



The HMM210 series of humidity modules is ideal for accurate relative humidity, temperature and dew point measurement in demanding environments.

**A**s is well-known, relative humidity affects the operation of machinery and equipment. Electrical equipment, in particular, is very sensitive to moisture. For this reason, environmental chambers are used in certain industries to test the impact of harsh environments on equipment performance. The measurement of relative humidity and temperature plays a critical role.

#### Accurate RH, temperature or dew point measurements

Vaisala's HMM210 series of modules is optimized to deal with harsh environments in which there are high humidities and wide temperature ranges. The humidity measurement is fully temperature compensated. Being highly versatile and flexible, the modules can provide relative humidity, temperature and dew point measurements with various configurations.

All modules are microprocessor-based, and are equipped with analog or digital outputs. In addition, they have good EMC characteristics.

#### Flexible OEM applications

The HMM210 series of modules is designed for OEM-type (original equipment manufac-

turers) applications needing humidity or dew point measurement in demanding environments – as in environmental chambers.

HMM210 modules provide users with fast and stable humidity measurements. A warmed humidity probe is available as an option to HMM211 and 213. The advantages of using Vaisala's patented technique of a composite humidity sensor are as follows:

- no condensation problems
- fast humidity response time, especially in rapidly changing temperatures
- improved stability and accuracy in high humidities.

#### Reliable HUMICAP® sensor

The HMM210 series of modules uses Vaisala's HUMICAP® sensor, which is highly accurate and has excellent long-term stability and negligible hysteresis. The sensor is insensitive to dust and most chemicals. However, in conditions characterized by extremely high levels of chemicals and cleaning agents, sensor regaining is available as an option to assure accuracy between calibrations.

Calibrations can be done quickly and easily with Vaisala's HMI41 humidity indicator, or alternatively with an HMK15 saturated salt calibrator. ■

Reliable humidity measurements at extreme temperatures

## Special Demands in Bakery Applications



*Bread baking involves high temperatures and humidities. To achieve optimum results, the baking process must be monitored and controlled carefully.*

The measurement of humidity in many high-temperature baking and drying processes requires special instruments characterized not only by stability, reliability and accuracy, but also by ease of use and flexibility of configuration. The DMP246 transmitter meets these requirements. When configured to customer specifications, it can be used safely in temperatures up to 350 °C.

**I**n many high-temperature baking and drying processes, the achievement of the right conditions makes all the difference between prime and inferior quality foodstuffs. Applications such as bread baking or cereal manufacturing, for example, must have a carefully controlled humidity level in the dryers and ovens in order to keep quality and yield high.

To maintain humidity within acceptable limits, the moisture content of the process air must



*The DMP246 dewpoint transmitter has been specially designed for reliable and accurate measurements in demanding environments.*

first be measured. A combination of high temperature, up to 350 °C (662 °F), and high humidity poses special challenges for measurement equipment. Very few devices can survive these conditions.

### Moisture control ensures high quality crackers

One example of a food production process where the right moisture level in the ambient air is essential is cracker production. The crackers are dried in three different phases in which the temperature varies from 150 to 300 °C (302...572 °F) and the humidity goes from high to low.

If the ambient air has too much moisture in it, the crackers retain a high level of free moisture and will not crackle, as they should. The high water content also means the crackers spoil more easily, and the production yield stays low. On the other hand, if the air is too dry, the surface of the crackers can dry too quickly and trap the free moisture within – or the product can become too dry and brittle. Drying the product

too much also wastes heating power. In both cases the color and flavor of the crackers suffer and the product yield is poor.

Similar effects take place in bread and biscuit baking and in cereal and snack manufacture. Even in processes like roasting, the ambient moisture level changes the end product.

### The DMP246 keeps cool at 350 °C

Vaisala's DMP246 dewpoint transmitter is specially designed for applications where both high temperatures and high humidities occur.

Although the capacitive DRYCAP<sup>®</sup> sensor's upper operating limit is below 200 °C (392 °F), thanks to the probe structure and the passive cooling utilized, the sensor can be placed directly in high temperatures without sacrificing measurement accuracy or stability. At 350 °C (662 °F) the sensor temperature is approximately 150 °C (302 °F). Because dewpoint measurement is independent of temperature, the sensor gives the correct dewpoint of the chamber or oven air, even if its temperature is lower.

Since the sensor can be installed inside ovens or dryers, no costly sampling systems are required. Measurement accuracy and reliability is also better. With a sample system there is a high risk of condensation if the dewpoint temperature in the process is high. Once the mois-

ture condenses, the moisture reading will change and be erroneous. Furthermore, a sampling system becomes dirty more easily, and can be blocked.

The cooling effect of the DMP246 may be regulated by adding more cooling profiles or removing them from the cooling set of the transmitter, depending on the application. Thus, the sensor's temperature can always be kept above dewpoint, i.e. condensation. If condensation occurs, the sensor recovers from it fully.

The passive cooling method requires no moving parts or additional power. This eliminates the risk of damage to the transmitter due to a cooling failure. No water or gas cooling arrangements are required.

### Transformable for each application

The DMP246 is a microprocessor-based transmitter, which is configured to the customer's specification in the factory, and shipped programmed and ready for installation. However, its settings are easy to change, even in the field.

The transmitter measures water vapor pressure in the chamber or oven air, and outputs the dewpoint temperature and mixing ratio. The measurement ranges can be selected, and scaled to desired ranges within the full measurement ranges: +10 ... +100 °C (50 ... 212 °F) Td and 0 ... 10,000 g/kg dry air.

### Versatile hardware

The probe of both the DMP246 transmitter and the cooling set are made of stainless steel, which can be used safely in food production. The aluminum housing, which protects the electronics from dust and sprayed water, has an IP 65 classification. The housing also provides protection against electromagnetic interference.

The transmitter can be supplied with or without a display/keypad cover. The display shows the measurement reading at the point of installation, and the user can use the keypad to configure the settings through menu-based commands.

The transmitter has two analogue outputs, and an alarm relay output is also available. The DMP246 transmitter's versatility is further enhanced by serial bus modules, 115 VAC/230VAC power units and three different cable lengths for the measurement probe. ■