



Permanent gas analyser

- Robust analyser with high uptime
- Reliable diaphragm valves
- Modular detectors
- ASTM D1946, D2504, D2505

Get ready for tomorrow's analytics

GAS offers custom configured GC analysers for many application fields for over 50 years. GAS analysers are designed to meet many standardised methods from GPA, ASTM, UOP, ISO, EN and others. The efficient configurations are based on proven GC technology, resulting in robust, highly productive instruments with an optimal return on investment.

The GAS permanent gas analyser (PGA) is the customised solution for analysing permanent gases, C₂ isomers and H₂S in various gas matrices. The analyser complies with ASTM D1946, D2504 and D2505.



Figure 1 Permanent gas analyser with external valve oven

Analysed Components

Diagram 2 shows the principle of the permanent gas analyser: H₂, O₂, N₂, CH₄ and CO are analysed on Molsieve column, while CO₂, Ethylene, Ethane, Acetylene and H₂S are analysed on column Hayesep 2. COS can be measured as well. Column Hayesep 1 is used to backflush propane and higher boiling components to vent. The used detector is Thermal Conductivity Detector (TCD).

Robust diaphragm valves

The PGA uses robust diaphragm valves with internal purge, mounted in an independently heated valve oven. These valves offer 5 times longer lifetime compared to rotary valves, with reduced maintenance costs as a result.

GC 1600

The GAS Permanent Gas Analyser is available on Thermo Trace 1600/1610 bench-top GC, which offers unique InstantConnect injector and detector modules that can be exchanged by the user in minutes (figure 8).

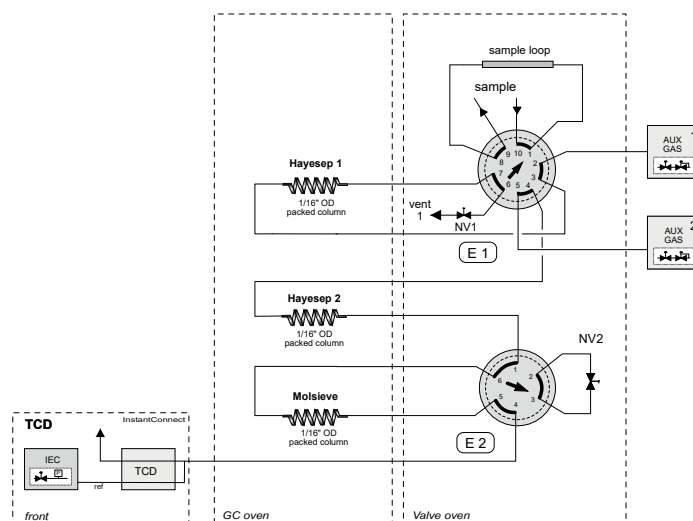


Figure 2 Diagram permanent gas analyser

Results

Figure 3 shows a typical chromatogram; figure 4 shows excellent repeatability. Calibration standard: 1% of all components in Helium.

Options:

• H₂ analysis

Helium is often used for carrier gas, offering good sensitivity for all components except for hydrogen. An optional channel with a second TCD with nitrogen or argon carrier gas is therefore available for hydrogen detection from low ppm to high %.

• Hydrocarbon analysis

An analysis channel with FID detection is offered for extended hydrocarbon analysis. Depending on required isomer separation and boiling point range, an optimal column is chosen. The separation columns for the permanent gases are mounted in the valve oven in that case, allowing an optimal temperature program for hydrocarbon separation in the GC column oven.

• Low sulphur analysis

The standard PGA configuration using TCD offers H₂S (and optional COS) detection at low ppm level. An additional channel with FPD (figure 5) or PFPD is available for sub ppm/ppb sulphur analysis. Separate application notes are available.

• ppm/ppb CO -CO₂ analyser - UOP 603

CO and CO₂ detection at sub-ppm/ppb concentration level using methaniser-FID is described in a separate application note.

• Sample stream selector

For automated analysis of various sample streams, a selector valve is available (figure 6). The analysis sequence is programmed by Chromeleon chromatography data system.

• Sampling and conditioning options

- stop flow valve for highly quantitative results
- sample pump
- vacuum sampling option in case of low sample pressure or small sample volume; requires only 1 ml of gas sample
- heated sample lines, filters

• Permanent gas analysis on CompactGC^{4.0}

For fast analysis of permanent gases in only 60 seconds, we offer CompactGC^{4.0} in a 19" industrial standard enclosure (figure 7).

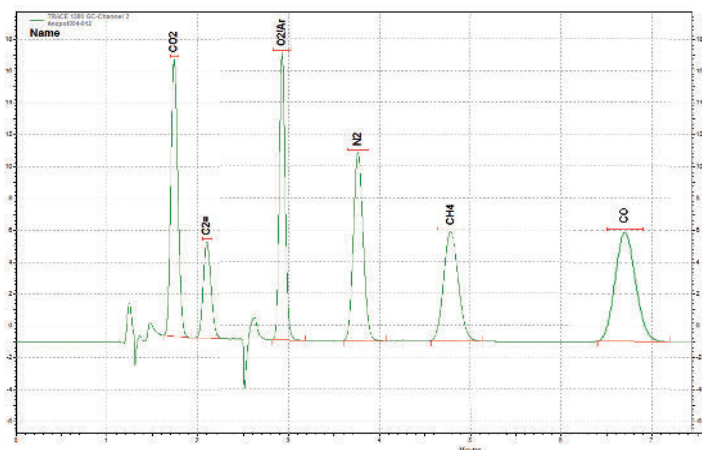


Figure 3 Chromatogram PGA. TCD; 1% concentration level

| | CO2 Area | O2/Ar Area | N2 Area | CH4 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 4 Repeatability at 1% concentration level



Figure 5 Modular InstantConnect FPD (Flame Photometric Detector) for sub-ppm sulphur analysis



Figure 7 CompactGC^{4.0} for fast permanent gas analysis (< 1 minute)



Figure 6 Sample stream selector

Specification

| | |
|------------------------|---|
| Standardised method: | ASTM D1946, D2504, D2505 |
| Application: | Custom configured analyser for the analysis of gaseous samples containing permanent gases The instrument is factory tuned for the specific application intended |
| Configuration: | 1 channel instrument, gas injection, column switching, 2 valves/3 columns, TCD detection |
| GC instrument: | Thermo GC Trace 1600/1610 |
| Optional: | <ul style="list-style-type: none">- Additional channel for H₂ using second TCD and Ar or N₂ for carrier gas- Additional channel for hydrocarbons using FID- Additional channel for low ppm/ppb sulphur detection using FPD or PFPD- Sample stop-flow valve for accurate results- Selector valve for multiple stream analysis- Vacuum sampling option. Requires only 1 ml of sample |
| Sample tubing: | Sulfinert® tubing for inert sample path (sulphur components) |
| Sample requirements: | See our pre-installation guide for additional requirements |
| Analysis Time: | < 10 minutes |
| Minimum detectability: | 10 ppm depending on sample loop volume and separation |
| Dynamic Range: | Four decades for all components |
| Accuracy: | Better than 1 % RSD |
| Repeatability: | Better than 1 % RSD (depending on application and configuration) |
| Software: | Chromeleon, OpenLab |

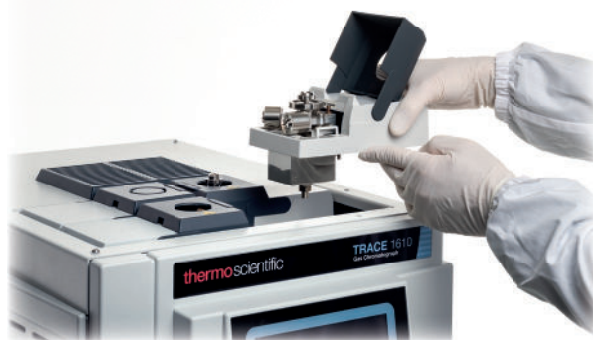


Figure 8

Easy exchange of injectors and detectors offers high flexibility and low maintenance costs

powered by **interscience**



Turnkey customised
GC & GC/MS solutions



Xpert center for chromatography

Expert & education centre
Learn from the Xperts!



Fully automated solutions
for sample preparation

GAS, IS-X & SampleQ are Interscience brands

Find out more on www.gassite.com