

## Selecting the right dewpoint instrument for your compressed air application



### Vaisala products in this category include the following

- Fully configurable transmitters: DMT340 Series and HMT337, HMT338
- Analog & serial device: DMT152
- Analog only devices: DMT242 and DMT142

### Portable handheld device

These units are battery powered mobile devices of varying size and function, optimized for different applications. They are typically used for verifying fixed mount transmitters in the field or for spot-checking various points in a compressed air system.

### Vaisala products in this category

- Lightweight hand-held meter DM70

*Selecting the right dewpoint sensor and transmitter type to meet the stringent needs of your unique installation is a critical task. Navigating through this process can often be confusing and time consuming due to the number of choices and options available. This tutorial is designed to help guide you through the most essential questions you should answer when weighing your choices. When finished, you should have the knowledge and tools necessary to make a more informed buying decision.*

### 1. What is the platform - are you looking for a fixed or a portable instrument?

#### Fixed mount transmitters

These instruments usually require an external power source to operate and can range in complexity from a basic analog only device to very sophisticated units with displays, alarm relays, datalogging, ethernet connections, and more.

The following set of questions will help narrow down the selection of products to choose from.

What do you need the instrument to do?

- Continuously monitor with a local display? Panel meter or integrated display?
- Send a signal somewhere for control or other purposes? What type of signal?
- Alarm at a high/low setpoint?
- Datalog?

Fixed mount units can be installed on supply side OEM applications, for dryer monitoring or control, as well as on the demand side for end user applications connecting to PLC's, dataloggers, and panel meter displays.



Fully configurable Vaisala DMT340 and a hand-held DM70.

## 2. Which type of dryer are you using?

In most compressed air systems, the type of dryer will dictate the dewpoint operating range required from the dewpoint instrument or sensor type.

Currently there is no single instrument on the market that measures all dewpoint levels well. Sensing technologies are optimized to excel in specific ranges – very dry conditions, mid-range ambient levels, or high humidity condensing environments. Measuring dewpoint in each of these ranges presents its own unique set of challenges.

Choosing the instrument with the right measurement range will impact both the short and long term accuracy and stability of the dewpoint measurement.

### Desiccant dryers

Compressed air systems using a desiccant type dryer can have dewpoints anywhere between -100...-30°C (-148...22°F). However, most operate between -60...-40°C (-76...-40°F). It's important to identify what level you actually wish to control or monitor. If your dryer outputs air at -80°C (-112°F) dewpoints however your intended control setpoint is at -50°C (-58°F), this is where your accuracy and performance is critical.

For these dry, low dewpoint conditions, Vaisala products using the DRYCAP® sensor are recommended for optimum performance.



Lightweight hand-held meter DM70

### Dewpoints -60...-10°C (-76...14°F):

- DMT340 Series – fully configurable transmitter
- DMT142 – analog only device for OEM applications
- DMT242 with 180M sensor – analog only device for end users
- DM70 with DMP74B probe – handheld

### Dewpoints -80...-10°C (-112...14°F):

- DMT152 (-112...14°F)

### Refrigerant dryers

In systems operating at higher levels, refrigerant dryers produce dewpoints between 2...4°C (35...40°F). For these mid-range measurements, Vaisala HUMICAP® sensor products and modified DRYCAP® sensors optimized for higher dewpoints are recommended.

### Dewpoints -10...+20°C (14...68 °F):

- HMT337, HMT338 – fully configurable transmitter
- DMT242 with 180S sensor – analog only device for end users
- DM70 with DMP74A probe – handheld



Compact DMT152 measures dewpoint down to -80 °C (-112 °F).

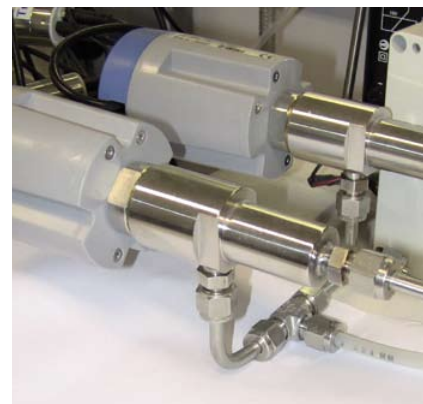
The ranges outlined above are intended to serve as a general guideline to assist in selecting the right product. The -10°C (14°F) crossover point that distinguishes between the two technologies is a good rule of thumb however since application conditions such as pressure and temperature can affect this threshold, it's a good idea to consult a Vaisala specialist before making your final decision.

## 3. What is the pressure and temperature at the measurement location?

While the temperature of the compressed air will not have any affect on the dewpoint value, it may negatively impact the performance of the dewpoint sensor. If the air is too hot at the intended measurement point, choosing a cooler downstream location or use of a sampling system may be required.

Careful monitoring and management of pressure is critical to making a good dewpoint measurement. Since changes in pressure have a dramatic affect on dewpoint, it's important to know the pressure at each measurement location in order to compare dewpoint readings and baseline them to a single pressure value.

*Most Vaisala dewpoint products are rated to withstand pressures up to 20 bar (290 psia) with some rated as high as 100 bar (1450 psia).*



Reliable DMT242 includes sensor options for desiccant and refrigeration dryers

## 4. Will the measurement be made directly in the line or using a sample cell?

Deciding how to install a dewpoint probe can be a difficult choice. Two options are usually considered – inserting the threaded probe directly into a “T” or ball valve for an in-situ measurement or using a sample line and sample cell to isolate the measurement outside of the system. There are advantages and disadvantages associated with each method.

### In-the-line measurements

The benefits of in-situ measurements can be a

- a) simplified and lower cost installation and
- b) potentially faster response time.

However, drawbacks include fluctuating line pressures (resulting in changing dewpoint values) and inability to isolate or remove the probe conveniently from the compressed air system when it's time for service or calibration. Typically dewpoint probes come in two varieties, fixed and adjustable. Adjustable probes use a threaded

compression fitting allowing for adjustable insertion depth into a line. Fixed probes have welded fittings that cannot be repositioned.

### Vaisala products in this category

- HMT338 and DMT348 with adjustable insertion fittings

### Measurements with the sample cell

The alternative approach involves the use of a sample cell and stainless steel tubing connected to the main line at the point of interest. A small amount of compressed air is allowed to flow past the sensor by opening a leak screw or valve. The flow rate through the cell must be carefully controlled in order to ensure minimal

pressure drop from the process line which could cause erroneous readings. The advantages of this approach are better control of air pressure minimizing main line fluctuations, ability to isolate the sensor from the system, and option to cool and condition the air sample if necessary.

### Vaisala offers a choice of three different sample cell options.

- DSC74: quick connect fitting on inlet and bleed screw on outlet
- DMT242SC2: Swagelok connections on both the inlet and outlet
- DMT242SC: female threads on inlet and outlet

### Vaisala dew point sensors ensure a clean and dry compressed air system

- Fastest wet-to-dry response time on the market - just minutes
- High resistance to contamination - immune to compressor oil and most other chemicals
- Complete recovery from saturated conditions
- Long 2-year calibration interval

# VAISALA

For more information, visit [www.vaisala.com](http://www.vaisala.com) or contact us at [sales@vaisala.com](mailto:sales@vaisala.com)

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