Gas Chromatography Volatil Organic Compounds (BTEX) Analyzer

VOC72M

The VOC72M's metrology, **in accordance with EN 14662-3 standard** for benzene measurement, is based on gas chromatography (GC) for the separation of the measured compounds coupled with a photo-ionization detector (PID).

This compact and fully automated analyser provides equal performance to the laboratory chromatographs and is particularly well-suited for fixed or mobile ambient air quality monitoring stations.

NEW: on board web server compatible with any internet browser. **Es@cloud™** user interface with on-line help for the display, configuration, maintenance, diagnostics or software updating of the analyser, remotely, from any PC, tablet or iPhone.

TCP IP remote control with dynamic, multilingual interface, featuring intuitive navigation by pictograms.

EXCLUSIVE FEATURES:

- Robust and low maintenance instrument, (no PID lamp cleaning)
- Ready to use in less than 30 minutes
- Performs all the functions, such as: sampling, analysis and data management, in a simple and completely autonomous mode
- Quick check of the chromatogram peaks possible directly on-screen, without the use of a computer
- Memory effect (up to 10 times lower than required by the standard EN14662-3) allowing the automatic calibration of the analyser on a single cycle without an external PC
- GC column equipped with an innovative liquid-cooler; retention times are stable even with a fluctuating temperature
- Ultrafast trap heater (heating rate >160°C/second)
- Remote diagnosis, made possible without opening the hood
- Replacement of the trap in less than 2 minutes. No adjustment required
- Use of a single gas source (nitrogen)
- 3 levels of built-in security
- Equipped with LCD screen
- High sensitivity, stable and linear response PID detector
- Long-life capillary column
- Self-contained and completely automated
- Synoptic flow diagram display
- **TUV Compliant following EN 14662-3**

MAJOR FIELDS OF APPLICATION:

- Ambient air monitoring
- Monitoring of industrial sources emitting VOCs
- Photochemical pollution studies (stationary and mobile laboratories)

Gas Chromatograph BTEX Analyzer **VOC72M**

SPECIFICATIONS:

- Measured compounds: **Benzene, Toluene, Ethylbenzene, m+p-Xylene, o-Xylene** (other compounds on request)
- Measuring ranges: **maximum 1000µg/m³** (programmable)
- Units: **ppb or µg/m³** (programmable)
- Cycle duration: **10, 12, 15, 20, 30 minutes** (programmable).
  Specifications are based on 15 min cycle.
- Measuring noise (σ): ≤**0.025µg/m³ at 0.5µg/m³** benzene
- Lower detectable limit (2σ): ≤**0.05µg/m³ benzene**
- Carry-over (memory effect): ≤**0.5% on the first zero**
- Long-term span drift: ≤**4% on 15 days**
- Lack of fit; largest residual: ≤**4%** of the measured value
- Repeatability standard deviation: ≤**0.05µg/m³** at 5µg/m³ benzene (<1% of the annual limit)
- Sample flow: **50ml/minute**
- Flow control: integrated vacuum pump + heated micro capillary tube
- Trap adsorbent: **Carbopack®**
- Sampling temperature: **35°C**
- Desorption temperature / heating rate: **380°C** (programmable) / **> 160°C/second**
- Injection valve: **6-port** (heated)
- GC column: **stainless steel** 15m x 0.25mm x 1µm apolar
  - Carrier gas control: electronic pressure control
  - Temperature control: **20-170°C ± 0.1°C**. 5 ramps up to 30°C/minute.
  - Cooling: liquid heat exchanger and thermo-electric cooler
- GC detector: **Photo-ionisation** (PID) 10,6eV with nitrogen curtain
- Detector's temperature: **140°C** (programmable)
- Gas supply: **Nitrogen 6.0** (99.9999%) 3.2 ± 0.2 bar 15 ml/minute
- Display: LCD 240 x 128 text and graphic mode
- Serial link: **RS232 or RS422**
- Ethernet port: **RJ45** socket, UDP protocol
- USB port: **USB** socket format 1.0
- Dimensions: (LxWxH): **601 mm x 483 mm x 133 mm**
- Weight: **12.5 kg**
- Electrical consumption: average: 130VA, peak 200VA, stand-by 50VA
- Power supply: 100–240V + ground ; 50–60Hz
- Operating temperature: + 5°C to + 35°C

OPTIONS:

- ESTEL electronic board with: 4 independent analog inputs (0-2.5 V) / outputs (0-1 V, 0-10 V, 0-20 mA, 4-20 mA), 4 remote control inputs, 6 dry contacts

OPERATING PRINCIPLE:

The VOC72M performs three main functions: the sampling, the GC analysis and the data processing.

Sampling:

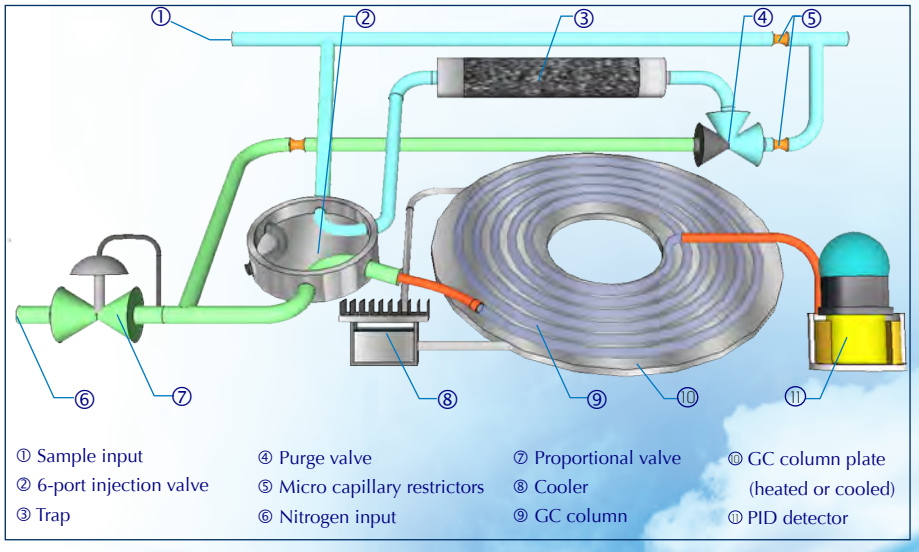
The sampling is achieved with a single trap filled with a specific sorbent. Its flow through the trap is about 12 ml/min which gives a sampled volume of 165 ml with the standard 15 minute cycle (sampling time >90% of cycle time). Other cycle durations are possible from 10 to 30 minutes. A bypass flow of 35 ml/min is added in order to maintain a sample input flow when the trap is not sampling.

GC analysis:

At the end of the sampling cycle, the trap is connected to the GC column and quickly heated (35 to 380°C within 2 seconds). The compounds are thermally desorbed and flushed with nitrogen into the GC column. Then the trap is fastly cooled with a fan for a new sampling cycle. Inside the GC column, the compounds are moved forward by the nitrogen flow (the mobile phase) and retained by the internal coating (the stationary phase) causing a selective retardation of the compounds. In order to achieve an optimal separation within a minimal time, the GC column follows a multi ramp thermal cycle from a cold step (25°C) for the injection to a hot step (160°C) for flushing all the heavy compounds (i-e compounds with a high boiling point). At the end of the hot step, the GC column is cooled to the cold step for the next injection.
The GC column output is connected to a photo ionization detector where the compound concentration is converted into a small electric signal. This signal is amplified and digitized in the electrometer board. The time recording of this signal gives the chromatogram which exhibits a peak for each detected compound. An ambient air chromatogram may include over 100 peaks.

Data processing:

The ARM7 board processes the chromatogram. The peaks are detected and integrated with a baseline correction. The peak timing (retention time) is also recorded. When a peak retention time falls into a compound retention time window (typically ± 2 seconds), this peak is identified as the compound. The peak area is corrected with a volume calculation (based on the trap pressure during the sampling) and the atmospheric pressure compensation for the detector response. The corrected area, multiplied by the compound response factor, gives the compound's concentration.



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