

Technical Bulletin

#124

SpectraSensors SS2000 Tunable Diode Laser System Resistance to Contamination

There are many techniques for moisture analysis but until recently all on-line systems have exhibited only a small degree of tolerance to contamination. This means that most process analysers require frequent calibration checks to compensate for loss of sensitivity of the sensor caused either by contamination or drift. Natural gas in particular presents additional problems with some analysers influenced by methanol injection or glycol and amine carry-over. Conventional sensors are regularly returned for re-calibration or re-coating, in some cases this can be as frequent as every 3 or 4 weeks. A new and novel technique, using a tunable diode laser, is proving to have a high resistance to various form of particulate and chemical contamination.

The SS2000 is an accurate, non-contact, technique that uses a new laser based measurement for water vapor and carbon dioxide measurement and offers significant advantages in terms of speed of response maintenance requirements resulting in greater cost efficiencies and improved safety for many process control applications.

The SS2000 measures how much light at a specific wavelength is returned after passing through the sample environment, as a percentage of the total light that was sent into the environment. The key to this is being able to select and use a precise and spectrally narrow light source so that water vapor (or the target gas) is the only molecule absorbing light. The amount of light absorbed by the gas space is proportional to the concentration of the target gas present.

As both the laser and the detector are mounted behind a window the measurement devices do not come into contact with the sample gas and non-contact systems such as the SS2000 offer many benefits for the user over surface sensor techniques such as aluminium oxide, phosphorous pentoxide, quartz crystal or chilled mirror systems. The quality of measurement of surface techniques can rapidly degrade when exposed to the various contaminants commonly present in process gases.

Contaminant	Al ₂ O ₃	P ₂ O ₅	Quartz Crystal	Chilled Mirror	SS2000
Methanol vapour	* † ⊗	* † ⊗	* ⊗	⊗ †	✓
Glycol vapour	* † ⊗	* † ⊗	⊗ †	⊗ †	✓
Amine vapour	* † ⊗	* † ⊗	⊗ †	⊗ †	✓
Mercury vapour	•	†	✓	✓	✓
H ₂ S	•	•	•	•	✓
HCL	•	†	•	•	✓
Chlorine vapour	•	†	•	•	✓
Ammonia vapour	•	•	•	•	✓

✓ = Analyser unaffected

† = increased frequency of calibration/cleaning required

• = Can severely effect or permanently disable the sensor

* = slows response of sensor

⊗ = Can cause inaccurate readings