

# GE Sensing

## Features

- A break-through in low cost reliable dew point sensing
- 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 National Institute of Standards and Technology (NIST) reference standard in less than 15 minutes
- Easily applied to indoor, outdoor or in-duct measurements

## 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 and Prevent Mold Growth in:

Supermarkets and Big Box Retail schools, offices, hotels, restaurants, museums/art galleries, ice arenas, laboratories and clean rooms

# Telaire<sup>®</sup> Vaporstat<sup>™</sup> 9002 Infrared Dew Point Sensor

Telaire Vaporstat 9002 is a Telaire product. Telaire has joined other GE high-technology sensing businesses under a new name-GE Industrial, Sensing.



# GE Sensing

## **New Dew Point Sensor**

The Vaporstat is the first commercial infrared dew point sensor. 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 comparable performance to a chilled mirror, but is a fraction of the cost and requires considerably less maintenance.

## **Durable Sensor with a Fifteen 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 relative 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.

## **In-Field NIST Calibration**

Returning the unit for factory calibration is not necessary if the NIST certified calibration can be verified in the field. Each sensor is assigned a unique calibration curve based on an NIST certified chilled mirror hygrometer. This individualized calibration curve is stored in the sensors permanent memory and will be valid for the life of the device. The sensor's NIST calibration can be verified or reestablished by using a reference device or flowing gas with a known water vapor concentration over a single calibration point. Calibrating at a single point will reestablish the sensor calibration to its original NIST certified calibration points.

## **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**—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**—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).

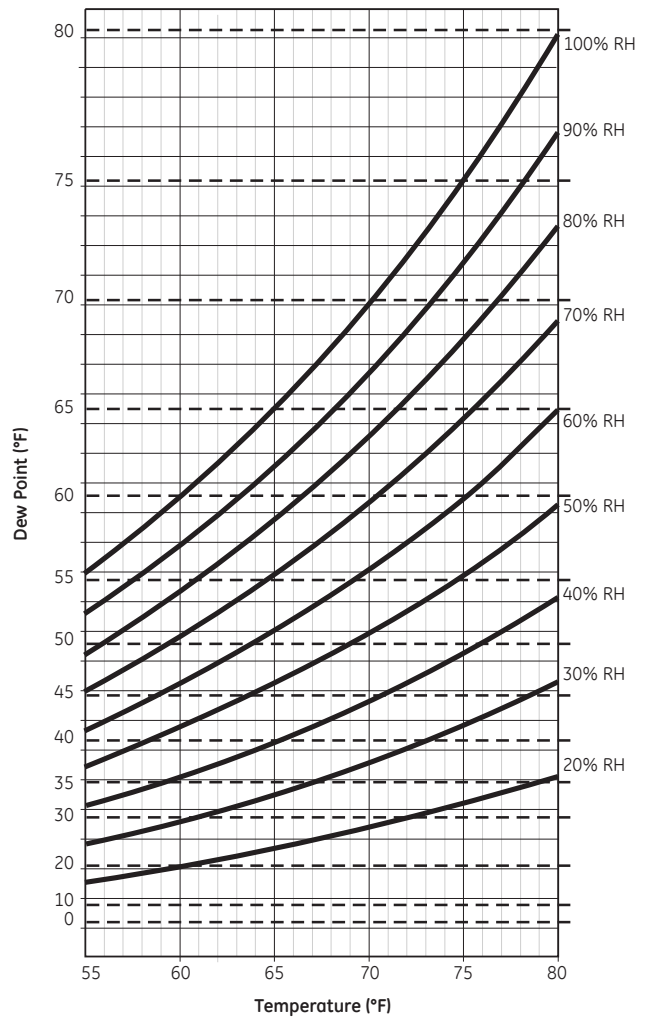
## ASHRAE on Different Types of Humidity Measurements\*

“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

The Telaire Vaporstat 9002 can help you control RH within a very specific range of conditions. By isolating the water vapor content in air, specific latent control strategies can be applied to your mechanical equipment to ensure that delivered air hits the target RH and temperature conditions identified for the conditioned space. The adjacent chart illustrates dew point concentration at a specific relative humidity and temperature index. Utilize the chart to identify the control point you require to meet the desired RH and temperature target.



# Vaporstat 9002 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 (-18°C to 26°C) dew point

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

As measured against a factory certified reference:  
35.6°F (2°C) Dew Point 3.6°F (-15.77°C)

## 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 (152.4 m) 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 77°C)

## Input Power

- 18 to 30 VAC, 50/60Hz (half wave rectified)
- 1.75 VA average, 2.75 VA peak

## Analog Outputs (available simultaneously)

- 0 to 10 VDC (100 Ω output impedance)
- 4 to 20 mA (RLmaximum=500 Ω)

## Relay Output

- Normally open and normally closed (SPDT)
- Gold bifurcated, 2A maximum @ 24 V

## On Board Keypad Adjustments

- Select °F dew point output and 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)

*Not recommended for supply air duct mount installation*



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