

Vaporstat™ 9002

Infrared Water Vapor/Dew Point Transmitter

Introducing A New, Reliable Technology to Measure And Control Moisture

Developed with the assistance of the: U.S. DOE, Desiccant Technologies Program, Oak Ridge National Laboratories

Control Humidity, Ensure Comfort & Prevent Mold Growth In:

Schools - Offices - Supermarkets & Big Box Retail
Hotels - Restaurants - Museums/Art Galleries
Ice Arenas - Laboratories - Clean Rooms

Infrared Dew Point Offers:

- A Break-Through in Low Cost Reliable Dew-point Sensing
- Measure Moisture Independent of Temperature Interference
- Direct Measurement of Dew Point Eliminates Stacked Errors Resulting From RH and Temperature Calculation
- Unprecedented 15 Year Sensor Life
- Non Interactive Sensing Technology That Can't be Poisoned or Saturated
- Can Be Field Calibrated to an Easy-to-Use NIST Reference Standard in Less Than 15 Minutes
- Easily Applied to Indoor, Outdoor or In-Duct Measurements



Indoor or
Outdoor
Monitoring



New Dew Point Transmitter

The Vaporstat™ is the first commercial infrared dew point transmitter that directly measures dew point. The Vaporstat™ is a new generation, low-cost moisture sensing device that directly measures water vapor rather than relative humidity. A relative humidity measurement reflects the amount of moisture air can hold at a certain temperature. If the temperature changes the relative humidity will change. In contrast, the water vapor sensor measures the absolute amount of water vapor in the air and is unaffected by temperature. The Vaporstat™ provides a similar performance to a chilled mirror but is a fraction of the cost and requires considerably less adjustment and maintenance.

Durable Sensor with a 15 Year Life

The Vaporstat™ is a durable dual beam infrared optical sensor that cannot be saturated or poisoned by other gases. There is nothing to repair or replace for the 15 year operating life of the sensor.

Eliminate Stacked Errors Related to Calculating Dew Point

Many building control systems take temperature and humidity and calculate dew point. If you can measure water vapor in air with the Vaporstat™, why rely on the complex and imprecise calculation method required when using combined sensors. Eliminate stacked errors and gain precise and more effective control, resulting in energy savings and increased comfort.

Configure to Your Needs

The on board keypad allows for the sensor to be configured to your needs. Correct for elevation, scale measurement range and outputs or adjust the on-board SPDT relay set points. Once installed you can lock the sensor in place and choose to provide a visible or hidden display. Telaire also offers options for duct mount and outside air sensing.

Specifications

Measurement Method

Non-Dispersive Infrared, Dual-Channel, Non-Interactive, Non-Saturating

Sensor Output Units

°F Dew Point

Measurement Range

0 °F to 80 °F Dewpoint (-18°C to 26°C Dew Point)

Typical Dew Point Accuracy @ 77°F (25C), 27°F to 80°F DP (-3 to 26°C DP)

(As measured against a factory certified reference): 2°C Dew Point (3.6°F)

NIST Certified Calibration

The NIST certified calibration of the sensor can be restored or checked using a zero gas certified to have less than 0.05 grains/lb dry air moisture content. (Calibration Kit 2076)

Altitude Correction

User adjustable in 500 ft increments using keypad.

Operating Temperature Range

Room and Duct

32°F to 120°F (0°C to 50°C)

(Accessory Enclosure 1551 Required)

Outdoor

-20°F to 120°F (-29°C to 50°C) when installed in 1551 enclosure

Storage Temperature:

-40°F to 170°F, (-40°C to 70°C)

Input Power:

18 – 30 V AC, 50/60Hz (half wave rectified)

1.75 VA average, 2.75 VA peak

Analog Outputs (available simultaneously):

0-10 V DC (100 Ohm output impedance)

4 – 20 mA (RLmax – 500 Ohms)

Relay Output:

- Normally open and normally closed (SPDT)

- Gold Bifurcated, 2A max @ 24 V

On Board Keypad Adjustments:

- Select °F Dewpoint output & display

- Altitude Correction

- Measurement Range

- Analog Output range

- Zero Concentration Calibration (With Nitrogen)

- Calibration To Ambient Air

- Relay Setpoint

- Relay Dead-Band

Limited Warranty:

18 months (see warranty card for details)

Sensor Rated Life:

15 years

Installation:

- Wall

- Duct with aspiration box (model 1508)

- Outside air enclosure (model 1551)

In-Field NIST Calibration

Factory calibration isn't necessary if an NIST certified calibration is required. Each sensor has an individually developed calibrated curve based on an NIST certified Chilled Mirror hygrometer, over 8 calibration points using a General Eastern Model GC1 Calibration Chamber. This individualized calibration curve is stored in the sensors permanent memory and will be valid for the life of the sensor. The sensor's NIST calibration can be can be verified or reestablished by using a reference device with a known concentration. Calibrating at a single point will reestablish the sensor calibration to its original NIST certified calibration points. Reference devices can include a calibrated hand held dew point sensor or flowing a known concentration of water vapor through the sensor.

Explanation of Humidity Measurement Terms

Humidity refers to the water vapor content in air or other gases. Humidity measurements can be stated in a variety of terms and units. The three commonly used units of measure for humidity are relative humidity (RH), dew point, and humidity ratio. Dew point and humidity ratio are referred to as measures of absolute humidity because the values are not relative to, or affected by the air temperature.

Relative Humidity is the amount of water vapor air can hold at a given temperature. Because this value has been so easy to measure, and its values appear to correlate to comfort it's use has become widespread by the general public. As discussed in the ASHRAE Humidity Control Design Guide* because "Relative humidity changes widely and constantly with temperature" it may not be the appropriate humidity control parameter for many applications.

Dew Point is the temperature water vapor in air begins to condense to liquid. Like humidity ratio, it is an absolute measure of water in air that is independent of temperature. The lower the dew point the drier the air. Dew point is a measure used in applications for humidity control to avoid condensation of water on cooler surfaces within a building (e.g. windows, refrigeration cases, inside walls, electronic equipment, ductwork and grills). This type of condensation can lead to discoloration, physical or structural damage and mold and mildew growth).

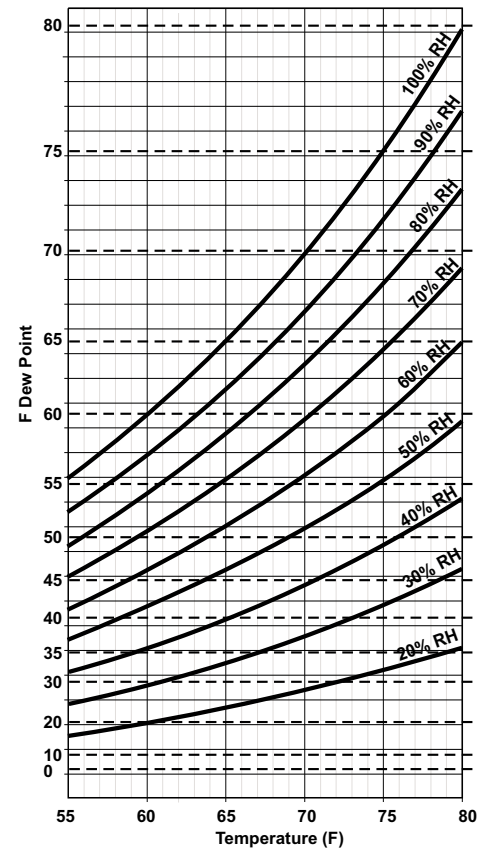
ASHRAE on Different Types of Humidity Measurements*

"Like humidity ratio the dew point temperature clearly defines the amount of water in the air in non relative terms. So dew point is often used to clearly communicate moisture content, and is often used in contract documentation to avoid the potential confusion caused by specifying the relative humidity alone. Furthermore an HVAC system can keep a building in a narrow range of dew point at far less expense and complexity than one, which control relative humidity in a narrow range. Unlike relative humidity the dew point (and humidity ratio) is not affected by changes in dry bulb temperature as the air moves through equipment and the building. Relative humidity changes widely and constantly with temperature. Dew point (and humidity ratio) only changes with additions or subtractions of water vapor, which are less frequent and less extreme than temperature variations in commercial buildings."

*L.G. Harriman III, G.W Brundrett, R. Kittler, *ASHRAE Humidity Control Design Guide*, American Society of Heating, Refrigeration And Air Conditioning Engineers, 2001, ISBN1-883413-98-2

Use Dew Point to Control RH

If you need to control RH within a very specific range of conditions the Vaporstat™ is the control you need. By isolating the water vapor content in air you can apply specific latent control strategies in your mechanical equipment to ensure delivered air hits the target RH when it meets the temperature conditions in the conditioned space. The chart provides guidelines for the dew point concentration that is equal to a specific relative humidity at a specific temperature. Use the chart below to choose the control point you need to ensure target RH levels are maintained at your target temperature conditions.



It is our intention to keep the product information current and accurate. We can not cover specific applications or anticipate all requirements. All specifications are subject to change without notice. For more information or questions relative to this Specification Sheet, contact Telaire.

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5,370,114 / 5,601,079 / 5,691,704 / 5,767,776 / 5,966,077
6,107,925 / 5,798,700 / 5,945,924 / 5,592,147 / 6,255,653
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