

# HYGROLAB

# HYGROCLIP<sup>®</sup>

Water Activity goes Digital



## Digital Water Activity Analysers

- New range of laboratory and portable instruments
- Digital technology
- Results in minutes
- Interchangeable measurement probes
- Up to four measurements simultaneously
- Advanced software utilities
- SWISS MADE

**WATER ACTIVITY  
OR WATER  
CONTENT?**

# rotronic<sup>®</sup>

LEADING IN HUMIDITY MEASUREMENT

# WATER ACTIVITY

The new ROTRONIC range of Water Activity analysers uses the latest digital technology to bring the user new levels of measurement performance, application flexibility and features.

## The Digital Advantage

Multiple inputs, PC based data handling, instrument networking, software based calibration, and interchangeable measurement stations are just some of the features included in our comprehensive new range.

Our 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 range of water activity measurement stations and probes feature the HygroClip digital signal processing technology, including signal transmission and calibration. This produces significant gain in accuracy, data integrity and stability, as well as convenient features such as simplified PC based configuration, data acquisition and calibration using easy-to-use Windows software.

Benchtop display instrumentation is now complemented by a handheld portable solution; both use the same high precision measurement technology to ensure consistently precise results and full interchangeability between laboratory and production data.

### HygroData Quick

Aw-Quick is advanced software for water activity analysis. All current versions of HW3 are shipped with this function integrated; with the HygroLab 2 activation requires a license access code (see ordering information on page 8). HygroData Quick includes:

- $A_w$  Quick mode: Accelerated water activity analysis with results typically in 5 minutes or less.
- Connecting four probes simultaneously means for results in five minutes.
- Standard mode: conventional water activity measurement with automatic detection of equilibrium and the option to record and graph data.
- Automatic capture of end values to a text file for record keeping. Each record includes a product description, instrument identification, date and time.

### Why is water activity measured?

Water activity defines the active part of a products moisture content. Water activity influences microbiological, chemical and enzymatic stability of perishable products such as food and seeds. For similar reasons, water activity is equally relevant in the pharmaceutical industry where it also provides useful information regarding properties such as the cohesion of tablets, agglomeration of powders, and adherence of coatings.

The table shows typical growth thresholds below which the specified contaminant cannot replicate, and therefore spoil the product. Control of water activity therefore has a significant impact on shelf life.

### Temperature Control

Stable temperature during measurements can be very important with some products to obtain precise results. Our measurement probes are designed with a high thermal mass to prevent variations during measurement, but for the highest precision, or where laboratory temperature changes, temperature control solutions are now available. Please contact ROTRONIC or your local distributor for more information.

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

MENU: Press this key to activate the functions menu



Up to 32 HygroLab instruments can be networked together. 128 measurement probes controlled by one PC!

Water activity	Contaminant
$a_w = 0.91 \dots 0.95$	most bacteria
$a_w = 0.88$	most yeast
$a_w = 0.80$	most mildew
$a_w = 0.75$	halophile bacteria
$a_w = 0.70$	osmiophile yeast
$a_w = 0.65$	xerophile mildew

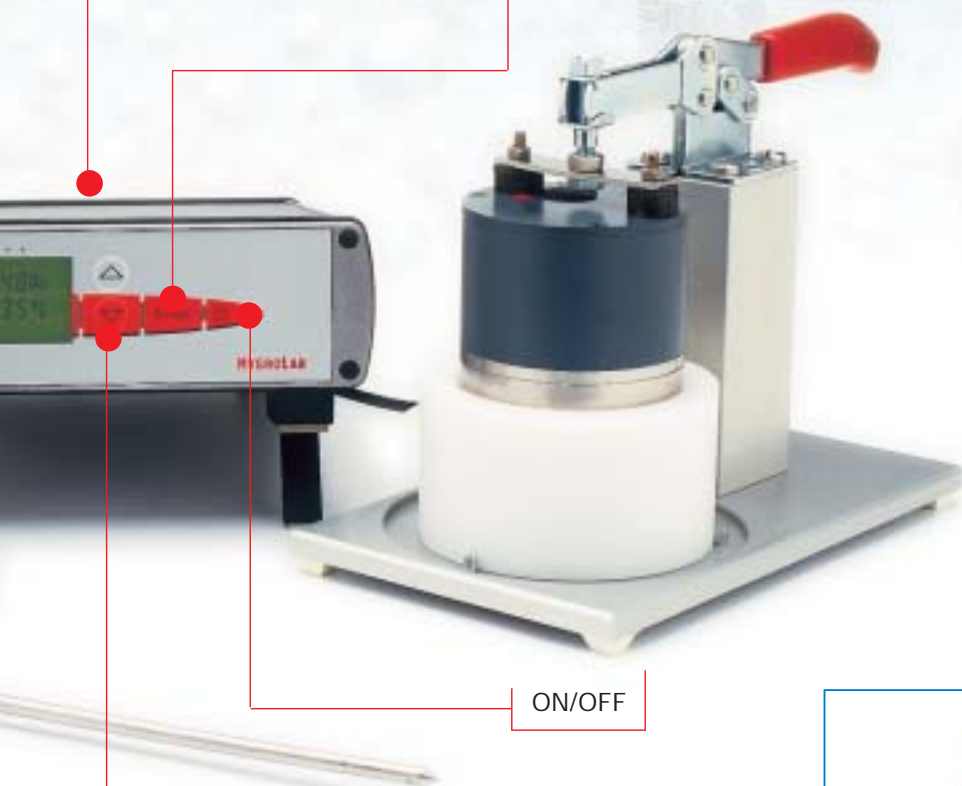


## Display Options

Three display options are currently available, each compatible with all of the HygroClip® digital probes and Water Activity stations. Key features are described below, and a full technical specification is on page 8.

Multiple inputs:  
4 probes simultaneously

Enter: Confirms selection  
Start A<sub>w</sub> Quick mode



ON/OFF

Up/Down:  
Changes displayed probe and navigates

### HygroPalm AW1

Handheld instrument specially configured to suit the water activity user. It includes many of the advanced features of the HygroLab, but in a convenient portable configuration.

- Integrated A<sub>w</sub> Quick mode
- Single digital probe input
- Single or multiple point digital calibration directly with keypad
- A<sub>w</sub> display units
- Available as a set with carry case
- Optional docking station for battery charging and mains power operation

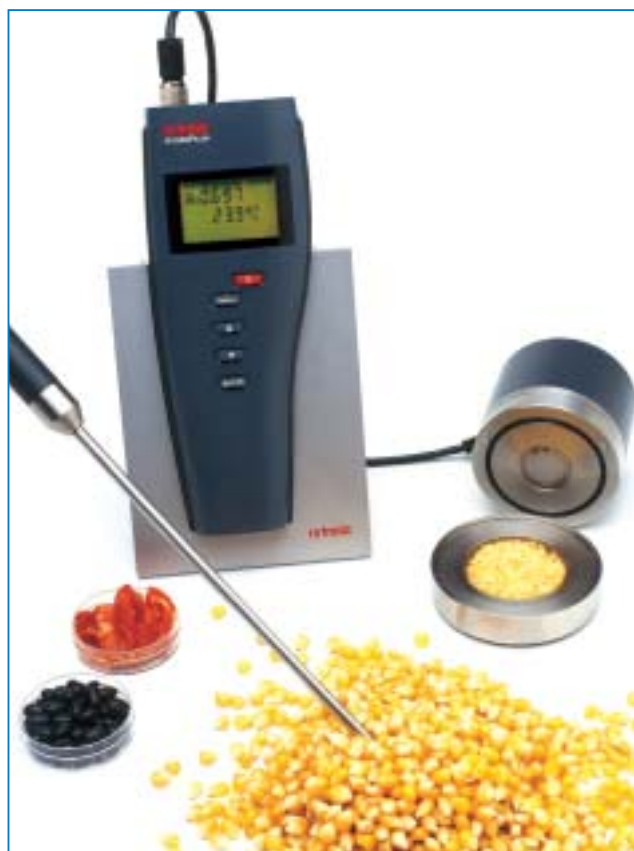
For ordering information, see page 8

### HygroLab 2

- A<sub>w</sub> Quick mode through RS232 output and optional HygroData Quick analysis software (PC required)
- Four simultaneous digital probe inputs
- Single or multiple point digital calibration directly by keypad

### HygroLab 3

- Integrated A<sub>w</sub> Quick mode for results within 5 minutes
- Four simultaneous digital probe inputs
- Single or multiple point digital calibration directly by keypad
- RS232 output for capture of end values by a PC



## Software and Calibration

### HW3 Software

HW3 is an easy-to-use software package that is compatible with all ROTRONIC products with RS232/485 outputs. It enables many of the advanced functions that digital technology can provide:

- Live display and recording of measured values on any PC
- PC based instrument configuration
- PC controlled digital probe calibration
- Manual or on-line calculation of almost any humidity or moisture parameter
- Alarms with notification by e-mail or SMS text
- Integrated HygroData Quick function.



Order code: **HygroData-LAB**  
**HygroData-QUICK**

Includes HW3 and RS232 connecting cable.  
Software license to activate  $A_w$  Quick mode in combination with HygroLab 2, HW3 software, and RS232 connection cable

### Digital Probe Calibration

It is essential that instruments have regular calibration checks to provide measurement traceability to national standards, and to ensure optimum performance at all times. HW3 software 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 0.001  $a_w$  (0.1%rh) 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 recognised internationally. For ordering information see page 8.

- Single use, hermetically sealed glass ampoules maintain optimum condition right up until use is required, storage 10 years and over.
- 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 specialist knowledge required.

\* SCS – Swiss Calibration Service



For ordering information, see page 8



## Water Activity Probe Options

All based on HygroClip digital electronics technology for high performance and convenient digital calibration, our selection of probes will suit almost any application. All water activity stations and probes incorporate temperature measurement as standard.

### AW-DIO Water Activity Station

The AW-DIO is a water activity measurement station which measures over the range 0...1<sub>aw</sub> (0...100%rh) and provides a digital output signal to interface with HygroLab and HygroPalm Aw display units. Digital calibration can be performed using a compatible display instrument.

Minimised internal volume of the sensor chamber ensures fast equilibrium with all products, and an 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.

Order Code: **AW-DIO**



### HygroClip SP05 Insertion Probe

For direct measurement of water activity in bulk samples. Applications include tablets, gel capsules, grain and plastic granules. HygroClip SP05 features a precisely engineered 5mm-diameter stainless steel probe with laser cut slots to allow the humidity measurement sensor exposure to water vapour in the air (not suitable for powders or dusty products).

Order Code: **HygroClip SP05** 5mm insertion probe  
**MOK-02-B5** Cable, HygroClip SP05 to HygroLab/HygroPalm Aw1



### HygroClip HP28 Insertion Probe

For direct measurement of water activity in bulk samples. Applications include powders, granules, grain and cereals. HygroClip HP28 features a robust 10mm-diameter stainless steel probe with replaceable sintered steel dust filter to allow the humidity measurement sensor exposure to water vapour in the air or product.

Order Code: **HygroClip HP28** 10mm insertion probe  
**MOK-02-B5** Cable, HygroClip HP28 to HygroLab/HygroPalm Aw1



### HygroClip SC05

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 the measurement of humidity and temperature in packaging, storage containers and incubators.

Order Code: **HygroClip SC05** 5mm cable mounted probe  
**MOK-02-B5** Cable, HygroClip SC05 to HygroLab/HygroPalm Aw



## 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 measurement is most commonly used in the food and pharmaceutical industry, where it is used to determine shelf life and quality.

### 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 can take place. It is expressed on a scale of 0...100%. 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 vapour present on a product, both at its surface and within its structure, and are practically the same measurement expressed in a slightly different way. Throughout this data sheet we will refer to Water Activity, but this can be interchanged with ERH. Where specified, ROTRONIC products offer the user the possibility to select display units of  $a_w$  or %rh.

### What is Water Content?

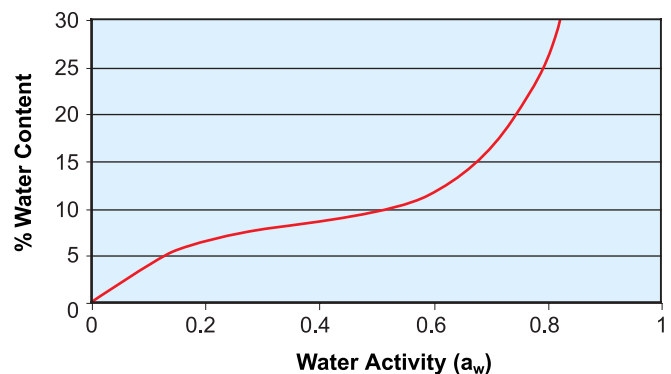
Water content, when referring to a solid material, is an expression of the percentage of the materials weight which is water (both in liquid or gaseous phase); usually referred to as 'percent moisture content'. This term is widely used in many areas of industry.

### Water Activity or Water Content?

There is frequently confusion between water activity and water content measurements. In many industries, water 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 water content may be useful in maintaining product quality, but can also impact on profitability (more water equals more profit)

Water activity is more significant for qualitative considerations such as product stability shelf life (e.g. microbiological & enzymatic stability, aroma retention), handling characteristics (e.g. agglomeration of powders), physical properties (e.g. dimensions of paper) and chemical stability (e.g. pharmaceuticals).

Water activity and water content can be related by a graph called a Sorption Isotherm (see diagram) so if the user has the ability to measure both parameters, the relationship can be defined and each parameter derived from the other (interpolation).



In practice, the Sorption Isotherm may be impractical to use, because, not only does the relationship between  $a_w$  and moisture content change with 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 his products and processes. For quality control purposes moisture content limits are easily converted to water activity limits by very simple comparative tests. Water Activity measurements offers a non-destructive, easy-to-use measurement in a wide range of convenient configurations for both laboratory and on-site use.



## Accessories & Consumables

### Sample Holders

Stainless steel sample holders that are precisely engineered to work with the AWC/VC water activity chamber. Two sizes are available, WP14 is for small product samples (14mm depth) and WP40 for larger materials (40mm depth). Both products provide excellent sample containment and optimum temperature stability.

Order code: **WP-14-S**  
**WP40**



### Sample Containers

Disposable sample containers that ensure the optimum sample volume is introduced into the WPS14 and WPS40. They help to prevent the sample holders from coming into direct contact with product being tested, and hence prevent soiling or cross contamination. The sample containers also provide a convenient means of collecting and storing samples.

Order Code: **PS14** Pack 100 sample containers to suit WP14-S  
**PS40** Pack 100 sample containers to suit WP40



### Clamp Sealing Mechanism

In some circumstances additional mechanical sealing of the Aw measurement station and sample holder is required to prevent external conditions influencing the sample. The AW-KHS provides a strong mechanical seal, and is compatible with all available sample holders.

Order Code: **AW-KHS**



### Calibration 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 (see also page 4). They can be applied to all probe types, with Water Activity probes using sample holders and containers, or for other probes (HygroClip SP05, SC04 and HP28) a calibration device is required.

Order Code: **EA-xx-SCS**

Where xx = 0, 5, 10, 11, 20, 35, 50, 65, 75, 80 & 95 %rh

### Calibration Devices

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

Order Code: **ER-05** 5mm diameter probes (HygroClip SP05 / SC05)  
**EGL** 10mm diameter probes (HygroClip HP28)

Aw-DIO can be calibrated using the sample holder and containers.





## Product Summary & Technical Data



FEATURES	HYGROLAB 2	HYGROLAB 3	HYGROPALM AW 1
Probe Connections (combined %rh/°C)	4	4	1
PC Interface	RS232/485	RS232/485	No
Networking	Up to 32 instruments using RS 485		No
A <sub>w</sub> Quick Mode	Through HygroData	Integrated and through optional HygroData-LAB (HW3 software and connection cable)	Integrated
Calibration functions	Using keypad or PC; 1 or 4 point %rh (a <sub>w</sub> ), 2 point °C/F	Using keypad or PC; 1 or 4 point %rh (a <sub>w</sub> ), 2 point °C/F	Using keypad; 1 point %rh(a <sub>w</sub> ), °C/F, 4 point %rh, 2 point °C/F
Display units	%rh, a <sub>w</sub> , °C, °F, Calculated parameters		a <sub>w</sub> , °C, °F,
Calculated parameters	Dew-point, wet-bulb, enthalpy, mixing ratio, moisture content, partial water vapour pressure, saturation water vapour pressure		None
Audible signal when measurement is finished	No	Yes	No
<b>Technical Specifications (including probe)</b>			
Measuring range	With AWC water activity stations: 0...100%rh/0...1 a <sub>w</sub> , 5...50°C With HygroClip probes: 0...100%rh, 0...1 a <sub>w</sub> , -40...+85°C		
Accuracy at 23°C	± 1.5%rh, ± 0.015 a <sub>w</sub> , ± 0.3K/°C		
Repeatability	Better than 0.5%rh/0.005a <sub>w</sub> , 0.1°C/0.2°F		
Sensors	Hygromer C94 humidity, Pt100 1/3 DIN temperature		
Instrument operating range	0...99%rh, -10...+60°C (14...140°F)		
Display Type	Liquid Crystal 1 line alphanumeric, 2 line numeric	4 line alphanumeric	
Display resolution	0.1%rh, 0.001a <sub>w</sub> , 0.1°C/F, 0.01 calculated value		
Housing	Aluminium/stainless steel (dimensions see page 6)		ABS
Power	9V Power adapter, +Tip		PP3 battery, or 9V power adapter, +Tip
CE Conformity	EMV: EN50081-2 EN/EN50082-2		

ORDERING INFORMATION	
Order code	Description
HygroLab 2	A <sub>w</sub> , humidity temperature meter, four probe inputs, full psychometric calculation, RS232/485 interface
HygroLab 3	A <sub>w</sub> , humidity temperature meter, four probe inputs, full psychometric calculation, A <sub>w</sub> Quick mode, RS232/485 interface
HygroPalm AW1	Handheld humidity temperature meter, A <sub>w</sub> Quick mode
HygroPalm AW1-Set/14	HygroPalm AW1, carrying case, Aw-DIO, PS-14, WP-14-S, EA10-SCS, EA35-SCS, EA50-SCS, EA80-SCS
HygroPalm AW1-Set/40	HygroPalm AW1, carrying case, Aw-DIO, PS-40, WP-40, EA10-SCS, EA35-SCS, EA50-SCS, EA80-SCS
PD1	Docking station for HygroPalm Aw1 with 9V power connector
AC1207	Power adapter 9V, +Tip for HygroLab or PalmDock1
HygroData-LAB	HW3 software and RS232 cable for HygroLab2 and HygroLab3
HygroData Quick	HW3 software and RS232 cable, license and access codes to activate A <sub>w</sub> Quick mode in HW3 software (needs HygroLab 2)
AW-DIO	Water activity station
WP-14-S	Stainless steel sample holder 14mm depth
WP-40	Stainless steel sample holder 40mm depth
PS-14	Disposable sample containers to suit WP-14-S ( 100 pieces )
PS-40	Disposable sample containers to suit WP-40 ( 100 pieces )
AW-KHS	Clamp sealing mechanism for AW-DIO and WPS14/40
HygroClip SP05	5mm Ø insertion probe, -40...+85°C (requires cable) MOK-02-B5
HygroClip HP28	10mm Ø insertion probe, -40...+85°C (requires cable) MOK-02-B5
HygroClip SC05	5mm Ø cable mounted probe -30...+100°C (requires cable) MOK-02-B5
MOK-02-B5	Cable 2m, HygroClip probes to HygroLab/HygroPalm Aw