SLiM 100

A 1-ppb Class Chemical Metrology System for Lithography Process Tool Monitoring

PICARRO

- Broadband CRDS technology for VOC speciation
- Accommodates up to 4 Picarro analyzers to measure organic and inorganic compounds
- Fast system response
- Automated reference and clean cycles
- User-configurable graphing and trend analysis
- Available with 24 or 32 sample ports
- Supports 100+m inlet tube lengths
- Minimal stabilization time when switching from port to port
- No 3rd party integrator required
- Fab production ready

Picarro SLiM 100 Lithography Monitoring System

Overview

As design features shrink, small amounts of airborne molecular contamination (AMC) from volatile organic compounds (VOCs) are resulting in significant increases in non-visual defects on reticles and wafers. Crystal growth defects on reticles, hazing of scanner optics, and t-topping of photoresists are some of the serious problems that are caused by the presence of undesired VOCs. Ultimately, these contaminants not only damage expensive lithography tools; they result in yield loss on the wafer. To mitigate the negative effects of VOCs in the lithography process, fab operators need to measure VOCs at very low concentration levels. This is very difficult to do in the fab environment with traditional technologies because they are slow and difficult to use.

The **Picarro SLiM 100 Lithography Monitoring System** is a 1-ppb class detection system that integrates Picarro's industry leading cavity ring-down spectroscopy (CRDS) analyzers into a high-performance sampling system specifically for monitoring VOCs in the fab. The SLiM 100 system is a real-time measurement system that is designed to run 24/7 in the fab environment. It is a fully integrated chemical metrology system that is robust, easy-to-operate, and is ideal for use as a high-volume process monitoring and control system. The Picarro SLiM 100 has the capability to measure 10 organic compounds that negatively affect the lithography process with concentration sensitivity down to 1 part-per-billion. The system can also accommodate analyzers that measure inorganic molecules at parts-per-trillion concentration levels.

System Software

- Easily configure recipe to define sampling times and locations, and schedule a recipe to run any time
- Generate customized data visualization of all species in real-time and analyze historic data
- Set threshold levels to identify excursions and detect faults
- Ensure security with single sign-on user management
- Connect to remote host using Restful API

SLiM 100 Software

SLiM 100 Specifications		
Gas Detected	VOC: Acetic Acid, Acetone, D3 Siloxane, HMDSO, IPA, PGME, TMS, D6 Siloxane, NMP, PGMEA Inorganic (Optional): NH_3, HF, HCl, SO_2, H_2S (Depending on choice of analyzers from table below)	
Sampling Line	1/2” OD x 3/8” ID UHP-PFA tubing	
Number of Ports	24 or 32	
Dimensions	**Keyboard Tray Closed** 79” (H) x 34” (W) x 38” (D) 2012 mm (H) x 864 mm (W) x 971 mm (D)	**Keyboard Tray Open** 79” (H) x 34” (W) x 46” (D) 2012 mm (H) x 864 mm (W) x 1172 mm (D)
Weight (without Analyzers)	24 Port: 447 lbs (203 kg) 32 Port: 482 lbs (218 kg) Add 75 lbs (34 kg) for each analyzer	
Power Requirements	220-240 VAC single phase, 50/60 Hz, 20 Amp	
Communication	Ethernet TCP/IP, RESTful API	

Analyzers	Gases Measured
VOC Analyzer	VOC-10*
SI3401	NH_3, HF, HCl
SI2205	HF
SI2108	HCl
SI2104	H_2S
SI2306	HF, NH_3
SI2103	NH_3
SI5450	SO_2

** VOC (Acetic Acid, Acetone, D3 Siloxane, HMDSO, IPA, PGME, TMS, D6 Siloxane, NMP, PGMEA)*

Part Numbers (Other Combinations Available)	
SL100-24-EK00	24 port AMC system for NH_3, HF, VOC
SL100-32-K000	32 port AMC system for VOC
SL100-32-AK00	32 port stationary AMC system for NH_3, HF, HCl, VOC

VOC	Typical Performance** Precision (ppb), 600s, 3σ
ACETIC ACID	1.4
ACETONE	0.7
D3_SILOXANE	0.2
D6_SILOXANE	0.1
HMDSO	0.7
IPA	1.4
NMP	0.5
PGME	1.8
PGMEA	0.7
TMS	1.6

*** Typical Performance under standard background gas*

PICARRO

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3105 Patrick Henry Drive, Santa Clara, CA 95054 USA | +1 408-962-3900 | sales@picarro.com | picarro.com