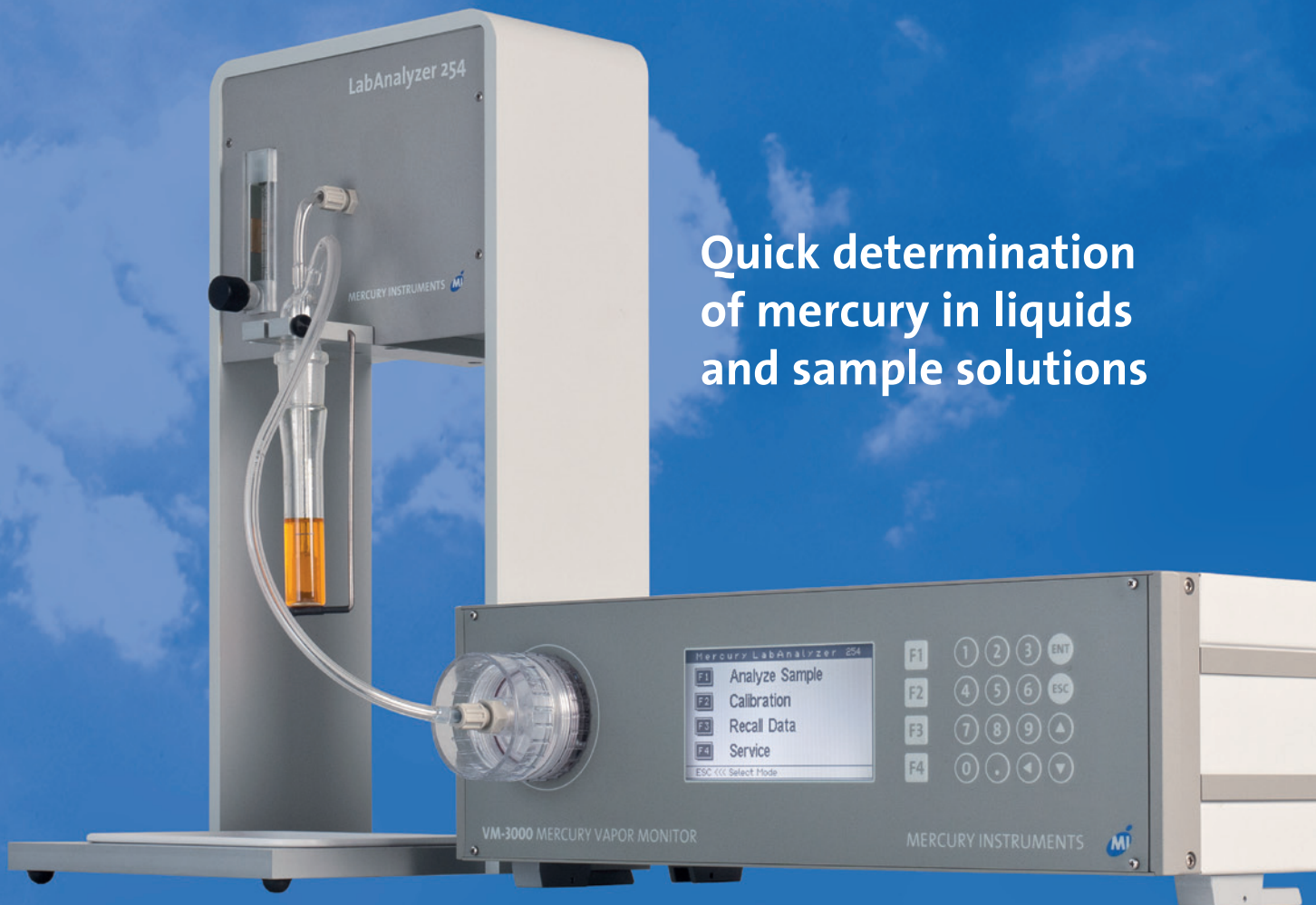


Mercury Analysis System: LabAnalyzer 254



Quick determination
of mercury in liquids
and sample solutions

- Compact atomic absorption photometer / cold vapor technique
- High sensitivity (0.05 ng)
- Short analysis time (ca 1 min)
- Low reagent consumption
- Automatic zero adjustment (Auto Zero)
- According to EPA 7470A / EPA 7471A / DIN 38406-12 / DIN EN 13806 / EN 1483

To know mercury concentrations is of great importance because of the toxicity of mercury and its compounds. Mercury analysis has gained an increased importance for the analyst in order to fulfill the actual requirements demanded by legal regulations. Whether samples should be analyzed only occasionally or if there are large quantities of samples to be done every day, the LabAnalyzer 254 is the right instrument. It is ready to go without time consuming preparations. A complete analysis cycle time is in a minute range. Operation of the LabAnalyzer 254 is very simple. The user is guided through his work step by step. The accuracy of the measurement results in the range of 10 ppt up to 10 ppb is outstanding.

Applications

The LabAnalyzer 254 is used for quantitative determination of mercury in aqueous samples and sample digests.

- **Water samples: drinking water, waste water, ground water, surface water, sea water**
- **Soil and sludge samples**
- **Geological sample material**
- **Waste samples: glass, construction rubble, contaminated liquids, wood**
- **Stack emissions monitoring: incinerators, power plants (e.g. to VDI 3868-2 VE / Ontario Hydro Method)**
- **Testing of foodstuffs**
- **Clinical samples: urine, blood, saliva**
- **Chemical industry: environmental protection and quality control**
- **Petrochemical industry**
- **Research (development of demercuration techniques, etc.)**

Measuring principle

First the mercury contained in the sample is stripped with an air stream and carried into an optical cell made of fused silica. There the quantitative determination of mercury is obtained by measuring UV absorption at a wavelength of 254 nm. This method is commonly known as the cold vapor method (CVAAS).

Optimization of AAS technology

In contrast to a typical multi element AAS as often used in laboratories the LabAnalyzer 254 is specially designed for mercury determination. This allows top



Compact und quick: LabAnalyzer 254 with reaction unit (left) and photometer (right)

performance in analytical applications. The use of a specially developed highly stable mercury lamp in connection with thermostat-controlled UV sensors results in a detection limit of a few ppt of mercury. Memory effects are minimized and a high sample throughput is possible thanks to specially selected materials for sample gas conducting components and heating of the optical bench.

Operation and maintenance

The LabAnalyzer 254 is operated with a waterproof membrane keypad and a graphic LC display. Handling is very easy. The LabAnalyzer 254 features a small footprint. No auxiliary gases are required for operation. The carrier gas flow required for the analysis is generated by a built-in diaphragm pump which is maintenance-free and has a long service life.

Measurement of a sample

The sample is transferred into a reaction bottle and 0.5 ml of reducing reagent, for example tin-II-chloride solution, is added. The bottle is then connected to the reaction unit of the LabAnalyzer 254 and measurement is started by just pressing a key. The mercury is quickly stripped from the reaction flask. After 60 to 80 seconds the end of the analysis is acoustically announced and the measurement result is displayed on the screen. Now the device is ready for the next analysis.

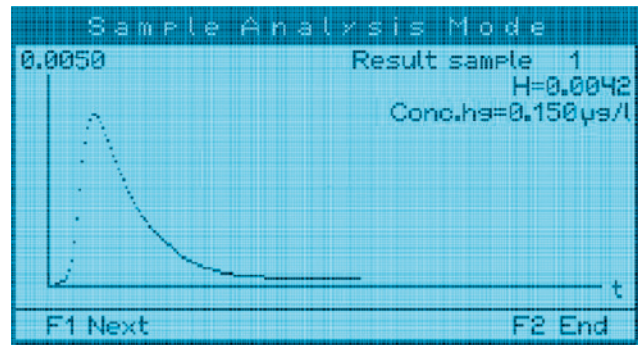
Short analyses

Even with high concentrations no lengthy purging time is required. After every measurement a zero adjustment is carried out automatically (auto zero).

The typical duration of a measurement including purging the system free from mercury is 60 to 80 seconds.

Display of results

During the measurement the measuring signal is continuously displayed on the screen. An acoustic alarm is activated to indicate the end of the measurement. In addition to the measurement signal graph, the peak value and the mercury concentration in $\mu\text{g/l}$ are indicated. For samples which are diluted prior to analysis a dilution factor can be entered.



Measurement signal of a 0.15 $\mu\text{g/l}$ sample

Calibration

Commonly available mercury standard solution is used for calibration. Up to three calibrations can be stored and activated for analysis. At the end of a calibration a linear calibration graph is automatically calculated and displayed. Up to 10 calibration points can be used for a calibration. Outliers are marked automatically and the corresponding calibration points may be rejected or accepted.

Safety for the user

The mercury cannot escape into the working environment, as any free mercury is collected in a sulfurized activated carbon cartridge. If the cartridge needs replacement, a message appears on the control panel. The analysed sample no longer contains any mercury.



Easy to operate: LabAnalyzer 254, the preferred system for many laboratories world-wide

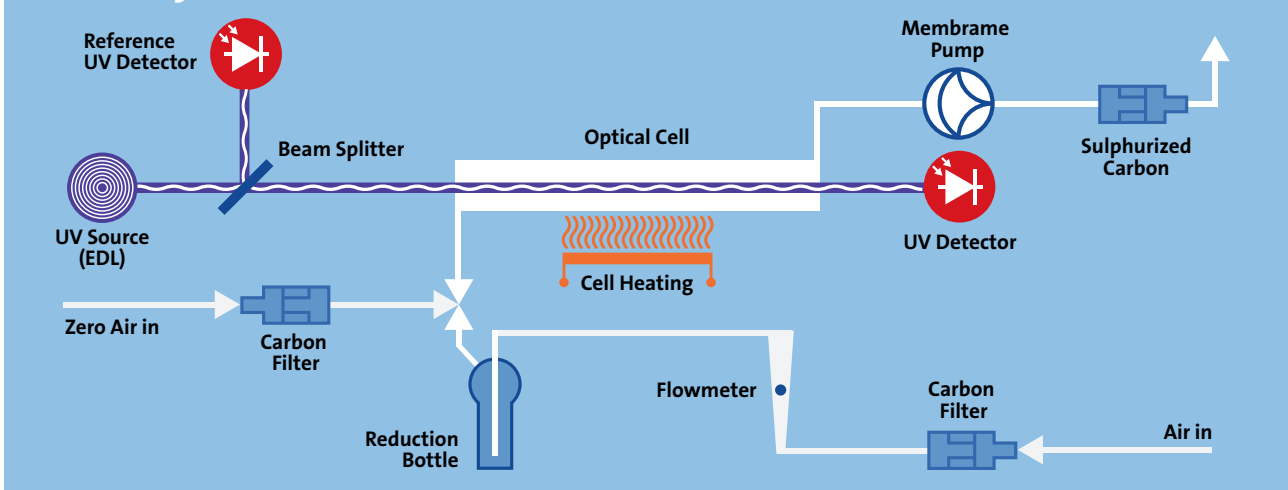
Storage of analytical results and quality assurance

Together with all the data necessary for quality assurance up to 100 results are stored in the RAM of the built-in computer. They can be recalled at any time, and a print-out of this data is also possible. All data can be transferred to a PC via USB or RS 232 connection and are stored in EXCEL® format.

Hg vapor in gases: VM-3000 upgrade

The LabAnalyzer 254 can be also used to measure mercury vapor in air and other gases with the optional VM-3000 upgrade. Measuring range is 0.1 to 2000 $\mu\text{g/m}^3$. More detailed information see VM-3000 brochure.

LabAnalyzer 254 flow chart



LabAnalyzer 254

Technical Specifications

Measuring principle:	UV absorption measurement (CVAAS), peak method
Wavelength:	253.7 nm
Light source:	electrodeless low-pressure mercury lamp (EDL),
UV detectors:	solid state, UV-enhanced, temperature-controlled
Measuring cell:	approx. 23 cm, made entirely of fused silica (Suprasil), heated
Pump:	long-life diaphragm pump
Air flow:	30 l/h, adjustable
Measuring range:	0.01 µg/l ... 10 µg/l (10 ppt ... 10 ppb) for 10 ml sample volume
Sensitivity:	5 ng/l or 0.05 ng absolute
Reproducibility:	< 1.5 % RSD at 1 ppb
Analysis duration:	< 80 sec
Sample volume:	2-10 ml
Reducing reagent:	tin-II-chloride or sodium tetrahydroborate (special reaction bottle)
Display:	graphic LCD with background illumination
Signal outputs:	analogue 4-20 mA, serial output, USB interface for communication with PC, RS 232 interface, parallel (Centronics) printer output
Power supply:	230 VAC / 50-60 Hz (optional 115 VAC / 50-60Hz)
Power rating:	35 VA
Dimensions:	45 x 15 x 35 cm (W x H x D) photometer section 24 x 48 x 27 cm (W x H x D) reaction unit
Required bench space:	approx. 70 x 50 cm (W x D)
Weight:	Photometer approx. 10 kg, reaction unit approx. 3 kg



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