

Using chilled mirror hygrometers to control moisture during sintering processes

Application background

In metallurgy, sintering processes use relatively low temperatures (around 600°C) to bond powdered metals. Sintering results in products that are both light and strong, which makes them suitable for a variety of applications from machine parts to shell casings for ammunition.

As an example, sintered metal filters are available with many of the Michell moisture sensors. The sintering process creates a strong product, which is still porous. It provides a finer filter than would be possible with gauze or by machining.



Why is control of moisture important?

Sintering may be carried out in a vacuum, however it can also be carried out at atmospheric pressure in an inert gas, such as hydrogen. Due to the powdered composition of the raw material, exposure to moisture inside the furnace can cause clumping, resulting in large holes being created in the finished product. Accurate measurement and control of moisture content is necessary to avoid this.

For sintering carried out 600°C, maintaining a constant dew point of -60°C is necessary. The gas is sampled at several points in the furnace and it is necessary to have a fast response for moisture measurements so action may be taken quickly if moisture levels rise above the maximum.

Measurement technique

The S8000RS is an ideal choice for this application because it uses the fundamental chilled mirror technique to measure moisture, and provides a fast response. It is accurate to $\pm 0.1^\circ\text{C}$ dew point and offers a range of -80 to +20°C dp.



The temperature in the ambient environment of the oven will likely be rather high, so the best position for hygrometers is in air conditioned instrumentation cabinets.



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