

Application Note

Trace Moisture Analysis In High Purity Bulk Gases with TDL Analyzers

Key Features

- *Fast and Dependable Real-time Measurements*
- *Responsive Detection To Process Changes*
- *Sensitive Down To PPB Levels*
- *Virtually Maintenance Free*

A number of process industries, such as petrochemical, refining, semiconductor and pharmaceutical, rely on the use of high purity bulk gases such as Hydrogen, Dry Air, Nitrogen, Carbon Dioxide, etc. Ensuring that the gases are free of contaminants, such as moisture, is a critical measurement for stable operations.

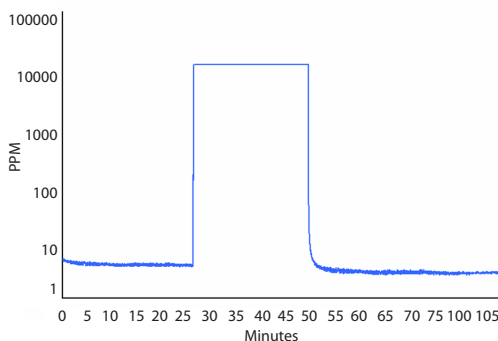
The SpectraSensors SS2100 is an ideal tool for this critical measurement due to its ability to provide analysis that is dependable, responsive and extremely sensitive.

High Purity Bulk Gases

One of the most important impurities to monitor is the moisture levels in the gas. Specifications for maximum allowed moisture can frequently be as low as the parts-per-million and even parts-per-billion levels.

On-line H₂O Analyzers

In the past, users have relied on electrochemical cells and other techniques to measure the level of moisture present



TDL Analyzers give nearly instantaneous response to changes in concentration



in the process stream. Unfortunately, the confidence level in the measurement was low due to drift of the devices, the inability to respond to large concentrations of moisture, and the tendency of the moisture probes to desensitize over time.

SpectraSensors' SS2100 analyzer employs a laser spectroscopy technique that measures trace amounts of a particular gas compound (H₂O in this case). The sensor determines the amount of light absorbed at a wavelength that is specific to the compound being measured. The system consists of a cell that the sample gas flows through, a tunable laser diode that emits a specific wavelength of light through the gas, an optical detector, and software to analyze and output the results.

The method is extremely fast and the results are highly reliable. Changes in concentration during process upsets can be seen without the normal wet up and dry down delays seen in moisture probes. Furthermore, the TDL analyzer does not have the problem of desensitizing over time due to operation in very dry samples over long periods of time.

In addition to moisture, a number of other compounds are able to be measured by the SS2100 such as NH₃, HCl, CO, CO₂ and H₂S.