



neoMONITORS

TDLAS analyzers for HYDROGEN

We did not know it was impossible
so we did it.

- to paraphrase Mark Twain

PERFORMANCE YOU CAN TRUST

NEO Monitors is expanding its product range with Hydrogen analyzers

We are proud to announce our new analyzers for Hydrogen measurements: Using our proprietary, well-proven and trusted LaserGas™ technology based on Tunable Diode Laser Absorption Spectroscopy, we offer the world first IN-SITU optical analyzer 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 analyzers 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 analyzers 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 analyzers 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.

Demands for Hydrogen monitoring have never been higher



THE ONLY TRULY CONTACTLESS H₂ ANALYSIS IN REAL TIME

Our new LaserGas™ II SP H₂ analyzer 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.

LaserGas™ 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.

At NEO Monitors we are constantly discovering new ways to deliver gas analysis beyond what is believed to be possible

LaserGas™ II SP and MP

PROVIDE

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

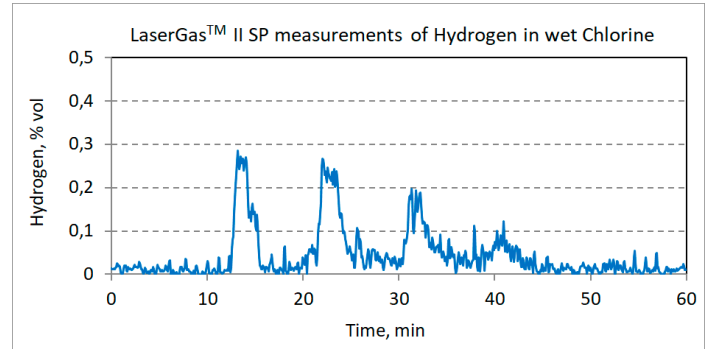
*based on the well-proven
and highly flexible
LaserGas™ platform*

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 LaserGas™ 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 LaserGas™ 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

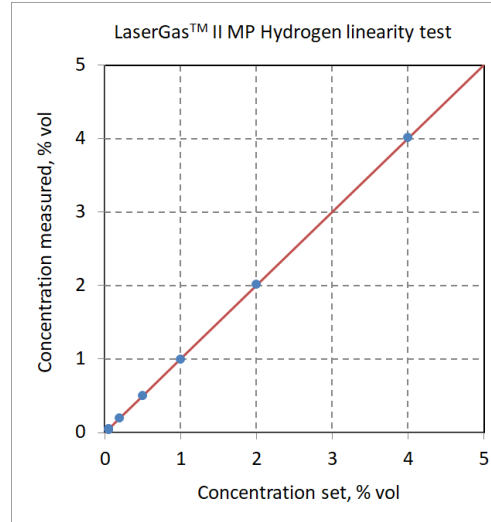
ADVANTAGES AND FEATURES OF LASERGAS™ II SP H₂

- 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

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 LaserGas™ II MP H2 analyzer. The analyzer 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 LaserGas™ II MP analyzer is extremely simple: turn-on, connect the gas sample line and the analyzer 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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