

WATER ACTIVITY

HYGROCLIP®

Water Activity goes Digital



Digital Water Activity Systems

- Measure water activity in minutes
- Up to four measurements simultaneously
- Interchangeable probes to cover different applications
- Proven sensor technology
- Advanced software utilities
- Choice of bench top or portable systems

WATER ACTIVITY OR
MOISTURE CONTENT?

SEE INSIDE FOR
AN EXPLANATION!

rotronic®

LEADING IN HUMIDITY MEASUREMENT

The Digital Advantage

The ROTRONIC water activity systems use the latest digital technology to bring the user new levels of measurement performance and application flexibility, with features such as multiple probe inputs, interchangeable probes, PC based data handling, and software based calibration.

The ROTRONIC humidity sensor has an enviable reputation for precision and reliability, but its performance is now augmented with the latest software based analysis tools and new developments in mechanical design. These combine to achieve high levels of performance with significantly reduced sampling times, and extremely cost effective pricing.

Our water activity probes feature the HygroClip digital technology. This produces significant gain in accuracy, data integrity and stability, as well as convenient features such as potentiometer-free calibration, data acquisition and calibration with easy-to-use Windows software.

Water Activity Indicators

Two bench top indicators, the HygroLab® 2 and HygroLab® 3, are complemented by the portable HygroPalm AW1. All use the same technology to ensure consistently precise results and full interchangeability between laboratory and production data. Each of these instruments can be ordered with any of the HygroClip probes and accessories to cover specific application requirements.

Both the HygroPalm AW1 and HygroLab 3 feature two automatic modes for measuring water activity:

- AwQuick mode: accelerated water activity measurement with results typically in 5 minutes or less
- AwE mode: conventional water activity measurement with automatic detection of equilibrium.

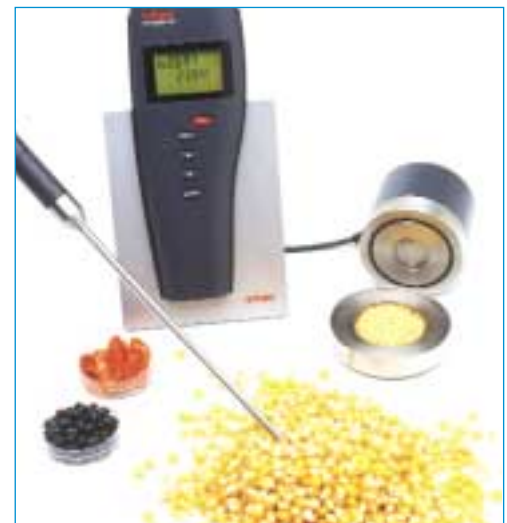
The HygroLab 2 indicator is designed for use together with a Windows based PC after installation of the ROTRONIC HW3 software. Both the AwQuick and AwE measuring modes are run from within HW3. The combination of the HygroLab 2 and PC provides additional functions such as the automatic capture of end results to a text file and the logging / graphing of measurement data, the latter only during conventional aw measurements.

LC Display: Includes probe input indicator, 2 line numeric display, 1 line alphanumeric

MENU: Press this key to activate the functions menu



Up/Down: Changes displayed probe and navigates the function menu



HygroPalm AW1 Set

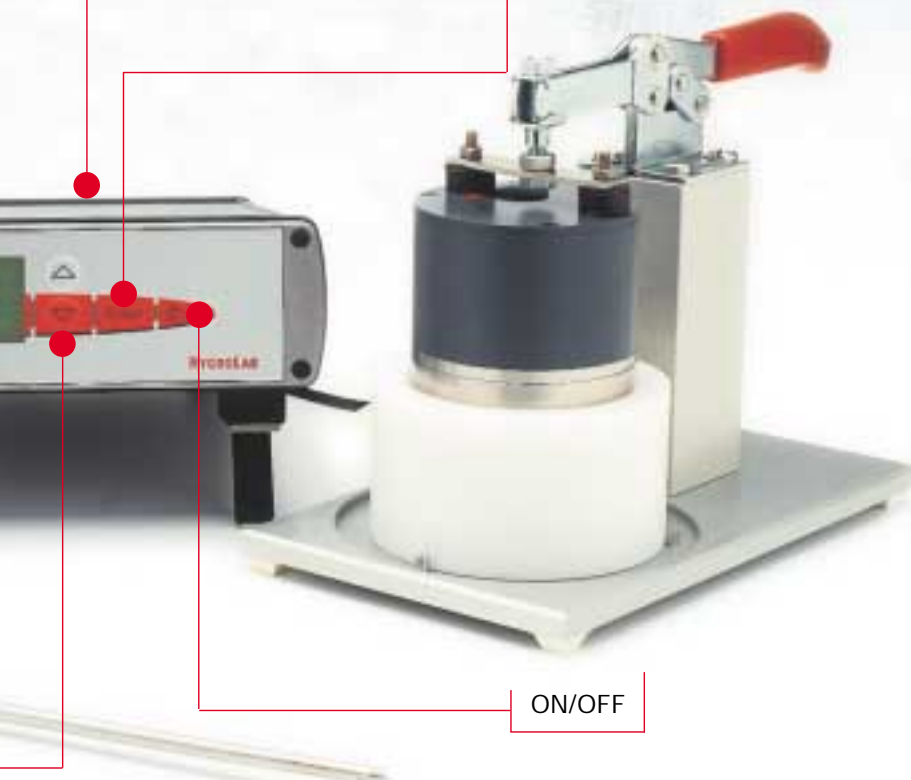


Water Activity Sets

Designed for those users who are primarily interested in measuring product samples, the following sets conveniently include everything needed:

Multiple inputs:
4 probes simultaneously

Enter: Confirms selection
Start Aw Quick or AwE mode



ON/OFF

HygroPalm AW1 Set

Ideal for low budget laboratories and quality control in the production, this set is limited to a single probe. Unlike our other sets, data cannot be displayed on a PC and end results cannot be captured to a text file. The set includes:

- HygroPalm AW1 indicator
- AW-DIO probe for the measurement of product samples
- WP14 sample holder
- PS14: pk of 100 disposable sample cups (14 mm deep)
- 1 box each EA35 (0.350 a_w) and EA80 (0.800a_w) humidity calibration standards
- Carrying case

Optional accessories include the WP40 large sample holder and PS40 disposable sample cups (40 mm deep) for chunky product samples as well as a docking station for battery charging (requires use of a rechargeable battery) and mains power operation.

HygroLab 2 Set and HygroLab 3 Set

Both sets offer the same functionality: accelerated or conventional water activity measurement, capture of end results to a text file on a PC, ability to log / graph the measurement data during conventional a_w measurements, possibility of using up to 3 additional probes for increased productivity.

Unlike the HygroLab 2 Set, the HygroLab 3 Set can be used as a stand alone unit, without a PC. In that case, PC based functions such as the capture of end results are not available. When no PC is being used, all probes connected to the HygroLab 3 must run simultaneously and in the same measuring mode. Using a PC removes this restriction.

Each set includes:

- HygroLab 2 or HygroLab 3 indicator (HygroData Quick enabled)
- AC adapter (115 VAC / 9 VDC)
- HW3 software on a CD
- RS232 cable HygroLab to PC (2m – 6ft)
- 1 x AW-DIO probe
- 1 x WP14 sample holder (small)
- 1 x PS14: pk of 100 disposable sample cups (14 mm deep)
- 1 x WP40 sample holder (large)
- 1 x PS40: pk of 100 disposable sample cups (40 mm deep)
- 1 box each of EA00 (0.005a_w), EA10 (0.100a_w), EA35 (0.350a_w), EA80 (0.800a_w) and EA95 (0.950a_w) humidity calibration standards

Additional AW-DIO probes can be ordered as a set which includes:

- 1 x AW-DIO probe
- 1 x WP14 sample holder (small)
- 1 x PS14: pk of 100 disposable sample cups (14 mm deep)
- 1 x WP40 sample holder (large)
- 1 x PS40: pk of 100 disposable sample cups (40 mm deep)

For ordering information, see page 8

Software and Calibration

HW3 Software

HW3 is an easy to use software package that runs on a Windows based PC. Minimum requirements: Pentium 233 MHZ / Windows 95, 98, NT, 2000 or XP / 32 MB RAM / 20 MB free disk space / CD drive / VGA or Super VGA high color 16-bit and 1024 x 768 resolution / one free COM port.

- Water activity functions: Aw Quick mode, AwE mode, automatic capture of end values to a text file, processing of up to four probes independently of one another and in any mode.
- PC controlled digital probe calibration
- PC based instrument configuration
- Manual or on-line calculation of almost any humidity or moisture parameter

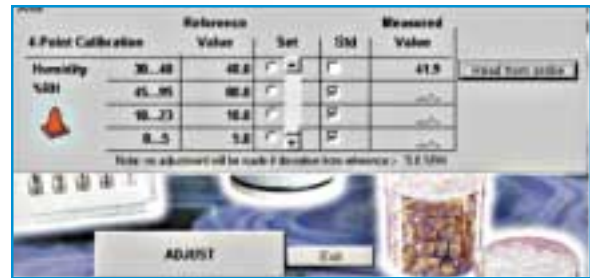
When ordered separately (not as part of a set), an access code is required for the water activity functions of HW3.



Probe Calibration

Probe calibration can be done directly from the keypad of any water activity indicator. As an alternative, the HW3 software also provides convenient, easy-to-use control of the calibration process, and if required, the adjustment sequence.

- Full software control of calibration or adjustment sequence and timing
- Single or multiple points
- Precise adjustment to 0.1%RH (0.001a_w) and 0.1°C
- Documentation of calibration including printable reports or certificates
- Pre-configured to suit ROTRONIC SCS certified humidity standards (see below)
- User configurable to allow comparison with other reference standards.



ROTRONIC Humidity Standards

Non saturated salt solutions manufactured to provide precise generation of %RH values in sealed chambers (calibration devices or sample holders). All values are supplied with certificates defining their value, uncertainty and traceability to SCS* standards that are recognized internationally.

- Single use, hermetically sealed glass ampoules maintain optimum condition right up until use is required
- Precisely manufactured to provide repeatable values
- Every standard is certified and is supplied with a full certificate of calibration
- Easy to handle and use, no special knowledge required.



* SCS – Swiss Calibration Service



Water Activity Probes

All probes measure over the range 0...1 a_w (0...100%RH) and also incorporate temperature measurement. Calibration can be performed using either the indicator itself or the HW3 software.

AW-DIO Water Activity Probe for product samples

The internal volume of the probe sensor chamber is minimized to achieve fast equilibrium. All metal construction ensures good temperature stability during measurements, with stainless steel used on all critical surfaces. Sample holders, sample containers and a sealing mechanism are detailed in accessories.



HygroClip HP28 Insertion Probe for materials in bulk

Applications include powders, granules, grain and cereals. HygroClip HP28 features a robust 10mm-diameter stainless steel probe with replaceable sintered steel dust filter to protect the humidity sensor.



HygroClip SC05 for measurement inside packaging, storage containers, etc.

Suitable for air measurement in small spaces thanks to the 5mm probe diameter and compact dimensions. For customers measuring water activity, the HygroClip SC05 is useful for testing packaging under different conditions.



HygroClip HS28 for measurement of packaging materials

This sword probe is suitable for measuring stacks and rolls of paper and cardboard when the condition of packaging materials may affect the product.



Temperature Control

Stable temperature during measurements is very important to obtain accurate and repeatable results. Our probes are designed with a high thermal mass to attenuate variations during measurement. For the highest precision, or when measurements at a specific temperature are required, both the probe and product samples should be placed inside of a temperature controlled incubator.

Water Activity Explained

What is Water Activity?

Water activity (a_w) is the relative humidity which is reached at equilibrium in a sealed container where a hygroscopic product has been placed, but expressed on a scale of 0...1. Water activity defines the active part of moisture content in a product and influences microbiological, chemical and enzymatic stability of perishable products such as food and seeds. Water activity measurement is most commonly used in the food industry, where it is used to determine shelf life and quality. Water activity is equally relevant in the pharmaceutical industry because it can influence the effectiveness of drugs. It can also provide useful information regarding properties such as the cohesion of tablets, agglomeration of powders, and adherence of coatings.

What is Equilibrium Relative Humidity?

Equilibrium Relative Humidity (ERH) is the value of relative humidity into which a hygroscopic product can be placed where no net exchange of moisture between the product and the surrounding environment takes place. It is expressed on a scale of 0...100% RH. ERH is typically used in the paper and pharmaceutical industries, but can be applied to almost any product that is sensitive to moisture, or where the presence of moisture can effect product handling.

A_w or ERH?

Both a_w and ERH are an expression of the amount of free water vapor present in a product, both at its surface and within its structure, and are the same measurement expressed in a different unit. Where specified, ROTRONIC products offer the user the possibility to select display units of a_w or %RH.

What is Moisture Content?

Moisture content, when referring to a solid material, is an expression of the percentage of the total weight of the material which is water; usually referred to as 'percent moisture content'. This term is widely used in many areas of industry.

Water Activity or Moisture Content?

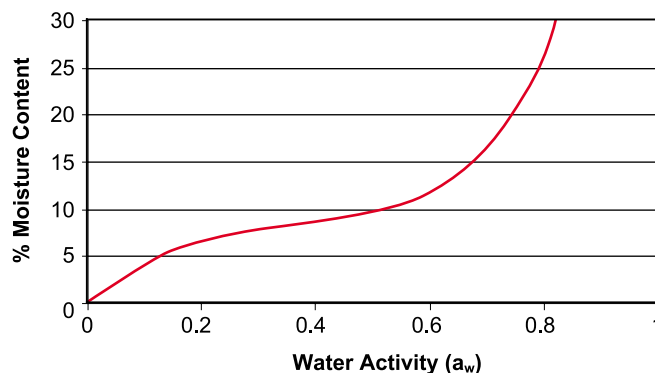
There is frequently confusion between water activity and moisture content. In many industries, moisture content is used to control the amount of water present in a product for quantitative reasons. For example, if a product is sold by weight, controlling its moisture content may be necessary.

Water activity is more significant for qualitative considerations such as product shelf life, handling characteristics, dimensional stability and chemical stability.

Water activity and moisture content can be related by a graph called a sorption isotherm (see example). Such a graph is valid only at a specific temperature. If the user has the ability to measure both parameters, the relationship can be defined and each parameter derived from the other.

In practice, the sorption isotherm may be impractical to use, because, not only does the relationship between a_w and moisture content change with the temperature of measurement, but also any variations in the material composition has modifying effect. This is especially the case with products of natural origin such as food and paper.

The user should therefore decide which parameter of measurement is best suited to their product and processes. For quality control purposes moisture content limits are easily converted to water activity limits by very simple comparative tests. Water activity measurement offers a non-destructive, easy to use measurement in a wide range of convenient configurations for both laboratory and on-site use.





Accessories

Sample Holders and Disposable Cups

Stainless steel sample holders are precisely engineered to work with the AW-DIO probe. Two sizes are available, WP14 is for small product samples (14mm depth) and WP40 for larger materials (40mm depth).

Disposable sample cups help to prevent the sample holders from coming into direct contact with the product being tested, and hence prevent soiling or cross contamination. The sample cups are also a convenient means of collecting and storing samples.



Clamp Sealing Mechanism for the AW-DIO probe

Conventional a_w measurements (AwE mode) can require a relatively long time before equilibrium is reached. In that situation, additional mechanical sealing of the AW-DIO probe and sample holder may be required. The AW-KHS applies pressure on the probe, and is compatible with all available sample holders.



Humidity Standards

The ROTRONIC SCS certified humidity standards provide a reference value against which instruments can be calibrated. They are supplied in packs of 5, complete with certificates of calibration. With the AW-DIO probe, place the humidity standard in a sample cup, inside the sample holder. For other probes (HygroClip SP05, SC04, HP28 and HS28) a calibration device is required.



Calibration Devices

Provide a sealed environment around probes where ROTRONIC humidity calibration standards can be applied.

The AW-DIO probe is calibrated in combination with the WP14 sample holder.





Product Summary & Technical Data



FEATURES	HYGROLAB 2	HYGROLAB 3	HYGROPALM AW 1
Probe Inputs	4		1
Digital Output	RS232/485		No
AwQuick Mode	with HygroData Quick	Integrated	Integrated
AwE mode	(PC required)	(no PC required)	
Probe Calibration	Using Keypad or PC 1 or 4 point %RH 1 or 2 point °C/°F		Using Keypad 1 or 4 point %RH 1 or 2 point °C/°F
Display units	a _w , %RH, °C, °F, calculated parameters		a _w , °C, °F
Calculated parameters	Dew point, wet bulb, enthalpy, mixing ratio, moisture content (air only), partial water vapor pressure, saturation water vapor pressure		None
Indication of measurement end	Acoustic + Visual Indication		Visual Indication
Technical Specifications (including probe)			
Measuring range	Aw-DIO probe: 0.000 to 1.000 a _w (0...100 %RH) / 5 ...50°C		
Accuracy at 23°C	± 0.015 a _w (± 1.5%RH) , ± 0.3°C		
Repeatability	better than 0.003 a _w (0.3 %RH), 0.1°C		
Sensors	Humidity: Hygromer C94, Temperature: Pt100 RTD (1/3 DIN)		
Operating limits at instrument	0...99%RH, -10...+60°C (14...140°F)		
Display type	Liquid Crystal		
Display resolution	0.001a _w / 0.1%RH , 0.1°C/F, 0.01 calculated value		0.001a _w , 0.1°C/F
Housing	Aluminum / stainless steel		ABS
Power	9V Power adapter, +Tip		9V battery or 9V power adapter, +Tip (requires optional docking station)
CE Conformity	EMV: EN50081-2 EN/EN50082-2		

ORDERING INFORMATION	
Order code	Description
HygroPalm AW1 Set	HygroPalm AW1 indicator, AW-DIO probe, sample holder and sample cups (small), calibration standards, carrying case.
HygroLab 2 – HW3 Set	HygroLab 2 indicator, AW-DIO probe, sample holders and sample cups (large and small), calibration standards, HW3 software (HygroData Quick enabled).
HygroLab 3 Set	HygroLab 3 indicator, AW-DIO probe, sample holders and sample cups (large and small), calibration standards, HW3 software (HygroData Quick enabled).
AW-DIO probe Set	Additional AW-DIO probe for the HygroLab 2 or HygroLab 3 Includes sample holders and disposable cups
HygroPalm AW1	HygroPalm AW1 indicator
PalmDock	Docking station for HygroPalm AW1 (allows use of 9V power adapter)
ACA	9VDC / 115 VAC power adapter
HygroLab 2	HygroLab 2 indicator with ACA 9 VDC / 115 VAC power adapter
HygroLab 3	HygroLab 3 indicator with ACA 9 VDC / 115 VAC power adapter
HygroData LAB	HW3 software and RS232 cable (HygroLab 3)
HygroData Quick	HW3 software and RS232 cable (HygroLab 2) + access code
AW-DIO	Water activity probe
WP14	Sample holder (14 mm) for AW-DIO probe
WP40	Sample holder (40 mm) for AW-DIO probe
PS14	Pk of 100 disposable sample cups for WP14 sample holder
PS40	Pk of 100 disposable sample cups for WP40 sample holder
AW-KHS	Optional clamp mechanism for AW-DIO probe and WP14 / WP40
HygroClip HP28	10mm Ø insertion probe (requires MOK-01-B5 cable)
HygroClip SC05	5mm Ø cable probe (requires MOK-01-B5 cable)
HygroClip HS28	Sword probe (requires MOK-01-B5 cable)
MOK-01-B5	Cable 1m, HygroClip probes to HygroLab/HygroPalm AW
EGL	Calibration device for HygroClip-HP28 probe
ER-05	Calibration device for HygroClip-SC05 probe
EGS	Calibration device for HygroClip-HS28 probe
EAXx	Box of 5 certified humidity standards. Where xx = 0, 5, 10, 20, 35, 50, 65, 80 & 95 %RH