Use of cooled mirror hygrometers as reference standards for manufacturers of compressed air dryers

Application background

When developing or evaluating new air dryer designs or air drying technology, a number of different validation tests will be performed to assess performance in a number of areas; mainly moisture content, consistency and reliability. Typically manufacturers are integrating ceramic dew point sensors into the finished product to facilitate dew-point dependent switching in order to maintain optimal efficiency and consistent quality of output air. Although their rugged design, immunity to contaminants and small size make them ideal for direct installation into the process, ceramic sensors require periodic calibration and verification from higher accuracy devices.

For development work, sophisticated service work and for ceramic transmitter verification there is a need for laboratory instruments with higher precision which can also be taken into the field.

The leading desiccant dryer manufacturers use cooled mirror hygrometers from Michell for their development projects and as a reference for use in in-house calibration programs, ensuring a degree of self-sustainability for their stock of Ceramic sensors. They can also be used in instances where there is a suspected problem with the dryer output, or when the readings of a particular Ceramic sensor are called into question, to provide a spot check with confidence.

Why cooled mirror?

Cooled mirror hygrometers are widely used in calibration and critical process monitoring around the world.

The cooled mirror instruments manufactured by Michell are ideal for a secondary standard application in research and testing. Their fundamental operating principle measures dew-point temperature by controlling the surface temperature of a metal mirror to the point where the mass of condensation formed on the mirror is constant. The instrument utilizes an optical control loop together with a high precision Platinum resistance thermometer (RTD) which measures the surface temperature of the mirror.

The precision of the measurement can be as high as 0.1°C dew point. Cooled mirror based instruments are the only humidity measurement technology capable of providing such high accuracy over a long period of time.

All National Meteorological Institutes (NMIs) use the cooled mirror technology for their own high precision measurements. The Michell S8000 high precision hygrometer is traceable to NPL and NIST.

Advantages

Having their own in-house NPL/NIST traceable cooled mirror - based calibration systems is highly beneficial for the desiccant dryer manufacturers. The extra confidence of the fundamental measurement principle allows for quick resolution of potential disputes with customers. In R&D projects the tests and comparison measurements can be performed with the highest available precision and so increase the overall quality of the designed products.

S8000 Integrale

Equipment

S8000 Integrale provides precision measurements, with accuracy of ±0.1°C dew point, and assured precision through repeatability of ±0.05°C. Measurements to -60°C dp can be made quickly at pressures up to 20barg.

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