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ter performs exceptionally well in applications that occasionally experience process water spikes such as pipeline condensation during a system start-up or failure. Humidity sensors, which the dewpoint sensors in essence are, should obviously also be durable for high humidity levels, even for water immersion, but not all of them are. Most existing sensors need recalibration or even replacement after a high humidity peak in the process. However, the DMT142 withstands and measures high and low humidities alike. In addition to the very durable sensor, the warming also helps to keep the sensorhead dry in condensing pipelines, resulting in reliable and accurate dewpoint measurement in all conditions.

Additional features and options

The DMT142 has a variety of features that the user can choose from, including different output and installation options. Several different sampling cells are available and measurement can be performed directly in systems of up to 20-bar pressure.

Additionally, the hand-held DM70 can be used to confirm the performance of the DMT142 in the field without disconnecting the transmitter. By comparing the reading of a DM70 reference probe and a DMT142 transmitter the possible drift of the DMT142 can be seen in the DM70 display. If adjustment is needed the transmitter can be sent to a Vaisala Service Center. Most likely, the user will avoid unnecessary factory recalibrations when it is seen how small the drift is in Vaisala dewpoint transmitters. ●

Vaisala DRYCAP® Polymer Sensors incorporate Superior Measurement Technology

Vaisala DRYCAP® polymer sensor technology has advanced the state of the art of process dewpoint measurement. To fully understand the benefits of DRYCAP®, it is helpful to review some of the pros and cons of commonly used sensor technologies for dewpoint measurement. Prior to DRYCAP®, users had only two or three real measurement technology choices, each representing serious tradeoffs in performance.

Aluminum oxide based sensors

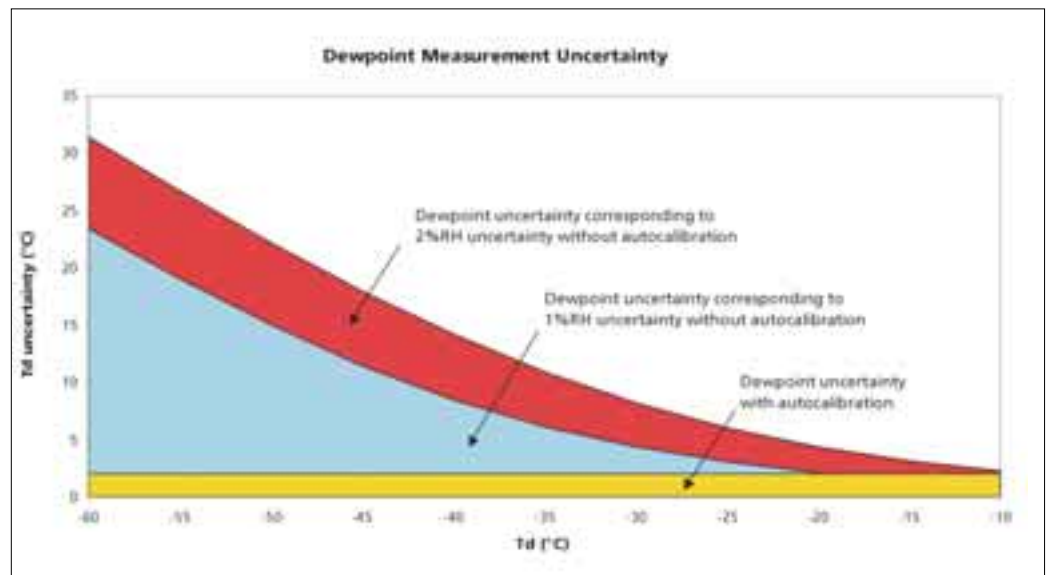
Aluminum oxide based sensors offer a measurement range extending below -100°C frost point, and in many cases are the only choice for process measurements in very dry gases. This mature technology is offered in

many form factors (intrinsically safe, portable, etc.) and is in widespread use. Unfortunately, these sensors require frequent calibration. They typically do not respond well to high humidity conditions, sometimes taking 24 hours or more to “dry down” after brief exposure to near saturated conditions.

RH measurement for dewpoint calculation

Polymer RH sensors used in conjunction with a temperature sensor are an excellent alternative for dewpoint measurements that are not too dry. Dewpoint is simply calculated from the measured RH and temperature.

In traditional relative humidity based dewpoint sensors, the uncertainty of calculated dewpoint increases rapidly as the dewpoint decreases. Vaisala's patented autocalibration maintains a ±2°C accuracy.



However, as RH approaches zero, the error in calculated dewpoint increases dramatically if only traditional dewpoint calculation is used.

Lithium chloride saturated salt sensor

The lithium chloride (LiCl) saturated salt sensor is still in use in many HVAC applications. Due to the chemical nature of lithium chloride, this sensor is limited to measurements above 11 %RH. It is also sensitive to flow rates and it must be "recharged" periodically, which is a messy and time-consuming process.

Other technologies

There are also other technologies often found in process environments. Condensation devices (chilled mirror, SAW) and quartz crystal microbalances offer superb accuracy but are rather expensive and complex for many industrial applications.

Vaisala DRYCAP® technology

Vaisala DRYCAP® technology has emerged as a strong player for a wide variety of dewpoint measurements. The measurement range of DRYCAP® extends from -60°C to +60°C, and a measurement accuracy of ±2°C can be maintained for two years. This performance has been achieved with the patented Autocal routine, and it leads to very low maintenance costs compared to other low dewpoint technologies.

Autocal method

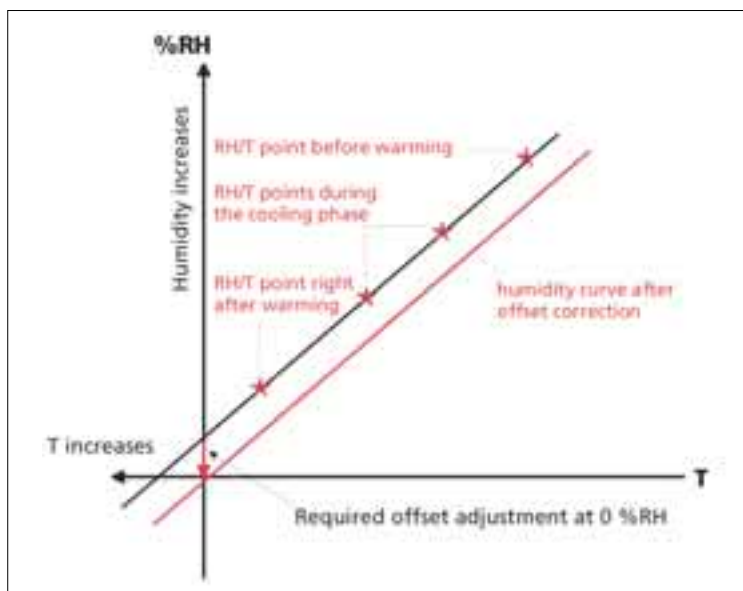
The Autocal method is at the heart of DRYCAP® technology and was developed when Vaisala researchers determined that polymer RH sensors have good sensitivity at low dewpoints but an accurate dewpoint reading can not be guaranteed, especially in the long term. Autocal harnesses the

sensitivity and durability of the polymer RH sensor by correcting its instability at low dewpoints. Physically, this requires the bonding of a temperature sensor to an RH sensor, so that the temperature of the polymer RH sensor is always precisely known. When an Autocal routine is invoked, the DRYCAP® Sensor is heated slightly and data is collected from the sensor as it cools. These data are compared to an "ideal," based on physical laws for the same conditions. Any deviation from the ideal is corrected, and the output of the DRYCAP® device is adjusted accordingly.

In practice, Autocal operates in the background and uses a series of "checks and balances" to control this process. DRYCAP® is really a combination of sensor, software, and hardware.

From innovations to instruments that meet customer need

The technical innovations of DRYCAP® are only half the story. After all, customers expect and deserve accurate and reliable measurements. They also expect instruments that meet their specific needs. The Vaisala DRYCAP® product family has been growing to accommodate these needs. The unique Hand-Held Dewpoint Meter DM70 was successfully introduced to enable fast and accurate dewpoint measurements where permanent instruments are not required. The latest addition to the



In autocalibration, an offset adjustment is made based on RH and temperature data collected during the cooling down of a heated sensor.

Vaisala DRYCAP® family, the Miniature Dewpoint Transmitter DMT142, has been well received by initial customers. With its 2-year calibration interval, the DMT142 can pay for itself by eliminating the cost of the annual

calibration required by many competing devices. The DMT142's combination of high performance, long-term reliability, small physical package, and reasonable price has been a hit with OEM customers. ●

Vaisala offers products based on DRYCAP® sensor technology for a variety of applications.

