



LabSwift-aw

*Portable measurement instrument for accurate and fast
water activity (a_w) determination*



LabSwift-aw

Leading by:

Innovation & Design

Speed & Accuracy

Price & Performance

novasina
The Art of Precision Measurement



„All life needs water!“

There is no life without water!

„Water“ is the main component of food and biological materials. The accurate determination of its form, nature and amount helps crucial to affect the structure respectively the physical and chemical properties of a product. Water has also a main influence on the mass transfer, on chemical reactions and the activity of microorganisms. Water is stored in every product, either in the bound form or as free water, which is stored between the compounds. What are the optimum amounts of both types of water? The amount of bound water depends on the chemical nature of the substances used.

Free water can be affected by production processes as well as by storage and packing. As well as the use of water, too much „free water“ can reduce the quality and shelf life of the product. Microorganisms such as fungi or bacteria can have optimum conditions to grow and replicate on this intermediate aqueous surface. Their metabolic products are deposited on the product and spoil the quality. Too high water activity means limited shelf life. Water activity values, which are too low can spoil the taste, texture or appearance.

Only an extremely accurate and safe quality measurement of the water activity („free water components“) guarantees quality products!

Meaning of „water activity“ (a_w)

For a long time the industry has accepted how important it is to check free water. The water activity (a_w) measurement forms the basis of this and provides important information about the quality of a product. Finally it provides information regarding the potential of microbiological growth on the surface and then conclusions can be made about the stability, durability and shelf life of a sample. Water activity is defined as the availability of free water in a sample. Only this component takes an active part in the exchange with the ambient humidity and can possibly form the ideal medium for microbiological growth on the surface. Above the sample, the humidity is measured immediately after reaching equilibrium in humidity exchange with the sample (*difference in partial vapour of water vapour*). The equilibrium relative humidity (ERH) is measured in % RH and is related to the a_w value as following:

$$a_w = \frac{ERH}{100}$$

0...100% RH corresponds 0.00...1.00 a_w



Introduction to a_w measuring

The equilibrium relative humidity of a product is defined by its water vapour partial pressure on the surface and depends on the chemical composition, temperature, water content, storage environment, absolute pressure and packaging. Chemical and biochemical reactions (e.g. *Maillard reaction*) proceed more frequently and influence the following product properties:

- Microbiological- and chemical- stability (*growth, see table*)
- Content of proteins and vitamins
- Colour, taste and nutritional value
- Stability of the compound & durability, solubility and texture
- Storage and packing

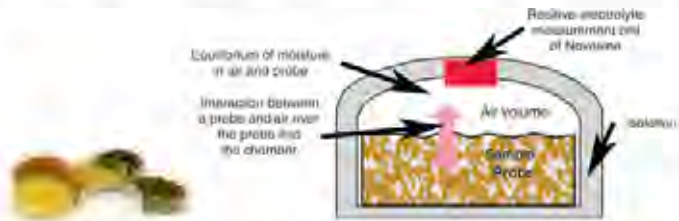
The optimisation and stabilisation of the product properties require an upper as well as a lower a_w limit. Therefore, constant supervision of this quality parameter is essential and necessary for efficient production.



The a_w value measuring method

The sample is put in the measurement chamber, which is air-tight. The free water of the sample humidifies or dehumidifies the air volume inside the chamber. Only the free water component can do this. This exchange takes place until the partial pressure of water vapour saturation = zero.

A highly accurate humidity and temperature measuring unit continuously determines the climate conditions of the air inside the chamber. If the parameters remain stable over a user-adjustable stability period, the instrument software determines the stable value and converts it to an a_w value. Thereby the display continuously shows the current measurement.

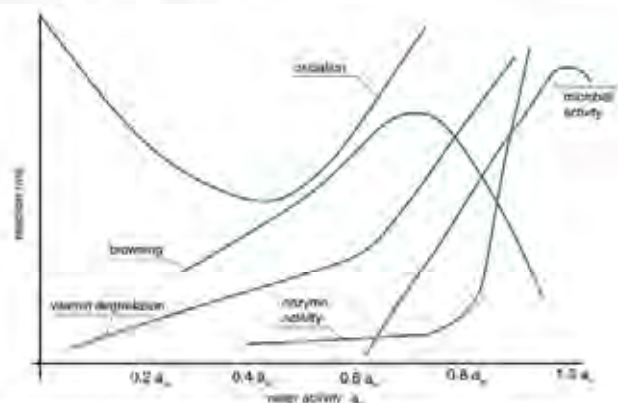


Important factors influencing measurement accuracy and speed :

- Sample and measurement chamber temperature
- System control capability
- Measurement chamber tightness
- Sample preparation
- RH measurement accuracy and measurement speed

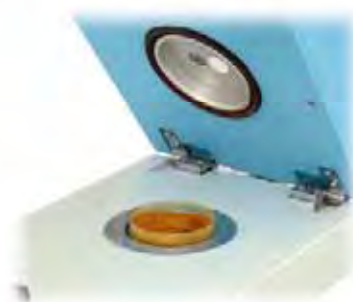
The measurement speed depends largely on the sample properties. Therefore the ability of how fast the available „free“ water is released to the surrounding environment plays a decisive role. The measurement speed provided by the electronics of the instrument is often insignificant.

On some oily samples the phenomenon of the second sorption step is known. At first the sample „seems“ in an apparently stable condition but later (*possibly after hours*) the a_w -value increases by a few percent (*breakthrough of the oil barrier*).



There are binding regulations in different regions worldwide concerning the a_w -value to be reached in foods. The measuring principle applied by Novasina has been checked by the FDA, UNO, WTO, FAO, AOAC and FOS (EFSA) and approved.

The *LabSwift-aw* product line



Come into the world of water activity measurement!

Novasina has developed for more than 40 years water activity measurement instruments for laboratories in the field of Product Quality Assurance and R&D. Thanks to the unique measurement technology, Novasina devices are used and appreciated worldwide. The core element of each instrument is the electrolytic sensor, which has been continuously developed and improved over the years. Today this is making sure that each measurement fits the high requirements of the a_w measurement and therefore is performing accurately, quickly and with a high reproducibility.

Following products are suitable for an a_w -value determination :

- Various kinds of foodstuff
- Pharmaceutical products
- Chemical products
- Cosmetic products



With Novasina a_w measurement devices almost all kind of samples in almost all physical states can be measured. It does not matter if samples are powders, gel, liquids, pastes or solids. The availability of sensor protection filters enable more accurate and reproducible measurements on samples with critical additives as e.g. alcohol, acids, bases, chlorine etc..

With the new *LabSwift-aw* Novasina sets a standard in the field of mobile a_w -measurement. This device takes the lead in its class thanks to its easy handling, flexibility, speed and appealing design.

LabSwift-aw - unique in function and design

- Ergonomic design with large and clear LC-Display
- New developed, intuitive stable value setting
- Spring loaded sealed measurement chamber
- Resistive-electrolytic sensor with „Novalyte“ technology and calibration point memory
- Infrared sample temperature measurement
- Data logger function with SD card interface

The data stored on the SD card can be transferred to a PC. For visualisation, analysis and archiving Novasina offers as option a PC software.

LabSwift-aw - fast, practical, innovative

The *LabSwift-aw* unites newest technologies as e.g. the contact free infrared sample temperature measurement with the maintenance free a_w -sensor. This allows efficient and fast a_w -value determination, which is required especially at the production line. The intuitive operation and the clear display are additionally supports for the user.

Further features such as the easy handling of samples, the SD card for mobile measurement data storage as well as the simple possibility for checking and calibrating the device ease the product quality inspections considerably.

The mechanical construction of the *LabSwift-aw* makes it possible to easily replace the a_w -sensor if necessary. Due to the fact that the calibration values are stored inside the sensor, the instrument has not to be calibrated afterwards. Included in the delivery are also multiple use humidity standards (a_w -standards). Therefore on site checks, calibrations and adjustments can be performed at any time.

LabSwift-aw - versatile, flexible, mobile

Using the standard sample dishes all kinds of liquid or solid samples with a volume of approx. 12 cm³ can be measured. If needed, sensor protection filters can be fitted to allow a coverage of a wide range of possible samples. For portable use, a rechargeable, long life battery is available.



Your advantages :

- Accurate, reproducible, fast a_w -value determination
- Easy menu structure and clear display
- Mobile use thanks to a Lithium-Ion battery (optional)
- SD card for mobile data storage
- Test- & calibration functions with Novasina a_w -standards
- Sensor protection filters to avoid contamination & errors
- Handy carrying case incl. sample dishes & a_w -standards

Specifications LabSwift-aw :

	A_w-value	Sample temperature
Measuring principle	Resistive - electrolytic	Surface Infrared-measurement + NTC
Measuring range :	0.03 1.00 a _w	5...45 °C (41.....113°F)
Accuracy: In the range of	+/- 0.010 a _w 0.10 0.95 a _w (10 ...95% rh)	+/- 0.15 °K 0. ... +50°C
Resolution :	+/- 0.001 a _w	+/- 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 & "autoload"	
Power supply	90 ... 264 VAC, 50 / 60 Hz, output -> 5 VDC	
Display :	Reflective, high contrast LCD - display, dimension: 35x69mm	
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, measurement chamber aluminium	
Weight	1.2 kg / Dimension approx. . 225 x 140 x 85 mm	
Protection class :	IP 30	
Measuring chamber	Volume: 21.1 ml / standardised sample dishes Spring-loaded measurement head (diameter 40x 12 mm)	
Special feature	Intelligent „Novalyte“ measurement sensor CM-2 with calibration point memory	



Novasina – Swiss quality, flexibility and expertise

Since its inception more than 50 years ago, the Novasina company has specialised in the **accurate measurement of air and material humidity**. The basis of this was the world's first, self-developed electronic measuring sensor for measuring humidity. This technology is based on the resistive electrolytic measurement principle. This was further developed and improved over decades. This measuring principle is generally the most demanding and most accurate. Modern substances and materials allow continuous improvement and expansion of the area of application of this measuring sensor. Today the highly accurate humidity measurement is among our core competences and forms an important pillar of our success. Intensive research and development further ensures a decisive advantage for us. Novasina sensors and measuring instruments are mainly applied to the area of air and material humidity. This is almost exclusively used in industrial applications as well as in research and development.

We continue to develop and produce Novasina precision measuring instruments thanks to many years of experience. We are proud of the „**SWISS MADE**“ label, which guarantees the highest quality, innovation and durability.

The diversity of our customers, business partners and applications as well as our international orientation makes Novasina the competent partner for demanding humidity measurements in the industrial sphere!

Customer applications and innovation always come first with Novasina!



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Subject to technical changes



For further technical information, see the technical data sheets:

Consultation, sales and services



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