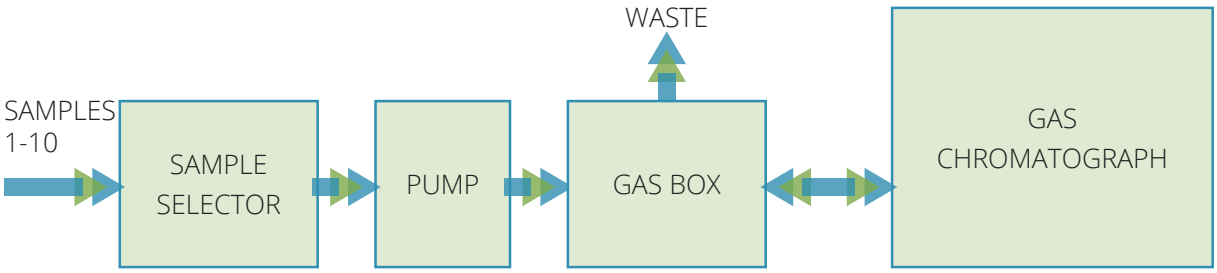
ETOx – Monitoring of Ethylene Oxide

Ethylene oxide monitoring system for machines and working environments enables to measure 1, 4, 6, 8 or 10 samples from various sample points according to user requirements (in economy one-channel version). The two-channel version gives double count of sample points with the same measurement interval. The system is composed of gas chromatograph (GC) with flame-ionization detector (FID), sample selector and gas box for up to 10 sample points, PC with ETOx control software and chromatography software (Clarity) and cabinet with hardware control modules. Whole system including control software is delivered as a turn key solution according to customer requirements.

FUNCTION DESCRIPTION

Individual samples are sucked from sample points by pump with PTFE membrane via PTFE tubing. Gas flow is set from 2.5 to 3.0 L/min to properly flush a sample loop by measured sample. Analytical part of the system covers gas chromatograph with FID detector and capillary column. Interval between each analysis is 3 minutes. See block diagram of ETOx monitoring system on Picture 1 below.



Picture 1 – Block diagram of ETOx monitoring system

APPLICATION

- Monitoring of working environment nearby sterilization line
- Measurement of Ethylene Oxide concentration in degassing chamber
- Measurement of Ethylene Oxide concentration in exhaust from the chimney (combustion efficiency)

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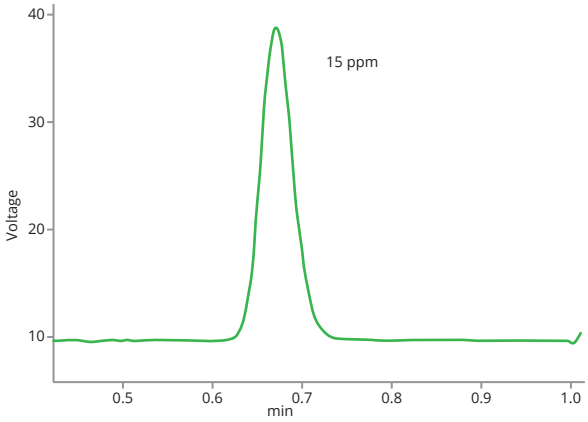
BENEFITS

- Direct measurement of Ethylene Oxide without loss of sample
- Cross interferences elimination
- High stability of response
- Robust detection system without significant UV lamp wear
- Excellent linearity of calibration curve (> 10^4)



ETOx software provides:

- Automatic response verification using calibration gas (adjustable time interval)
- Graphical interpretation of concentration including 2 alarm levels
- Data logging and storage
- Data visualisation by individual sample points
- Sequence change during system operation – includes priority setting when shorter interval between certain sample points is needed (primary and secondary sequence function)
- Flame control
- Sample loop flow control
- PC connection directly via USB or remotely via ethernet

Control cabinet (core unit is cDAQ by National Instrument) can be upgraded with:

- Relay module (up to 64 relays) for optical and acoustical signalling
- Digital communication protocol MODBUS
- Backup power supply for control cabinet and a local PC. In case of power blackout, system will restart automatically after failure disappears.

APPLICATION LIST #426

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Specification

Analysis duration	< 60 s
Minimum interval between samples	180 s
Detection principle	FID (Flame Ionization Detector)
Process gases	air, nitrogen, hydrogen
Ranges	0–100 ppm, 0–1000 ppm, 0–10000 ppm, user defined
Detection limit	0.05 ppm
Span drift	< 0.5 % / week
Calibration	one point or more
% RSD	< 0.5 %
Sample flow rate	2.5–3.0 L/min
Interface	digital inputs, digital output (MODBUS), relays, analogue outputs – all optional