



Meteorological
dewpoint measurements
from arctic conditions to hot deserts

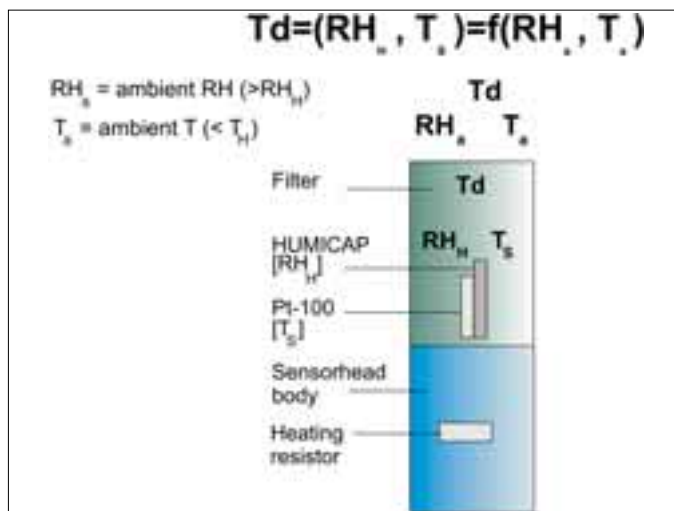
National Weather Service Relies on Vaisala Instruments for Dewpoint Measurement



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The National Weather Service (NWS) in the USA has started to update the dewpoint measurement in the ASOS (Automated Surface Observing System) network with Vaisala's HUMICAP® technology. The high measurement performance over a wide measurement range together with the long maintenance interval were among the most important factors considered when selecting the new-generation technology for the network. Vaisala's unique warmed sensor technology was finally chosen to satisfy the most demanding needs in humidity and dewpoint measurement.

Vaisala's 30 years experience with capacitive humidity sensors has resulted in a sensor which satisfies one of the most demanding needs in humidity and dewpoint measurement.



The dewpoint measurement principle in the warmed sensor head. The temperature of the warmed HUMICAP® sensor is measured accurately in addition to the RH measurement. These values result in ambient dewpoint as dewpoint does not change although the temperature of the sensor rises.



The dewpoint probe in the specially designed radiation shield with open structure.



The dewpoint measurement in the ASOS network at NWS incorporates an installation kit for the sensor head together with an enclosure for the dewpoint transmitter and optical modem. The warmed probe of the transmitter is installed in a radiation shield with open structure.

After a long evaluation period the National Weather Service in the United States has started to replace its dewpoint measurement instruments with Vaisala's HUMICAP® technology throughout the ASOS (Automated Surface Observing System) network in the USA. This network covers the entire continent from Alaska to Texas, setting very high demands for the instrumentation in terms of environmental conditions, which range from arctic to hot desert. The sensors that are being replaced represent technology with a high need for maintenance, mainly due to the basic operation principle of the instruments. They utilized

chilled mirror technology with optical dew detection which is known to be sensitive to dirt.

Reliable measurements with low maintenance needs

The new instrument for dewpoint measurement in the ASOS network is based on warmed HUMICAP® thin film polymer sensor technology, used in, for example, Vaisala HMP240 Series products. The measurement with capacitive thin film polymer sensor is itself very reliable and has a very low failure rate. For example, the MTBF value (mean time between failures) for the HMP243 Dewpoint Transmitter is more than 18 years (with 20

confidence). The measurement technology is also not very sensitive to dirt and operates with the required accuracy over the specified wide temperature and humidity range.

Warming prevents the adverse effects of moisture

The advantage of warming is a reliable measurement even in situations where the humidity levels are close to 100%RH, i.e. the moisture in the air starts to condensate and dewpoint equals the ambient temperature. Warming ensures the sensor will not get wet which could result in incorrect humidity readings (too high) until the sensor dries up. In

warmed sensor technology, the temperature of the HUMICAP® sensor is measured accurately in addition to the relative humidity measurement from which the dewpoint is calculated. The calculation results in actual ambient dewpoint, as dewpoint does not change although the temperature of the sensor rises.

Additionally, the long-term stability provided by HUMICAP® technology makes the final product concept unprecedented. It allows high-performance meteorological dewpoint measurements with minimal maintenance needs, meeting the exacting requirements of the NWS surface weather observing system. ●