

Time-Saving, High-Accuracy Humidity Calibration Process

The Application

Humidity measurement is an important parameter in many industrial processes, but measuring it correctly can be tricky. Relative humidity is a term used to describe the amount of water vapor present in air, expressed as a percentage of the amount needed for saturation at the same temperature. It is crucial that temperature is precisely determined to get an accurate relative humidity measurement. If the measured room temperature is off by only 1°C, the humidity measurement can vary by up to 3 to 4%.

In order to ensure accuracy, an international pharmaceutical company, has chosen to use AMETEK's RTC Reference Temperature Calibrators as an integral part of the process for calibrating their humidity measurement instruments.

The Challenge

On the one hand, regulations are getting tougher regarding proper testing and calibration of processing equipment by means of programs like GMP and ISO. On the other hand, companies are under internal pressure to lower costs. Today, many companies are implementing LEAN projects to help them increase accuracy, reduce calibration time, speed up operational downtime response, and avoid improper deviations.

Humidity calibration, necessary for monitoring packing facilities and climatic test chambers, has traditionally been done in a saturated situ salt solution. In this way the calibration is done with three different salt values. But doing the calibration this way is very time-consuming, requiring numerous changes of clothes in order to access different areas of the production

facility. In addition, due to the range of the salt, there is no way to adjust the range exceeding 75.3% relative humidity. Finally there are numerous links in the traceability chain, leaving many possibilities for uncertainty.

In addition to calibrating the humidity sensor, the temperature sensor must also be calibrated. Traditionally this was done on site with a dry block temperature calibrator, and this is the point in the process that offered an opportunity for innovation.

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The Solution

At the pharmaceuticals plant, they have found a smarter way to do “in situ” calibration. The new solution has numerous advantages. Switching to a combined temperature/humidity sensor (where the calibration constants are stored in the sensor) made it possible to do a so-called “separate calibration” — instead of calibration in situ of both temperature and humidity, the combined temperature and humidity sensors are “pre-calibrated” in the laboratory. This way, the technician can bring a properly calibrated sensor with him from the lab, and use it to replace the in situ sensor. He can then do a calibration of the old one in the laboratory, ensuring both as-found and as-left values. Using this method, the plant increases the accuracy of the sensor calibration as it is calibrated in the laboratory with reference equipment calibrated with the extremely accurate JOFRA RTC Series temperature calibrator and a dew point hygrometer. This saves time and allows technicians to respond quickly, minimizing operational downtime. As an added bonus, the plant has fewer links in the traceability chain, leaving fewer possibilities for error.

Benefits

With this new solution, the pharmaceutical plant has reaped many benefits.

- **Fewer links in the calibration chain lead to lower costs.** Savings are realized in both improved calibration standards and less paperwork required for traceability.
- **More efficient calibration means lower cost calibration.** With the laboratory set-up it is possible to calibrate up to 14 temperature sensors at a time. Added to this, the calibration is automated and can be done overnight.
- **Minimized downtime.** Using pre-calibrated sensors makes for quick exchange of faulty equipment, and limits changing of clothes to just those employees needing access to the packaging locale.
- **More accurate calibration.** AMETEK’s RTC family of dry block temperature calibrators plays an integral part in this smart calibration solution. Covering the widest temperature range, boasting excellent stability and high accuracy, the RTC family is a sure winner when an innovative, accurate temperature calibration is needed.

For more information, including videos and data sheets, [please visit our RTC product page.](#)

