Data Sheet

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Trusted Answers

Agilent 990 Micro GC Natural Gas Analyzers

Key benefits

- **Complete solution.** The Agilent 990 Micro GC Natural Gas 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. Software for calorific value/BTU calculations is available as an option.
- **Optimized configuration.** The Natural Gas Analyzers provide the results and ruggedness you demand in the laboratory or in the field for the analysis of natural gas and related sample streams. Agilent provides multiple Natural Gas Analyzer solutions depending on the composition of your natural gas and the compounds of interest.
- **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

Natural gas is bought and sold as a bulk commodity with a price based on its energy content. It is important for all stakeholders in the natural gas supply and consumer chain to determine the composition and heating value of their streams. Agilent 990 Micro GC based Natural Gas Analyzers can play a significant role in that process.

Natural gas consists primarily of methane, variable levels of other hydrocarbons, and permanent gases such as nitrogen and carbon dioxide. Different sources of natural gas usually have similar composition, but vary in concentration.

Gas chromatography offers a proven technology to determine the composition and energy content of natural gas in a cost-effective way. Based on the 990 Micro GC, Agilent offers a full range of solutions for the analysis of natural gas. The 990 Micro GC can be equipped with one to four independent column channels. Each column channel is complete with:

- Miniaturized GC with electronic carrier gas control
- Micro-machined injector
- Narrow-bore analytical column
- Micro-thermal conductivity detector (µTCD)

Choose the right natural gas analyzer for your needs

Depending on the composition of the natural gas and the components of interest, Agilent has four 990 Micro GC based Natural Gas Analyzer configurations available. The technical specifications table on the next page presents an overview of the hardware and analysis characteristics.

990 Micro GC based Natural Gas Analyzers are equipped with heated sample lines and injectors to eliminate any cold spots and prevent possible condensation of moisture, ensuring that the integrity of the sample is maintained throughout the sample flowpath.

When necessary, the column channels are equipped with backflush-to-vent functionality. For the molecular sieve column, this backflush to vent is required to maintain the separation efficiency. Moisture and carbon dioxide tend to adsorb quickly to its stationary phase changing the chromatographic properties. This can result in retention shifts and loss of separation. The backflush functionality for the other channels is used to backflush higher hydrocarbons to vent, preventing these late-eluting components from interfering in the next analysis.

The CP-Molsieve 5A channel 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. Using the RTS option enables a more efficient backflush of carbon dioxide. This enhances column lifetime and, most importantly, leads to more stable retention times.

For the analysis of hydrogen sulfide, the stainless-steel tubing and connectors in the PoraPLOT U column and Micro GC sample inlet have an UltiMetal deactivation layer resulting in an inert sample flowpath for excellent peak shape and lower detection limits. For more analysis details and a chromatogram for each column channel, see the Natural Gas Analyzer Application Note.[1]

Technical specifications

Analyzer Characteristics	Natural Gas A Analyzer	Natural Gas A Analyzer Extended	Natural Gas B Analyzer	Natural Gas B Analyzer Extended
Hardware				
Micro GC Cabinet Type	Dual	Dual + Channel extension	Dual	Dual + Channel extension
Number of Column Channels	2	3	2	3
HayeSep A Column Channel 40 cm, With Backflush	–	✓	–	–
HayeSep A Column Channel 40 cm, Without Backflush	✓	–	–	–
PoraPLOT U Column Channel 10 m, With Backflush	–	–	✓	✓
CP-Molesieve 5A column channel 10m with backflush and retention time stability	–	–	–	✓
CP-Sil 5 CB Column Channel 4 m, With Backflush	–	✓	–	–
CP-Sil 5 CB Column Channel 6 m, Without Backflush	✓	–	✓	✓
CP-Sil 5 CB Column Channel 8 m, Without Backflush	–	✓	–	–
Heated Injector (up to 110 °C)	✓	✓	✓	✓
Dual Carrier Gas Connection[1]	–	–	–	✓
Sample Inlet UltiMetal Deactivated	✓	✓	✓	✓
Heated Sample Line (up to 110 °C)	✓	✓	✓	✓
Analysis Characteristics				
C1 to C9 Hydrocarbon Analysis	✓	✓	✓	✓
C1 to C12 Hydrocarbon Analysis	–	✓	–	–
Carbon Dioxide Analysis	✓	✓	✓	✓
Methane and Composite Air Separation	✓	✓	✓	✓
Hydrogen Sulfide Analysis (Max 5%)	–	–	✓	✓
Oxygen and Nitrogen Separation	–	–	–	✓
Helium and Hydrogen Analysis[1]	–	–	–	✓
Miscellaneous				
Sample Type Natural Gas Liquified Natural Gas Related Streams[2]	✓	✓	✓	✓
Sample Introduction Internal Sample Pump Continuous Flow Mode Ambient Pressure to 68 bar/1,000 psi[2]	✓	✓	✓	✓
Repeatability (RSD%)[3]	<0.5%	<0.5%	<0.5%	<0.5%
Typical Analysis Time	100 seconds (to C7) 400 seconds (to C9)	100 seconds (to C10) 240 seconds (to C12)	75 seconds (to C6) 400 seconds (to C9)	75 seconds (to C6) 400 seconds (to C9)

[1] The CP-Molsieve 5A column channel is separated from the other channels; all channels are set to helium. When the analysis of helium and hydrogen is required, the carrier gas must be changed to argon.

[2] To introduce a liquified natural gas (LNG) or pressurized sample (above 1 bar/14.5 psi) on the Micro GC, the use of the Micro-Gasifier is required.

[3] For propane at 1 mol % level on WCOT column at constant temperature and pressure.

Calorific value determination

To determine the commercial value of the natural gas, it is crucial to calculate its heating value and some other related parameters. These key parameters, calculated by the optional EZReporter software, are available as a printed report, an export file for connection to a laboratory information management system (LIMS), for monitoring including lower and upper warning limits, and for trend plotting. Table 1 shows an overview for compatibility and official methods supported in EZReporter.

Accessories

Table 2 gives an overview of the most important Agilent 990 Micro GC Natural Gas Analyzer compatible accessories. Contact your local Agilent office for more details and other accessories.

Ordering information

The Agilent Natural Gas Analyzers can be purchased by ordering the main part number G3599A and an option number per analyzer type, which are displayed in the Product Description table. The calculation tool for calorific value, also included in the table, should be ordered as a separate option number.

For more information about the 990 micro GC Natural Gas Analyzer or other Micro GC solutions visit our website at www.agilent.com/chem/990micro.

Table 1. Methods supported in EZReporter.

Product Description	Compatible With	Supported Standards
EZReporter for Calorific Value/BTU Calculations	Agilent OpenLAB CDS EZChrom Edtion Agilent OpenLAB CDS Chemstation Edition Agilent OpenLAB CDS 2.x	GPA 2172, GPA 2177, ASTM D 3588, ISO 6976

Table 2. Agilent 990 Micro GC NGA-compatible accessories.

Product Description	Compatible With	Part Number
Micro-Gasifier for Micro GC[1] 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.	All (2)	G7623A + G7623A#002
Genie Filter	All	Multiple part numbers
Stream Selector Valve	All	Multiple part numbers

[1] The Micro-Gasifier cannot be used in combination with portable field case.

Dimensions and weight

Product Description	Height		Width		Length		Weight	
	inch	cm	inch	cm	inch	cm	lb	kg
Natural Gas Analyzer A Natural Gas Analyzer B	11.13	28.28	5.71	14.5	12.97	32.94	16.0	7.3
Natural Gas Analyzer A Extended Natural Gas Analyzer B 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	2.4	1.1

Product Description	Part Number
Agilent 990 Micro GC Analyzer	G3599A
Agilent 990 Micro GC Natural Gas Analyzer A	G3599A#120
Agilent 990 Micro GC Natural Gas Analyzer A Extended	G3599A#121
Agilent 990 Micro GC Natural Gas Analyzer B	G3599A#122
Agilent 990 Micro GC Natural Gas Analyzer B Extended	G3599A#123
EZReporter for Calorific Value Calculation	G3599A#105

Reference

1. Jie Zhang, Fast Analysis of Natural Gas using the Agilent 990 Micro GC Natural Gas Analyzer, *Agilent Technologies Application Note*, publication number 5994-1040EN, **2019.**

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