

## REAL TIME MONITORING OF PASTA DRYING



**In order to continuously monitor the drying process, humidity sensors measure the water content of the air intake and exhaust in cycles of seconds. Defined limiting values ensure that the precise quantity of water is always removed in order to guarantee the quality of the product.**

Pasta made from water, whole-wheat flour and salt has been known since the 12th Century. Pasta, as with all very popular noodle dishes, is sold either fresh or dried. Industrially produced dough passes through a closely adjusted process, in which the components of the measurement and control technology precisely monitor the specified process parameters.

### **Monitoring of pasta drying**

For example, continuous information about product humidity is essential for optimum drying of the pasta. However, in practice direct measurement of the product to be dried is not feasible. In spite of this, the drying process can be indirectly monitored by measuring the water content of the air intake and the exhaust.

The difference between the two values is used as a controlling value for the process temperature. In order to prevent the limiting values from being exceeded, producers specify a maximum value for the amount of water which can be extracted per unit of time in order to achieve an optimum result. If the same amount of water is present in the intake air and the exhaust, the drying process is complete, as the pasta is no longer giving off any water. The water content is measured in g/kg and indicates how many grammes of water are present in a kilogramme of air.

A good quality pasta essentially depends on how rapidly or slowly the water is extracted.

### **Structure of the hygrometer**

The sensor element is installed in the tip of the sensor tube and is protected from dirt by means of a stainless steel filter which is permeable to air. The measuring probe consists of the sensor, the sensor tube and the filter. Because the components are made from stainless steel, the measuring probe is robust and can be used in demanding industrial applications up to 180°C.

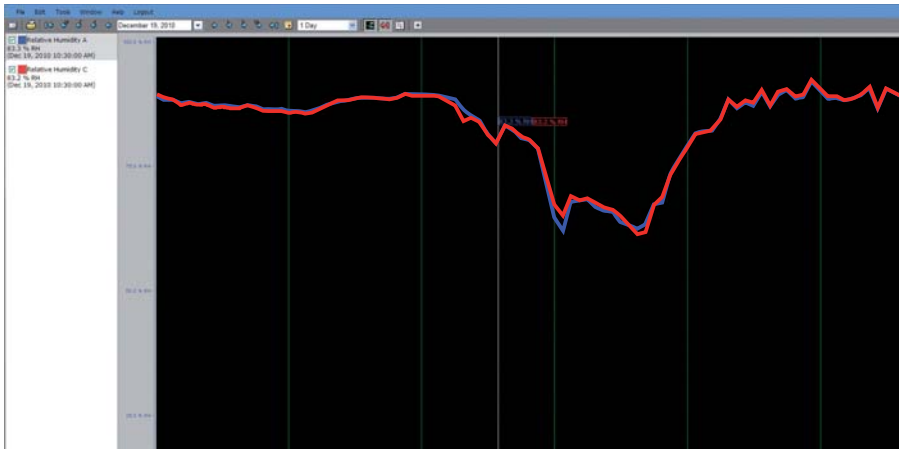


The sensor, which is also known as a hygrometer, is equipped with a hygroscopic layer as a dielectric between the electrodes of a capacitor. Through the absorption of moisture in the dielectric, its properties, and therefore the electrical capacity of the sensor changes.

The hygrometer converts the capacitance of the sensor into an analog or digital output signal, which is processed by a control unit. As there may be temperatures of up to 180°C at the measurement site, mounting of the electronics at a cooler location is important. For transfer of the signals, even over longer distances, the measuring sensor is connected to the electronics with a cable which is up to 10 m in length.

The sensor cable is made from polytetrafluorethylene (PTFE), which resists high temperatures and is therefore suitable for use in the food industry.

The control unit continuously reads



the output signal and calculates the water content of the intake air and the exhaust. This means that the set limiting values are continuously monitored.

A warning is given if a limiting value is exceeded. The reaction time of the sensor is in the range of seconds, so that producers can monitor the water content of the pasta during the drying process almost in real time.

## • Application conditions

Measurement range: 0-100% rel. hum.; -40.0.180□  
 Output: 0-5V, 0-10V, 4-20mA, 0-20mA, serial interface: RS232C + optionally RS485  
 Accuracy: +/-1.3% rel. hum.; +/-0.2°C

## • E+E solution



EE31  
 Humidity measuring transducers for accurate measurement up to 180°C

Industrial measuring transducer for highly accurate and reliable measurement of humidity, temperature, dewpoint and derived computational functions up to 180°C.