

# Agilent 990 Micro GC Biogas Analyzers



## Key benefits

- **Complete solution.** Agilent 990 Micro GC Biogas Analyzers are shipped as a total solution. The analyzers are factory tuned, and come with final test data, analytical method parameters, a user manual, and a check-out sample.
- **Optimized configuration.** The Biogas Analyzers provide the results and ruggedness you demand in the laboratory or in the field for the analysis of biogas and related sample streams. Agilent provides a single part number for Biogas and Extended Biogas Analyzers depending on the nature of the sample.
- **Ready-to-go.** Start-up is easy; the analyzer ships fully loaded with a method and is ready-to-go upon installation.
- **Easy to operate.** The Agilent 990 Micro GC is designed to achieve the best possible results. This system does not require a high degree of operator skill to be used successfully.
- **The speed you need.** Micro GC is all about fast chromatography. Precise gas analysis in seconds rather than minutes provides improved product quality and more exact product valuation.

## Introduction

Biogas is produced through biological processes such as anaerobic fermentation or digestion of organic material. The main components of biogas are methane and carbon dioxide, with some other permanent gases, hydrogen, and hydrogen sulfide. The composition of the biogas is related to the origin of the organic material.

Biogas is considered a renewable and sustainable energy source. It can fuel any type of heat engine to generate mechanical or electrical power.

To increase its caloric values, it is sometimes necessary to remove some of the carbon dioxide, or blend it with other hydrocarbon streams.

The increasing interest in biogas results in a demand for fast and efficient analysis technology to determine its composition. That is where Agilent 990 Micro GC Biogas Analyzers can play a significant role.

## Choose the right biogas analyzer for your needs

Depending on the composition of your biogas sample, Agilent has two 990 Micro GC-based Biogas Analyzer configurations available.

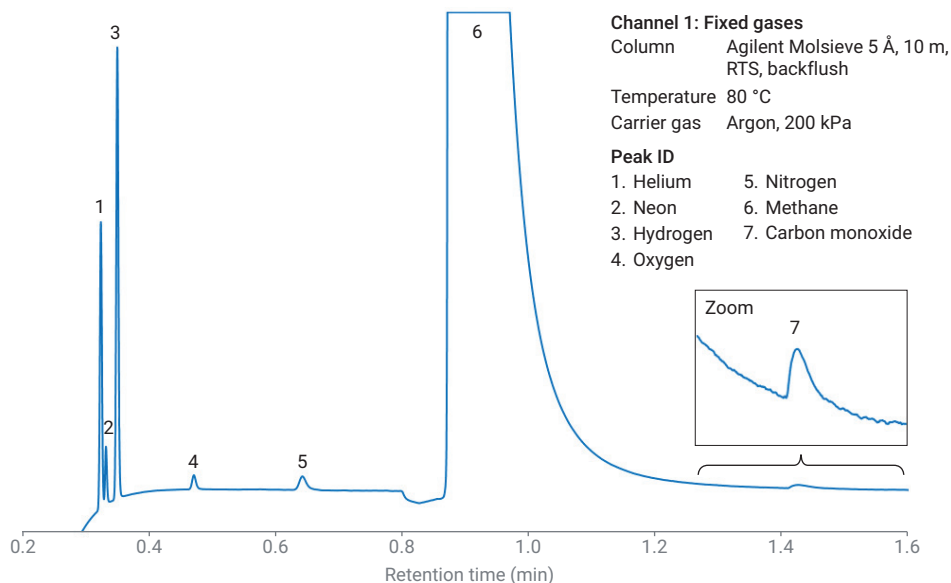
For pure biogas analysis, including permanent gases and hydrogen sulfide, the 990 Micro GC Biogas Analyzer is recommended; even ethane and propane can be analyzed with this setup. This Biogas Analyzer consists of a dual channel cabinet including a 10 m CP-Molsieve 5A column with argon as carrier gas, providing excellent sensitivity and linearity for hydrogen, and a 10 m CP-PoraPLOT U column channel with helium carrier gas.

When biogas is mixed with other hydrocarbon streams such as natural gas or liquefied petroleum gas (LPG), the sample contains higher boiling hydrocarbons. To analyze these hydrocarbons, the 990 Micro GC Biogas Analyzer Extended is the analyzer of choice. This Extended Biogas Analyzer is a quad channel cabinet Micro GC including three column channels:

- A 10 m CP-Molsieve column with argon as carrier gas (Figure 1)
- A 10 m CP-PoraPLOT U column (Figure 2)
- An additional 6 m CP-Sil 5 CB column with helium as carrier gas (Figure 3)

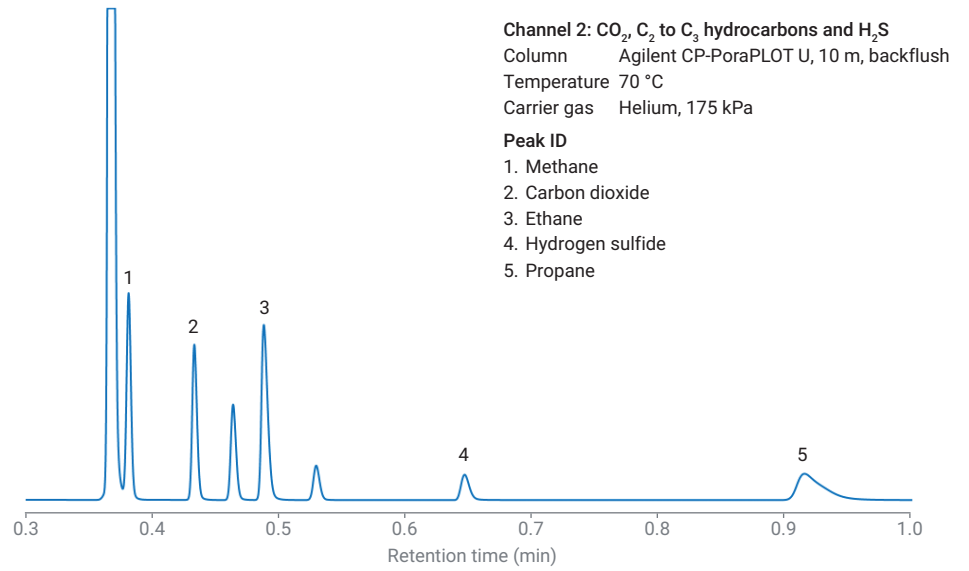
To ensure that the integrity of the sample is maintained throughout the sample flowpath, both Biogas Analyzers are equipped with heated sample lines and injectors to eliminate any cold spot and prevent possible condensation of moisture.

The CP-Molsieve 5A and CP-PoraPLOT U columns are equipped with backflush-to-vent functionality. For the Molsieve column, this backflush to vent is required to maintain the separation efficiency as biogas and related samples may contain larger amounts of carbon dioxide, moisture, and higher boiling hydrocarbons. Moisture and carbon dioxide tend to adsorb quickly to the Molsieve 5A stationary phase and change its chromatographic properties. This would result, over time, in retention shifts and loss of separation. Higher hydrocarbons will eventually elute, but will cause higher detector noise levels and lead to reduced sensitivity. The backflush-to-vent functionality on the Molsieve 5A and PoraPLOT U column channel prevents this from happening.

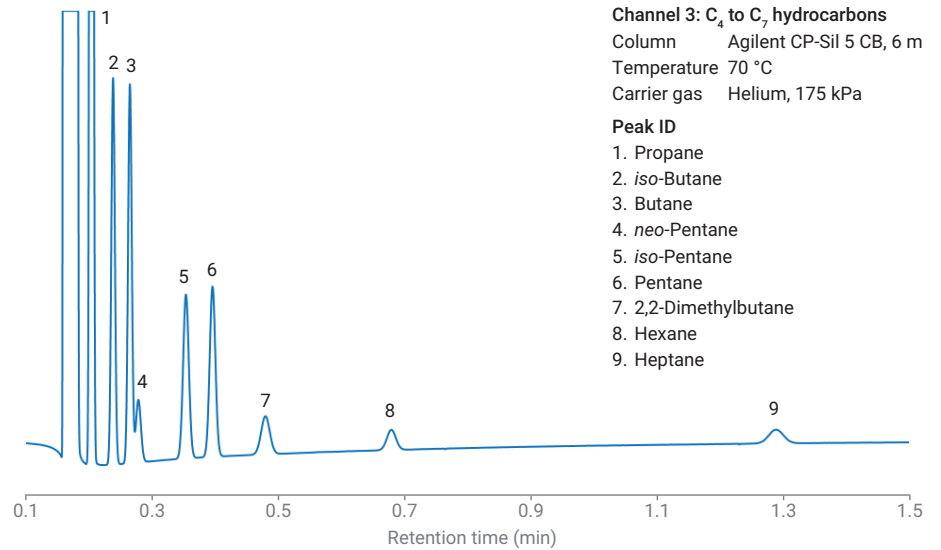


**Figure 1.** Agilent 990 Micro GC Biogas Analyzer Extended channel 1: Agilent CP-Molsieve 5A column, 10 m, with argon as carrier gas.

The CP-Molsieve 5A is equipped with the retention time stability (RTS) option. To ensure moisture and carbon dioxide free carrier gas, this RTS option consists of additional in-line filters between the electronic gas control and the column module. The use of the RTS option enables a more efficient backflush of carbon dioxide. This enhances column lifetime and, most importantly, leads to more stable retention times.



**Figure 2.** Agilent 990 Micro GC Biogas Analyzer Extended channel 2: Agilent CP-PoraPLOT U column, 10 m, with helium as carrier gas.



**Figure 3.** Agilent 990 Micro GC Biogas Analyzer Extended channel 3: Agilent CP-Sil 5 CB column, 6 m, with helium as carrier gas.

## Accessories

Table 1 gives an overview of the most important 990 Micro GC Biogas Analyzer compatible accessories. Contact your local Agilent office for more details and other accessories.

## Ordering information

Agilent Biogas Analyzers can be purchased by ordering the main part number (G3599A) and an option number per analyzer type, listed in Table 2. The calculation tool for calorific value, also included in Table 2, should be ordered as a separate option number.

## Technical specifications

Agilent 990 Biogas Analyzer Characteristics	Biogas Analyzer	Biogas Analyzer Extended
Micro GC Cabinet	Dual	Dual + Channel Extension
Number of Column Channels	2	3
CP-MolSieve 5A Column Channel (with Backflush and RTS)	✓	✓
CP-PoraPLOT U Column Channel with Backflush	✓	✓
CP-Sil 5 CB Column Channel	-	✓
All Channels Equipped with Heated Injectors (up to 110 °C)	✓	✓
Dual Carrier Gas: Argon on Molsieve 5A, Helium on Other Channels	✓	✓
Sample path UltiMetal Treated	✓	✓
Heated Sample Line (up to 110 °C)	✓	✓
O <sub>2</sub> /N <sub>2</sub> Separation	✓	✓
CO and CO <sub>2</sub> Analysis	✓	✓
H <sub>2</sub> S Analysis	✓	✓
CH <sub>4</sub> , C <sub>2</sub> , and C <sub>3</sub> Hydrocarbon Analysis	✓	✓
C <sub>4</sub> to C <sub>7</sub> Hydrocarbon Analysis	-	✓
Sample type 1. Biogas 2. Biogas Mixed with other HC Streams (NG or LPG)	1 2	1 2
Typical Peak Area Repeatability (RSD%)	<0.5%	<0.5%
Analysis Time	<120 seconds	<150 seconds

Table 1. Related Agilent 990 Micro GC accessories.

Product Description	Compatible With	Part Number
Gasifier II for Micro GC Provides controlled vaporization for liquid petroleum gas (LPG) and liquefied natural gas (LNG) before sample introduction to the Micro GC. In addition, high-pressure gas samples up to 1,000 psi/7,000 kPa can be reduced without creating cold spots, which prevents discrimination in the sample.	None	G3535A #001 (for 990) G3535A #003 (filter kit)
Genie Filter	All	Multiple part numbers
Stream Selector Valve	All	Multiple part numbers

## Dimensions and weight

Product Description	Height		Width		Length		Weight	
	inch	cm	inch	cm	inch	cm	lb	kg
Biogas Analyzer	11.13	28.28	5.71	14.5	12.97	32.94	16.0	7.3
Biogas Analyzer Extended	11.13	28.28	11.83	30.04	12.97	32.94	34.5	15.6
Micro GC power supply	1.8	4.6	3.3	8.5	8.3	21.0	21.0	1.1

Table 2. Agilent Biogas Analyzer part numbers.

Product Description	Part Number
Agilent 990 Micro GC Analyzer	G3599A
Agilent 990 Micro GC Biogas Analyzer A	G3588A#110
Agilent 990 Micro GC Biogas Analyzer A Extended	G3588A#111
Diablo EZ Reporter Software	G3599A#105

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