Application Note –

TDLAS analysers for HYDROGEN

NEO Monitors is expanding its product range with Hydrogen analysers

We are proud to announce our new analysers for Hydrogen measurements: Using our proprietary, well-proven and trusted LaserGasTM technology based on Tunable Diode Laser Absorption Spectroscopy, we offer the world first IN-SITU optical analyser for Hydrogen. In addition, we also offer an extractive version for on-line measurements employing a multi-pass cell.

Currently, all commercial Hydrogen (H2) detectors are of point type and there have so far been no optical in-situ or open-path H2 analysers available. The reason is that the Hydrogen molecule is considered to be non-absorbing in the infrared region where semiconductor lasers operate. However, the term “non-absorbing” is actually not accurate since some very weak absorption exists. This absorption has already been exploited in extractive laser analysers with the help of cavity-enhanced techniques: suitably strong H2 absorption levels can be achieved by generating extremely long effective optical path lengths between highly reflective mirrors.

NEO Monitors has chosen the opposite approach: we have redesigned our analysers to achieve unprecedented sensitivities down to tiny absorption levels. We achieved detection sensitivities that are sufficient for many applications using only relatively short optical path lengths - down to one meter.

THE ONLY TRULY CONTACTLESS H2 ANALYSIS IN REAL TIME

Our new LaserGasTM II SP H2 analyser opens up for new opportunities in process control: non-contact optical absorption measurements of Hydrogen. This is especially important for industrial applications where Hydrogen must be monitored in reactive, toxic, and corrosive gas streams.

LaserGasTM II SP can be installed directly on the process duct, in a by-pass configuration or on a gas cell using a simple extractive setup.

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Measure . Prevent . Protect . Control

LaserGasTM II SP and MP

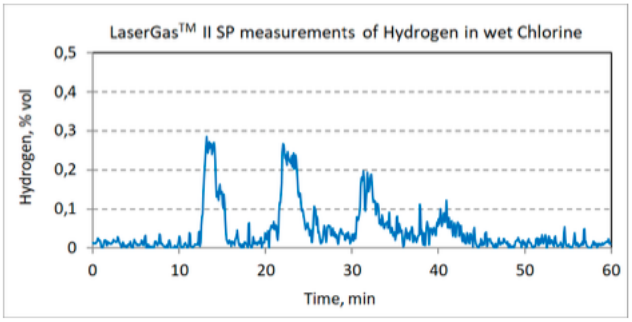
PROVIDE

- in-situ real time H2 measurements
- on-line and extractive H2 monitoring
- open-air H2 detection

FOR PROCESS ANALYSIS AND SAFETY APPLICATIONS

Leakage detection

Hydrogen is highly flammable and explosive with a LEL about 4 % vol, so that Hydrogen leakage detection is critical for safe deployment of Hydrogen systems.
Our LaserGasTM II SP is ideal for fast and reliable H2 leakage detection in industrial production facilities or directly in process streams.



The plot shows real time H2 measurements in wet Chlorine. Several short-lasting Hydrogen peaks are clearly detected by the LaserGasTM II SP but not resolved by a reference GC.

Process control and safety

Hydrogen is an important feedstock in many industrial processes. Applications can be found in the oil & gas industry, chemical plants, the steel industry, etc.:

- Hydrogen recycle/recovery
- Refinery processes
- NG processing
- Tail gas
- Syngas
- Chlorine production
- Ammonia production
- Blast furnace gas
- Fuel gas

ADVANTAGES AND FEATURES OF LASERGAS™ II SP H2

- Non-contact, in-situ, real time measurements
- Exceptional response time (< 2 seconds)
- Wide pressure and temperature ranges (0.5 - 4 Bar A, -50 - +150 °C)
- No interference from other gases such as CO, CO2, H2S, CH4, C2H6, H2O
- Applicable to "zero" H2 applications where H2 is normally not present
- Applicable for complex and varying gas matrices
- No zero drift
- No field calibration required
- Continuous internal health check
- Integrated span check option available
- Build-in cell for bump H2 span check
- Affordable price and very low maintenance costs

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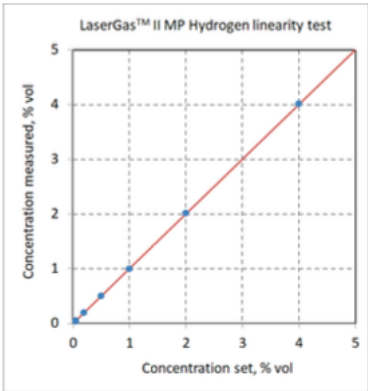
COMPLETE ANALYZER FOR SENSITIVE AND ACCURATE HYDROGEN MEASUREMENTS

For applications where Hydrogen measurements with better sensitivity and accuracy are needed, we offer alternatively the new LaserGasTM II MP H2 analyser. The analyser employs a Herriott-type multi-pass (MP) cell. Since the requirements on the mirrors are much less strict compared to mirrors used in cavity-enhanced configurations, MP cells are in general less prone to contamination issues while being more robust and less expensive.

Installation and operation of a LaserGasTM II MP analyser is extremely simple: turn-on, connect the gas sample line and the analyser starts reporting the Hydrogen concentration almost immediately.



The range of possible applications is very broad: from leakage detection to process control to a manifold of more applications where continuous Hydrogen monitoring is needed.

ADVANTAGES AND FEATURES OF LASERGAS™ II MP

- High sensitivity (<0.1 %)
- Short response time (< 20 seconds)
- No interference from other gases such as CO, CO2, H2S, CH4, C2H6, H2O
- Applicable to "zero" H2 applications where H2 is normally not present
- Applicable to complex and varying gas matrices
- No zero drift
- No field calibration needed
- Continuous internal health check
- Integrated span check option available
- Affordable price and low maintenance costs

	Detection limit	Min Range	Max Range	Response time
LaserGas™ II SP	0.1 %·meter	0 - 5 %·meter	0 - 100 %	<2 sec
LaserGas™ II MP	0.02 %	0 - 1 %	0 - 100 %	<20 sec

NOTE: Detection limits are specified for Nitrogen background at ambient temperature. Actual values may vary with process condition and gas matrix.

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