

How to Select, Install and Maintain A Dewpoint Sensor For Your Plastics Dryer

If you have sent for this information you are probably a little confused about measuring dewpoint. You are not alone! This subject is not taught in trade schools or even in engineering programs at universities. Vaisala has tried to pull together the most relevant information on this subject and explain it briefly – and simply.

We promised to answer five important questions about dewpoint measurement in plastics dryers. Below you will find the answers.

If you have questions after you review this information, you can call Vaisala directly and we'll answer your questions to the best of our ability.

Which Sensor Will Meet My Measurement Needs?

There are two basic types of sensors for measuring dewpoint in plastics dryers. One type is the polymer-based, relative humidity (RH) sensor. These devices measure RH and temperature and then calculate dewpoint. The other type is the oxide-based dewpoint sensor that directly responds to changes in dewpoint. Each of these sensors has their place, but neither one is appropriate for every measurement.

When you are defining your measurement requirements, there are three key things to keep in mind:

1. The expected range of dewpoint to be measured. *This is important because there is no single dewpoint sensor technology to cover the entire range of possible dewpoint conditions.*
2. Your accuracy requirements. *Usually accuracy of $\pm 3^{\circ}\text{C}$ ($\pm 5^{\circ}\text{F}$) is adequate for monitoring or control of dryers.*
3. Maintenance requirements of the dewpoint sensor. *Some sensors require frequent recalibration.*

RH sensor based devices are useful for measuring dewpoint temperatures above -12°C (10°F). At lower dewpoints, RH sensors lack accuracy and stability (see the gray shaded text for an explanation of why this is true). This makes them useful for refrigerant type dryers, but questionable in most other dryer applications. If you select an RH sensor based device to measure a -40°C (-40°F) dewpoint, you will most likely not meet your own accuracy requirements.

The alternative to an RH sensor is a dewpoint sensor. Most of these sensors use aluminum oxide or silicon oxide as the sensing element. For measurements of very dry air (-73°C (-100°F) dewpoint), these sensors may be your best choice. Unfortunately, these sensors are inherently unstable, drifting rapidly from their calibration points. Most manufacturers suggest a six-month calibration interval. It is not surprising to see these sensors drift 10° or 20° in six months. Also, oxide sensors can be damaged by exposure to water or condensation. After such exposure, they may take as long as 24 hours to “dry down” to the real dewpoint temperature.

A third option is to consider the unique (and patented!) Vaisala DRYCAP[®] Dewpoint Sensor. This sensor works reliably for dewpoints down to -51°C (60°F), and in some cases down to -60°C (-76°F). It easily withstands exposure to water, has a very fast response time (both for “dry down” and “wet up”), and has a suggested calibration interval of two years. A measurement accuracy of $\pm 2^{\circ}\text{C}$ ($\pm 4^{\circ}\text{F}$) is the norm for DRYCAP[®] instruments. This sensor covers the ranges required for refrigerant dryers and many desiccant dryers. However, it is not suitable for ultra-dry conditions.



Vaisala DRYCAP[®] Hand-Held Dewpoint Meter DM70

Do I Need A Portable Device, Or A Permanent Device?

This depends on your specific needs, but a portable instrument is a great way to get started. If you have dewpoint instruments already permanently installed, the portable can be used to check their performance. If you have no instruments, or you suspect problems in your dry air system, a portable is ideal for identifying problems. Permanent instruments should be installed when you desire full-time monitoring of your dryers. Many people working with PET like to monitor their dryers all of the time. Permanent instruments can also be installed to control your dryer and reduce energy costs. We suggest that you contact your dryer manufacturer to better understand how you can improve dryer efficiency with good dewpoint measurement.

The Vaisala DM70 is currently the most sophisticated portable dewpoint instrument on the market. It is small (hand-held), easy-to-use, runs on rechargeable batteries, and offers two powerful features: graphic trending and data logging. Trending lets you watch the measurement session in real-time,

