



Global  
Analyser  
Solutions



## Fermentation Gas Analyser CG500



- Analysis of permanent gases, hydrocarbons, esters, aldehydes, sulphur components, etc.
- Various sampling options
- Only 1 ml sample required

*Get ready for tomorrow's analytics*

Find out more on [www.gassite.com](http://www.gassite.com)

CG500v1

## Analysis of fermentation gases

The analysis of fermentation gases is crucial in biotechnology, microbiology, and environmental science, offering insights into the efficiency and nature of microbial processes. Fermentation produces gases like carbon dioxide, methane, hydrogen, and volatile organic compounds, whose composition and volume reveal the health and activity of microbial cultures and the completeness of substrate conversion. In industrial applications, gas analysis optimises biofuel, pharmaceutical, and food production, while in environmental science, it aids in understanding carbon cycling and greenhouse gas emissions. Gas analysis using gas chromatography enables better control and optimisation of fermentation processes, and allows a wide range of components to be analysed.

### Principle of operation

Diagram 1 illustrates the principle of the permanent gas analyser. Hydrogen ( $H_2$ ), oxygen ( $O_2$ ), nitrogen ( $N_2$ ), methane ( $CH_4$ ), and carbon monoxide ( $CO$ ) are analysed on the Molsieve column, while carbon dioxide ( $CO_2$ ), ethylene, ethane, acetylene, hydrogen sulphide ( $H_2S$ ) and other components of interest are analysed on the second column (Hayesep). The first Hayesep column is used to backflush propane and higher-boiling components to vent. The detector used is a Thermal Conductivity Detector (TCD). Figure 2 shows an example chromatogram; figure 3 shows repeatability data.

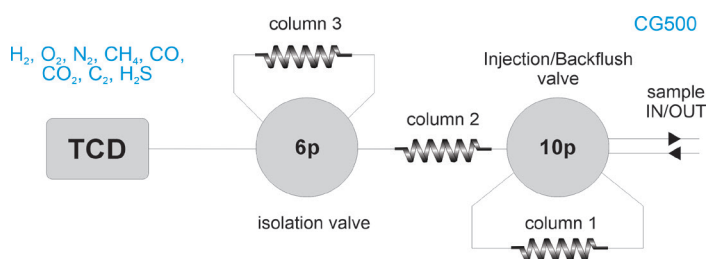


Figure 1 Fermentation gas analyser

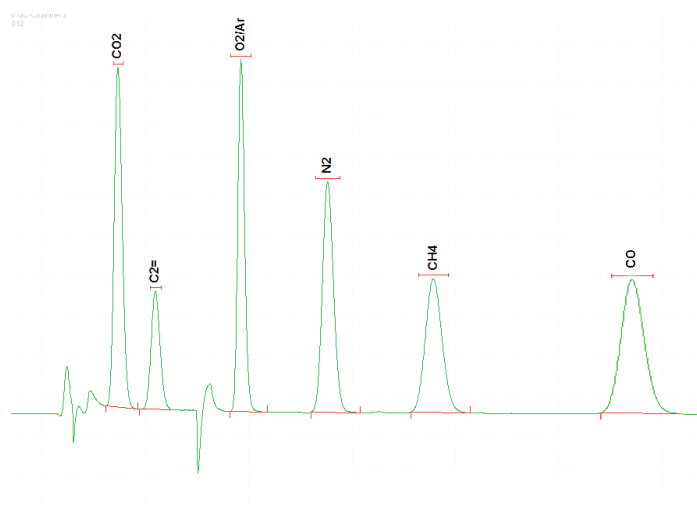


Figure 2 Chromatogram of the fermentation gas analyser

|          | CO2<br>Area | O2/Ar<br>Area | N2<br>Area | CH4<br>Area |
|----------|-------------|---------------|------------|-------------|
|          | 940359      | 828079        | 884555     | 779277      |
|          | 939330      | 828601        | 885834     | 775493      |
|          | 935071      | 827641        | 881940     | 772190      |
|          | 941345      | 831751        | 886659     | 778352      |
|          | 936345      | 829598        | 882438     | 776315      |
|          | 933830      | 827408        | 884447     | 772634      |
| Min:     | 933830      | 827408        | 881940     | 772190      |
| Max:     | 941345      | 831751        | 886659     | 779277      |
| Mean:    | 937713      | 828846        | 884312     | 775710      |
| Std Dev: | 3057        | 1623          | 1846       | 2897        |
| %RSD:    | 0.33        | 0.20          | 0.21       | 0.37        |

Figure 3 Method repeatability

### Specification

- Thermo Trace GC1600 with two diaphragm gas switching valves (rotary valves are optional) and TCD (Thermal Conductivity Detector)
- 3 packed columns
- Runtime 7 minutes
- Minimum detectability: 10 ppm (depending on sample loop volume and separation)
- Repeatability: < 1 %

| Ordering information CG50X - ABCDE |            |            |            |            |
|------------------------------------|------------|------------|------------|------------|
| code X                             | 0          | 1          | 2          | 3          |
| GC model, power                    | 1600, 230V | 1610, 230V | 1600, 115V | 1610, 115V |

For the selection of options ABCDE (e.g. valve type and passivation, pump and vacuum sampling, rotameter and sample connections, pressure and moisture sensors, hydrogen sensor for safety shut-off, power plug type and more), [see the options table in the order guide](#).

### About GAS

Global Analyser Solutions provides GC & GC-MS solutions for Energy, Refinery, Chemical and Environmental markets. Our analysers address a broad spectrum of measuring requirements with high precision and reliability. Please reach out for more information on our website. [www.gassite.com](http://www.gassite.com)