

Gas Chromatography Volatil Organic Compounds (BTEX) Analyzer

AIR QUALITY MONITORING SYSTEMS

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



SPECIFIC FEATURES:

- **Standard measured compounds: Benzene, Toluene, Ethylbenzene, m+p-Xylene, o-Xylene, 1-3 Butadiene...**
- Performs all the functions, such as: sampling, analysis and data management, in a simple and completely autonomous mode
- Self-contained, completely automated and ready to use in less than 30 minutes
- GC column equipped with an innovative liquid-cooler; retention times are stable even with a fluctuating temperature
- Long-life capillary column
- High sensitivity, stable and linear response PID detector
- Ultrafast trap heater (heating rate >160°C/second)
- Quick check of the chromatogram peaks possible directly on-screen, without the use of a computer
- Robust and low maintenance instrument (no PID lamp cleaning)
- 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
- 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
- Real-time chromatogram, animated synoptic, auto-diagnostic, control and maintenance data screens can be displayed while the instrument is operating



ESA Connect™
Free Apps
iOS / Android



Simultaneous multi-screen remote access via Wifi or Lan using the dedicated application ESA Connect™ for control, diagnostics, software update...

MAIN APPLICATIONS:

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

COMPLIANCE WITH:

ISO 13964, 2008/50/EC, EN14211:2012, EN15267-1:2009
EN15267-2:2009, 40 CFR PART 53 and 40 CFR PART 58

Gas Chromatograph BTEX Analyzer **VOC72M**

PRINCIPLE OF OPERATION:

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 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).

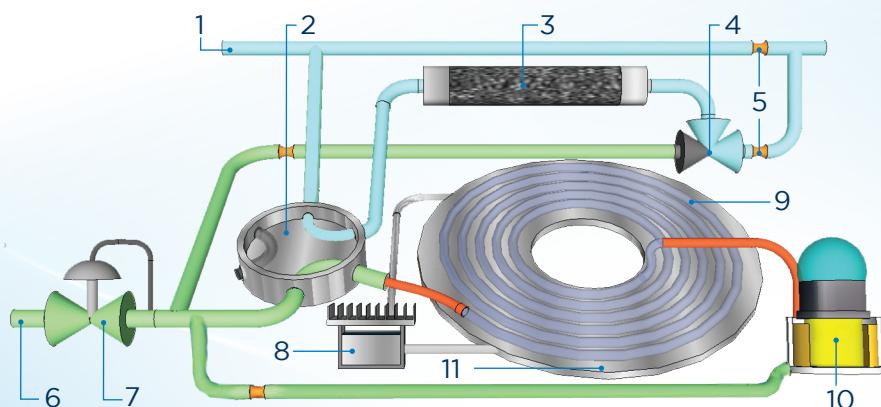
At the end of the hot step, the GC column is cooled to the cold step for the next cycle.

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 numerized in the electrometer board. Its recording gives the chromatogram which exhibits a peak for each detected compound. An ambient air chromatogram may include over 100 peaks.

TECHNICAL SPECIFICATIONS

Measuring ranges	max 1000 ppb (programmable)
Cycle duration	10, 12, 15, 20, 30 minutes (prog.)
Measuring noise (σ)	≤ 0.025 at 0.5 ppb benzene
Lower detectable limit (2σ)	≤ 0.05 ppb benzene
Long-term span drift	$\leq 4\%$ on 15 days
Lack of fit, largest residual	$\leq 4\%$ of the measured value
Repeatability	≤ 0.05 ppb at 5 ppb benzene (<1% of the annual limit)
Sample flow	50ml/minute
Flow control	integrated vaccum pump + heated micro capillary tube
Trap adsorbent	Carbopack®
GC Column	Stainless steel 15m x 0.25mm x 1 μ m apolar
Carrier gas control	electronic pressure control
Temperature control	20-170°C $\pm 0,1^\circ$ C 5 ramps up to 30°C/minute
GC detecteur	Photo-ionisation (PID)
Display	7" TFT colour touch screen
Serial link	RS232 / RS422, IP and USB
Operating temperature	+5°C to +35°C
Power supply	100-240V + ground, 50-60Hz
Gas supply	Nitrogen 5,5 3,2 bar 15 ml/min
Electrical consumption	average: 130VA, peak 200VA, stand-by 50VA
Dimensions (LxWxH) mm	601 x 483 x 133
Weight	12.5 kg

O342e Operating Principle



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|----------------------------|--------------------------------|--|
| 1- Sample input | 5- Micro capillary restrictors | 9- GC column |
| 2- 6-ports injection valve | 6- Nitrogen input | 10- PID detector |
| 3- Trap | 7- Proportional valve | 11- GC column plate (heated or cooled) |
| 4- Purge valve | 8- Cooler | |

MAIN OPTIONS:

- ESTEL 2 max electronic boards 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
- RS232 or RS422 serial interface (max. one Estel board if this option is used)
- Span gas input (atmospheric pressure)
- Span gas input under pressure (1 bar) for permanent connection to a gas cylinder

