

Application Note

Trace H₂O Analysis in Olefins Product Streams with TDL Analyzers

Key Features

- *Continuous real-time measurements*
- *Responsive detection to process changes*
- *Dependable sensitivity to ppb levels*
- *Virtually maintenance free*



HDPE



HDPE

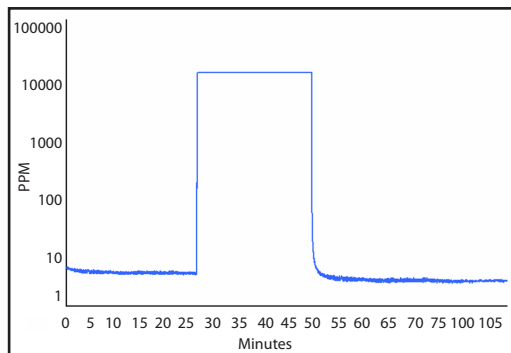
Production of quality polymers, such as polyethylene, depends on olefin feed streams that are extremely pure. Contaminants such as moisture can discolor the final product and shorten the life of the reaction catalyst.

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.

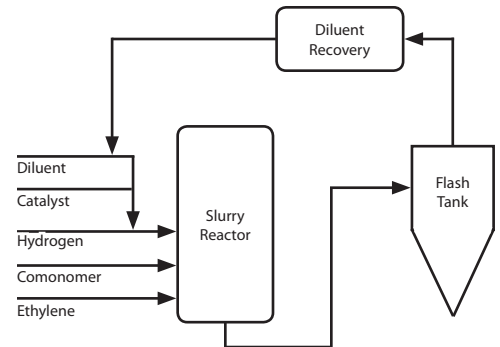
H₂O In Olefin Product Streams

Polymers, such as polyethylene, are made by combining a monomer, such as ethylene, in a reactor with a catalyst. Other components, such as hydrogen and a comonomer, are added to give the polymer various physical properties such as its stiffness and melt point.

Unfortunately, the presence of even minute amounts of impurities in the feed streams can have a negative effect on the efficiency of the reaction and the overall quality of the final product. One of the most important contaminants to monitor is the presence of H₂O. Even in concentrations as low as 1 ppm or less, it can discolor the product and “poison” the catalyst.



TDL Analyzers give nearly instantaneous response to changes in concentration



Flow diagram of a typical Olefins Reactor

Online H₂O Analyzers

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

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 due to operation in very dry samples over long periods of time.

SS2100 Application Note

Trace Moisture Analysis in Olefins

Performance Specifications

Measurement Range / Target Component	0-2 ppmv H ₂ O
Typical Measurement Repeatability	±50 ppbv*
Typical Lower Detection Limit	100 ppbv
Measurement Response Time	60 seconds
Typical Background Gas	pure ethylene, propylene, or isobutane
Certifications	CE, NEC505 C1D2*, ATEX Zone 2*
Communication Outputs	Generic or Modbus RS232 (all parameters)
4-20 mA loop (concentration)	

Environmental, Power and other general specifications are available on SS2100 Specifications Sheet

* Certifications Pending

Options

- Hazardous area rated electrical termination and switching hardware
- Type X, Y, Z NEC505 or ATEX nitrogen purge



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