

# Hydrogen Sulfide (H<sub>2</sub>S) Gas Concentration Analyzer

# PICARRO



- Real-time H<sub>2</sub>S measurements for fenceline monitoring and mobile surveys
- Best-in-class sensitivity for the most demanding regulatory requirements
- Excellent stability and continuous operation minimize downtime and data gaps
- Easy operation and no consumables or pre-concentration reduce costs
- Small footprint and quick installation simplify new deployments

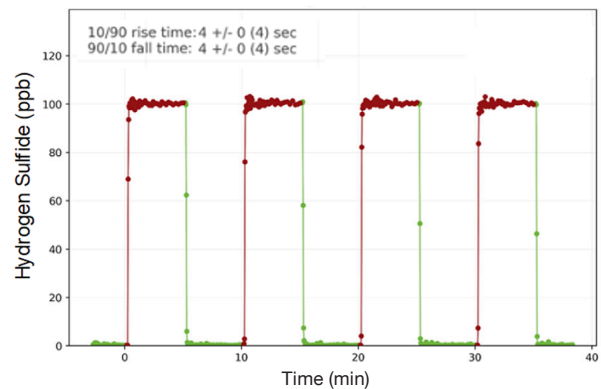
The Picarro **SI2104 Gas Concentration Analyzer** delivers precise, real-time monitoring of hydrogen sulfide (H<sub>2</sub>S). The analyzer features a parts-per-trillion (ppt) lower limit of detection (LOD), a small footprint, and is easy to install and use.

The SI2104 analyzer is a breakthrough field deployable analyzer that supports multiple applications. It can be used to monitor ambient air quality, stack emissions, and map emission plumes of hydrogen sulfide. It can be used as a proxy for plumes of toxic volatile organic compounds such as benzene, xylene, and toluene, and acidic gases from chemical and industrial facilities. It can be installed as a stationary monitor along a facility's fenceline, or when used in conjunction with a mobile weather station, a GPS system, and an inverter, it can also be configured for mobile leak detection and surveys.

All Picarro analyzers feature a full diagnostic software suite that continuously measures and records operation parameters for rigorous quality control and assurance of data integrity. If the analyzer is connected to the Internet, Picarro's service organization can access it remotely to provide rapid support and problem resolution.

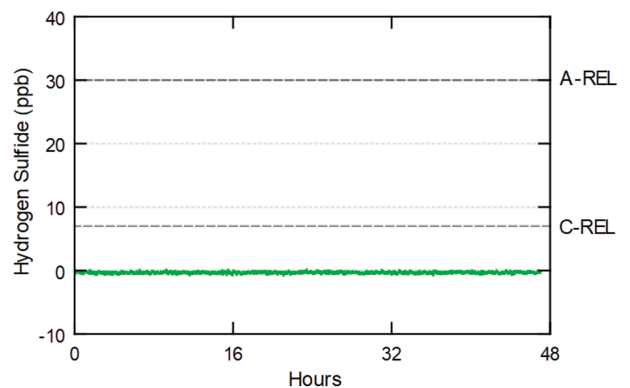
Picarro's patented Cavity Ring-down Spectroscopy (CRDS) technology enables Picarro analyzers to deliver real-time monitoring with parts-per-trillion (ppt) levels of detection, excelling over traditional technologies such as Fourier-Transform Infrared Spectroscopy (FTIR) or Gas Chromatography (GC). Because it uses a small 35 cc volume cavity, it delivers fast gas response times (Figure 1), lower noise, and higher sensitivity (Figure 2).

## Hydrogen Sulfide Response Time



Figures 1 - Multiple cycles of response time testing at 100 ppb of hydrogen fluoride on a SI2104. A gas response rate of <5 sec ensures even short-duration plumes are detected with high confidence.

## SI2104 Performance on Ambient Air



Figures 2 - Continuous monitoring of hydrogen sulfide in ambient air (green line) over ~48 hrs with no zero reference measurements or recalibrations. The instrument sensitivity enables accurate determination of any exceedance of Acute Reference Exposure Levels (A-REL, 30 ppb) and Chronic Reference Exposure Levels (C-REL, 7.1 ppb; California OEHHA). Dataset mean of 0.31 ppb and a standard deviation (1 sigma) of 0.12 ppb (5 min moving average).

SI2104 Performance Specifications	Guaranteed Performance*
Lower Detection Limit (3 $\sigma$ , 100 sec)**	1 ppb [1.44 $\mu\text{g}/\text{m}^3$ ]
Zero Drift (24 hrs)*** (peak-to-peak, 50-minute average)	$\pm 2$ ppb
Precision (1 $\sigma$ , 10 sec) Precision (1 $\sigma$ , 100 sec)	1.5 ppb 0.5 ppb
Measurement Interval****	< 4 sec
Response Time (Rise/Fall Time 10–90% / 90–10%)	$\leq 10$ sec (100 ppb challenge)
Measurement Range	0–10 ppm (guaranteed specification)

\* Specifications and an instrument-specific testing report (Certificate of Compliance) provided with every analyzer purchase.

\*\* Conversion to  $\mu\text{g}/\text{m}^3$  at 1 atm and 25°C.

\*\*\* Picarro analyzers do not require a zero reference gas or zero cartridge to operate or meet specifications.

\*\*\*\* Measurement interval at span may increase as much as 2x above listed values.

SI2104 System Specifications	
Measurement Technique	Cavity Ring-Down Spectroscopy (CRDS)
Measurement Cell Temp. and Pressure Control	$\pm 0.005^\circ\text{C}$ ; $\pm 0.0002$ atm
Sample Temperature	-10 to 45°C
Sample Flow Rate and Pressure	$\sim 0.4$ slm at 760 Torr, no filtration required, 600 to 950 Torr (80 to 127 kPa)
Max. Rate of Change in Ambient Temp.	5°C / hr
Sample Humidity	<99% R.H. non-condensing @ 40°C, no drying required
Ambient Temperature Range	10 to 35°C (operating); -10 to 50°C (storage)
Ambient Humidity	<85% R.H. non-condensing
Other Gases Measured	H <sub>2</sub> O (Typical Precision: $\leq 0.02\%$ of reading)
Accessories	Included: Pump (external), keyboard, mouse Optional: LCD monitor (A0901), 16-port sampling manifold (A0311, A0311-S), rack mount (A0954)
Data Outputs	RS-232, Ethernet, USB, analog 0–10 V, Modbus, 4–20mA (optional)
Fittings	1/4" Swagelok® SS fittings (recommended 1/4" OD PFA Tubing)
Dimensions	Analyzer: 17" w x 8.38" h x 24.4" d (43.2 x 21.3 x 62 cm), including feet External Pump: 6.1" w x 8.7" h x 13.6" d (15.5 x 22 x 34.5 cm)
Installation	Benchtop or 19" rack mount chassis
Weight	<55 lbs (25 kg) for analyzer and 14.3 lbs (6.5 kg) for external pump
Certifications	CE Mark
Power Requirements	100–240 VAC; 47– 63 Hz (auto-sensing); <375 W at start-up (total). Steady-state operation: 120 W (analyzer), 150 W (pump).
Applications Considerations	Requires an air-like matrix. Interference can occur for concentrations of H <sub>2</sub> O, CO <sub>2</sub> , and CH <sub>4</sub> well above normal ambient levels, as well as for organics, including, but not limited to ethane, acetylene and also other nitrogen and sulfur containing compounds. H <sub>2</sub> S accuracy is $\pm 3\%$ plus cylinder accuracy. Please contact us to discuss the experimental conditions.