7. Product types

Product type	Definition	Unit	Measuring range
absolute Humidity	absolute air humidity	g/m³	0 to 130 g/m³
Dew Point	Dew Point	°C °F	-55 °C to +60 °C -67 °F to 140 °F
relativ Humidity	relative air humidity	% RH	0 to 100 %
EMC Wood	Wood equilibrium moisture content	% EMC.	2 to 30 % (wood moisture)
EMC POM	POM equilibrium moisture content	% EMC.	0 to 2 %
Water Activity	water activity	aw	0 to 1
Empty 1 - 5	Free curve for special products		

7.1 Definition product types

Absolute humidity

The absolute air humidity shows the contained amount of water in gramme per cubic metre of air. The absolute humidity is a direct degree for the amount of water vapour contained in a certain air volume. It shows how much condensate can precipitate or how much water has to be evaporated in order to obtain the desired humidity.

Dew Point

The dew point is the temperature to which the air that is not completely saturated with water vapour must be cooled so that it is completely saturated. When a room with the current relative humidity cools down to the dew point temperature, the water vapour begins to condense.

Relative humidity

Indicates the relationship between the current water vapour pressure and the maximum possible, the so-called saturation vapour pressure.

The relative humidity shows the degree the air is saturated with water vapour. Examples:

50% relative humidity: At the current temperature and pressure, the air is half saturated with water vapour. 100% relative humidity means that the air is totally saturated with water vapour. If the air has more than 100% humidity, the excessive humidity would condense or precipitate as mist.

EMC wood

Shows the wood equilibrium moisture content (for wood stored under these conditions) in % wood moisture and the temperature in the selected unit (°C or °F).

EMC POM

Shows the POM granulate equilibrium moisture content (for granulate stored under these conditions) in % moisture content and the temperature in the selected unit (°C or °F).

Water activity

Water activity is also described as free, non-cellularly bound water in products such as food. The water activity is described in chapter "7.2 Definition water activity".

Free calibration curves

There are free calibration curves in the measuring device. These can be used for special products.

On request Schaller Messtechnik GmbH can develop customer-specific calibration curves for your product.

7.2 Definition water activity

Water activity is the ratio of the partial water vapour pressure in food (p) to the saturation vapour pressure of pure water (p0). It is an important indicator for the product quality in the food, tobacco and pharmaceutical industry and is represented in an aw value from 0 to 1.

The water activity is synonymous with the equilibrium moisture content – the relative humidity at which the material to be measured is in equilibrium with the ambient air. The relative humidity of air however is expressed in %.

The water activity is temperature-dependent. For the determination of the water activity at a desired temperature, the measuring device and the material being measured should be stored at the same temperature before starting the measurement.

The humimeter RH2 water activity measuring chamber is suited for the measurement of materials such as cereal products, coffee, cocoa, muesli, butter, mixtures of dried fruit, spices, granulates, mushrooms, sugar, xylitol, biscuits or dried sausage as well as many other types of food where a check of the water activity is necessary.

The humimeter RH2 water activity measuring chamber is generally not suited for liquids as well as juices (syrup), acidic food such as onions, fruits and tropical fruits or food and beverages containing alcohol, such as filled chocolates. Vinegar and acids destroy the calibration and the sensor.

Materials with a moisture content above the fibre saturation point, this means an aw value above 1, cannot be measured. For such materials only the water content can be determined.

The water activity must not be confused with the water content – the percentage of water contained in a product.
The water content is used for billing according to the dry content of food and materials, it shows the ratio of water to the total mass in percent (kg/kg)x 100.

The water activity influences the following characteristics of a product:

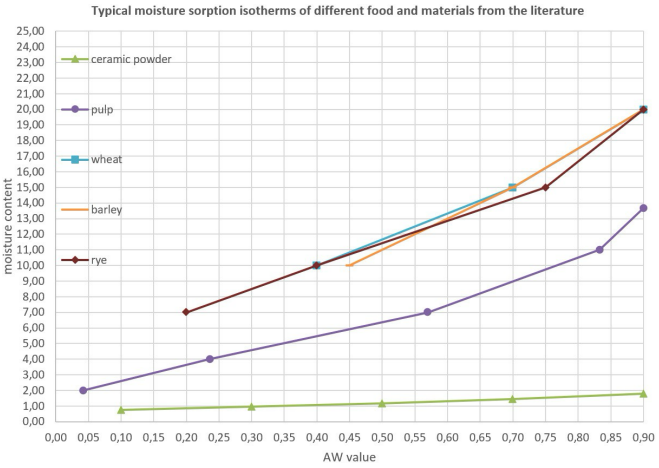
- microbiological stability
- chemical stability
- enzymatic stability
- colour, taste and nutritional value
- content of proteins and vitamins
- stability of composition
- shelf life
- storage and packaging

All forms of life are dependent on water. The water activity indicates the amount of water available for micro-organisms such as bacteria, fungi, moulds, etc. Each type of microorganism needs a certain minimum water activity value for being able to grow.

Typical minimum water activity values taken from literature:

Water activity	Organism
aw = 0.91 - 0.95	Bacteria
aw = 0.88	Yeast
aw = 0.80	Mould
aw = 0.75	Halophilic bacteria
aw = 0.70	Osmiophilic yeast
aw = 0.65	Xerophilic mould

Typical sorption isotherms of various foods and materials taken from literature:



7.3 Application range

Within the normal application range (normal range) the accuracy of the device is as indicated. A long-term application beyond the normal application range (max. range), particularly at an air humidity of more than 80%, can lead to higher measuring errors (+3 % after 60 hours). Back in the normal application range, the sensor will return to the indicated accuracy automatically.