

# SI5450 Gas Concentration Analyzer for Sulfur Dioxide (SO<sub>2</sub>)

AMC Monitoring for Inorganic Gases

# PICARRO



- Real-time AMC monitoring in cleanrooms, FOUF and fab equipment
- Fast, continuous analysis in seconds
- Virtually no downtime or consumables cost
- Free of interference from common fab chemicals
- Extreme accuracy for event confirmation
- No field calibration required

## SO<sub>2</sub> AMC Analyzer

Yield declines due to airborne molecular contamination (AMC) have been well documented. The **Picarro SI5450 sulfur dioxide analyzer** utilizes Picarro's highly selective, sensitive, and accurate cavity ring-down spectroscopy (CRDS) for real-time measurement of sulfur dioxide.

The SI5450 analyzer offers the power of highly sensitive laser spectroscopy in a robust, easy-to-use, compact design. It employs a mid-IR laser that effectively measures the concentration of SO<sub>2</sub> gas with a high degree of accuracy and precision. It offers significant advantages compared with incumbent AMC measurement techniques, such as ion-mobility spectrometry (IMS), ion chromatography, mass spectroscopy, and UV fluorescence. The legacy techniques suffer the inadequacies of high costs of ownership, performance shortfalls and slow speeds of response.

## Patented Cavity Ring-Down Spectroscopy (CRDS) Technology

Picarro's patented CRDS technology enables an effective measurement path length of up to 20 kilometers in a compact cavity, providing exceptional precision and sensitivity from a small footprint analyzer. A meticulously designed small optical cavity incorporates precise temperature and pressure control. The result is an analyzer that delivers a best-in-class combination of precision, accuracy, low drift and ease-of-use.

## Proven in Production

The SI5450 analyzer is available in a standard rack-mounted enclosure, paired with a multi-port sampling system. It is currently installed in several major semiconductor fab locations. The SI5450 analyzer monitors cleanroom air at the lowest possible concentration level in real time with adherence to the process industry standard. Optimized for long-term stability, Picarro laser analyzers do not require field calibration and is ideal for continuous operation.

Designed to operate in both cleanrooms and plenums, this laser-based analyzer can operate for many months without user interaction. The analyzer can be commissioned and operating within minutes, with zero sample preparation. The gas concentration is displayed in real-time with no post-processing requirements. The analyzer can be configured to automatically export its measurement data at regular intervals, via an Ethernet or RS-232 interface.

## Picarro SI5450 Performance Specifications

Gas Detected	Sulfur Dioxide (SO <sub>2</sub> )
Precision (1σ)	≤360 ppt (10 sec), ≤120 ppt (100 sec), ≤70 ppt (300 sec)
Lower Detectable Limit (3σ)	350 ppt (100 sec), 200 ppt (300 sec), 140 ppt (600 sec)
Linearity (per IEC 61207)	±1%
Accuracy at Span	±5% @ full scale
Accuracy at Zero	±300 ppt
Instrument-to-Instrument Consistency	±5% @ full scale ±300 ppt @ zero
Measurement Range	0–1000 ppb
Measurement Interval	<5 seconds
Sample Flow Rate	~0.2 slm
Combined Response Times (T90/10 + T10/90) @ 20 ppb (Humid)	<30 seconds
Fall Times T90/10 @ 20 ppb (Humid)	<15 seconds

## Picarro SI5450 System Specifications

Measurement Technique	Cavity Ring-Down Spectroscopy
Calibration Period Recommendation	Calibration not required - Initial validation at 6 months, then every 12 months thereafter
Time Required to Perform Validation	Estimated at <15 minutes per manufacturer's instructions
Measurement Cell Temperature Control	±0.005°C
Measurement Cell Pressure Control	±0.0002 atm
Operating Temperature	15 to 35°C (operating); -10 to 50°C (storage)
Ambient Humidity	<99% RH non-condensing
Accessories	Pump (external, included), keyboard (included), mouse (included), LCD monitor (optional), Maintenance Kit (optional)
Communication Interfaces	RS-232, Ethernet, USB, Modbus, 4-20mA(optional)
Sample Inlet Connection	1/4" Stainless steel swagelok® tube fitting (recommended 1/4" OD PFA Tubing)
Dimensions	Analyzer: 16.63" w x 8.75" h x 30.25" d (42.24 x 22.22 x 76.84 cm)
Weight	75 lbs. (34 kg) including external pump
Power Requirements	100–240 VAC, 47–63 Hz (auto-sensing), <400 W (total): 250 W (analyzer), 150 W (pump) at steady state
Warranty	12 months
Certifications	CE conformance
Country of Manufacture	USA

**PICARRO**

© 2021 PICARRO, INC.  
41-0057 Rev A  
LIT CODE: SI5450-DS52-V1.0-211025

3105 Patrick Henry Drive, Santa Clara, CA 95054 | +1 408-962-3900 | [sales@picarro.com](mailto:sales@picarro.com) | [picarro.com](http://picarro.com)