type: SD / SD HC data system: FAT-16 / FAT-32	
Housing:	Two-part PVC design housing	
Weight:	1.2 kg	
Dimensions approx:	225 x 140 x 85 mm	
Protection class:	IP 30	
Measuring chamber:	Volume 21.1 ml standardised sample dishes	
Special feature:	Measurement sensor CM-2 with cal point memory	

Selecting the correct product

Benefits	 LabStart-aW	 LabSwift-aW	 LabTouch-aW	 LabMaster-aW neo
Data storage	✗	✓	✓	✓
Chem. Protection filter	✓	✓	✓	✓
Heating control *(required for samples above 0.9 aW)*	✗	✗	✓	✓
Cooling	✗	✗	✗	✓
Price	£	£ £	£ £ £	£ £ £ £
Re-usable standards	✓	✓	✓	✓
Stability observation time *(humidity)*	✓	✓	✓	✓
Cfr 21 part 11 compliance	✗	✗	✗	✓

Application Suitability					
0.1 aW		✗	✗	✗	✓
0.6 aW		✓	✓	✓	✓
0.75 aW		✓	✓	✓	✓
0.8 aW		✗	✓	✓	✓
0.85 aW		✗	✓	✓	✓
0.90 aW		✗	✗	✓	✓
0.98 aW		✗	✗	✓	✓

Accessories and Options

Accessory	Article-Nr.
In-built rechargeable battery	260 0187
Replacement sensor CM-2	111 9983
Power supply Euro-plug / UK-plug	260 0181
Protection filter eVC-21	111 1001
Protection filter eVALC	111 0995
Tension ring for filters	260 0152
ePW sample dishes 100 pieces	111 0601

Re-usable calibration standards with UKAS certification

Humidity Standards	Article-Nr.
Humidity Check SAL-T 33% RH	260 0188
Humidity Check SAL-T 58% RH	111 9983
Humidity Check SAL-T 75% RH	260 0181
Humidity Check SAL-T 84% RH	260 0182
with UKAS certificate	
Humidity Check SAL-T/C 33% RH	1111057
Humidity Check SAL-T/C 58% RH	2600190
Humidity Check SAL-T/C 75% RH	1111063
Humidity Check SAL-T/C 84% RH	2600276