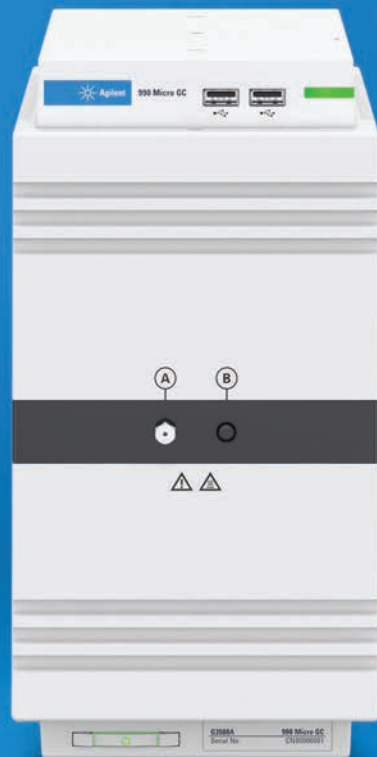


# Fast, Reliable GC Analysis In or Out of Your Laboratory

Agilent 990 Micro gas chromatography systems





# Get Immediate Answers Your Analysis Demands

Whether you are locating natural gas deposits, evaluating biogas, monitoring well efficiency, or measuring samples in your lab, you need fast, reliable results.

Agilent 990 Micro GC systems provide the vital answers you need in the compact footprint you want. They combine innovative, industry-leading features with the quality and speed that are critical to your gas analysis.



## Instruments that work as hard as you do

Micromachined components and onboard data handling functions give you continuous unattended operation, easy troubleshooting, and portability. Self-aware features and diagnostics identify and alert you to possible errors before they affect your results.

## Designed for flexibility

With options like optimized sample conditioning, up to two sample inlets, up to two carrier gases, and a user interface/touchscreen, every 990 Micro GC fits the way you work. Modular construction lets you quickly reconfigure the system using plug-and-play GC channels. In addition, the ability to make onsite channel repairs saves time and cost.

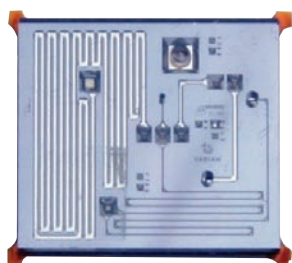
## Small yet powerful

The goals that motivate Agilent innovation are also your goals: maximum reliability and trouble-free operation under all conditions. And this spirit of innovation is reflected in our 990 Micro GC systems. With their compact, laboratory-quality gas analysis platform, you can generate more data in less time for fast, confident business decisions.

# Produce Actionable Results, Fast

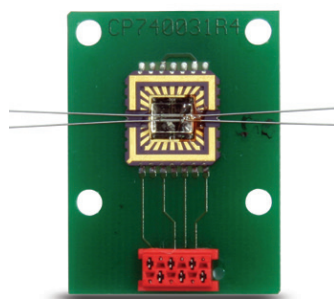


Innovative technologies deliver separate gases in seconds—in less space and with less power and carrier gas consumption than benchtop GC systems. Quick, easy startup lets you achieve results in minutes, even if you change measurement locations frequently.



## Micromachined injectors

- **Higher dependability:** silicon micromachined injector has no moving parts to wear or break.
- **More functionality:** software-selectable injection times cover a range of application requirements.
- **Less wear and tear:** available backflush capability protects the analytical column.
- **Improved performance:** injector can be heated to 110 °C, eliminating discrimination of higher hydrocarbons.



## Micromachined thermal conductivity detector ( $\mu$ TCD)

- **Better data quality:** 200 nL internal volume eliminates peak broadening.
- **Lower detection limits:**
  - 0.5 ppm for WCOT capillary columns
  - 2 ppm for PLOT columns
  - 10 ppm for micropacked columns

## Agilent Micro GC columns and applications

| Column/Phase Type                        | Target Components  |
|--|--|
| Molsieve 5Å                              | Permanent gases (N <sub>2</sub> /O <sub>2</sub> separation), methane, CO, NO, and so forth; 20 m required for O <sub>2</sub> -Ar baseline separation; natural gas and biogas analysis; optional retention time stability (RTS) configuration |
| Hayesep A                                | Hydrocarbons C <sub>1</sub> -C <sub>3</sub> , N <sub>2</sub> , CO <sub>2</sub> , air, volatile solvents, natural gas analysis  |
| CP-Sil 5 CB                              | Hydrocarbons C <sub>3</sub> -C <sub>10</sub> , aromatics, organic solvents, natural gas analysis   |
| CP-Sil 19 CB                             | Hydrocarbons C <sub>4</sub> -C <sub>10</sub> , high boiling solvents, BTX  |
| CP-WAX 52 CB                             | Polar volatile solvents, BTX   |
| PLOT Al <sub>2</sub> O <sub>3</sub> /KCl | Light hydrocarbons C <sub>1</sub> -C <sub>5</sub> saturated and unsaturated; refinery gas analysis   |
| PoraPLOT U                               | Hydrocarbons C <sub>1</sub> -C <sub>6</sub> , halocarbons/freons, anesthetics, H <sub>2</sub> S, CO <sub>2</sub> , SO <sub>2</sub> , volatile solvents; separation of ethane, ethylene, and acetylene  |
| PoraPLOT Q                               | Hydrocarbons C <sub>1</sub> -C <sub>6</sub> , halocarbons/freons, anesthetics, H <sub>2</sub> S, CO <sub>2</sub> , SO <sub>2</sub> , volatile solvents; separation of propylene and propane, coelution of ethylene and acetylene             |
| CP-CO <sub>x</sub>                       | CO, CO <sub>2</sub> , H <sub>2</sub> , Air (coelution of N <sub>2</sub> and O <sub>2</sub> ), CH <sub>4</sub>  |
| CP-Sil 19CB for THT                      | THT and C <sub>3</sub> -C <sub>6</sub> <sup>+</sup> in natural gas matrix  |
| CP-Sil 13CB for TBM                      | TBM and C <sub>3</sub> -C <sub>6</sub> <sup>+</sup> in natural gas matrix  |
| MES NGA                                  | Unique column specially tested for MES in natural gas (1 ppm)  |

## Stay in control with intelligent GC

Gain the freedom to work the way you want—where you want—while achieving quality data, every time.

- **Inert sample flow path:** We treat key parts with UltiMetal for superior inertness to deliver the best possible detection limits and long-term instrument stability.
- **Intuitive user interface:** Control your instrument through your mobile device, and receive pass/fail results on your phone or tablet. Optional touch screen display lets you easily view instrument status.\*
- **Better support:**
  - Plug-and-play simplicity makes it possible to replace channels in as little as 10 minutes.
  - Reduce your cost of ownership with onsite service repair of the column, injector, and detector.
  - New retention time stability (RTS) design lets anyone replace the filter with minimal training.
- **Improved diagnostics:**
  - Instrument intelligence keeps tabs on system health and alerts you to leaks.
  - Obtain critical information on instrument status, maintenance, and more.

\* Included with the 990 Mobile Micro GC system. Optional with the 990 PRO and 990 Micro GC systems. See next page for more details on these models.



## Benefits of wireless connection

- Easily connect your 990 Micro GC to a phone or tablet.
- Eliminate the need to carry cables or computers to the analyzer.
- Quickly reference instrument status and analysis results.
- Enable start/stop runs.

# Flexibility to Suit Your Applications



Your gas analysis needs are unique to your lab. That's why we offer three 990 Micro GC systems that let you spend time on what matters, where it matters.

*"We need a system that delivers fast, reliable gas analysis—without wasting valuable space."*

- Lab manager at a global gas manufacturing plant



The 990 Micro GC with the channel extension cabinet and optional touch screen provides up to four channels to maximize productivity.

## Agilent 990 Micro GC system Modular and ready to perform

The 990 Micro GC system delivers actionable results in seconds using half the bench space and less than half the power of most traditional GCs. It gives you the flexibility to:

- Accommodate one to four channels.
- Speed up cycle time and protect your columns with backflush configurations.
- Expand your range of samples, and improve sample handling, with optional accessories.
- Analyze components of interest while eliminating those that are not.
- Save time by replacing modular GC channels in as little as 10 minutes.

The basic 990 system, also referred to as the DUAL, holds one or two channels. When three or four channels are required, the instrument is equipped with a Channel Extension Cabinet. This combination is called the QUAD.

Each channel is a miniaturized GC with electronic gas control, injector, narrow-bore column, and detector for sensitive, efficient separations. The channels also feature independently controlled injection volume, oven temperature, and carrier gas—making reconfiguration simple.



On-the-go measurement convenience

*"I have to be able to take my GC system anywhere at a moment's notice."*

- Quality engineer with an environmental lab

### Agilent 990 Mobile Micro GC system

#### Your go-anywhere GC

This portable, self-contained GC system includes a rugged field case with onboard gas cylinders and rechargeable batteries. So you can bring your analyzer to the sample with ease. It lets you:

- Increase productivity with up to 16 hours of battery life for out-of-lab analysis.
- Leave your laptop and cables at the lab. Stay connected with an intuitive user interface, plus optional wireless connection to a tablet or smartphone.
- View simplified results in full or "true/false" mode for instant feedback.
- Store full results on a mass storage device for post-processing in your lab.
- View system status quickly with a user-friendly touch screen.

The 990 Mobile Micro GC is perfect for monitoring perimeters, multiple drilling sites, and natural gas pipelines. Take it with you whenever you need to analyze gas samples away from your lab.

*"Monitoring processes is our number one concern."*

- Chemical engineer at a global on-line process company

### Agilent 990 PRO Micro GC system

#### All-in-one process control

In addition to the standard 990 features, the 990 PRO is designed for an online process environment for onboard data collection, integration, and result generation. This complete system allows you to:

- Control processes by directing automatic user-defined information to an external system.
- Eliminate the need for an external computer by using our onboard setup feature.
- Meet industry standards with confidence through various communication protocols such as Modbus, FTP, 4-20 mA.

What's more, the 990 PRO features complete unattended operation capabilities. That makes it ideal for monitoring online catalytic reactors, odorants (such as THT or DMS) in natural gas, calorific value of natural gas for invoicing, and dissolved gases in mud logging.



# Customized to Get You on the Fast Track



Every Agilent 990 Micro GC delivers unparalleled performance for all applications that demand precise gas analysis. Choose from standard configurations as well as custom analyzers to meet your specific requirements. Each is factory pretested and preconfigured to deliver the mission-critical results you need, while saving you precious startup time.

## Natural gas analyzers (NGAs)

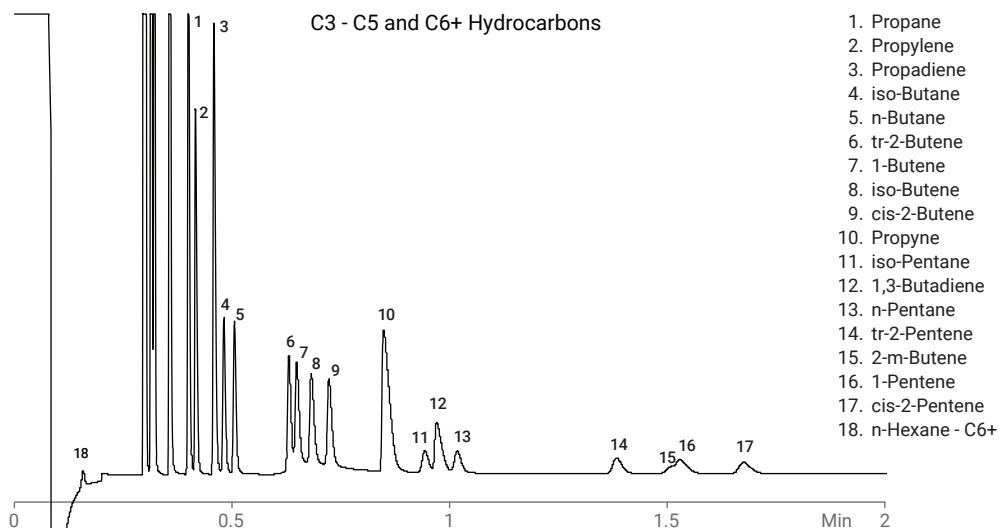
Agilent NGAs are excellent for determining the composition and calorific value of natural gas in BTUs or Joules/mol.

## Biogas analyzers

Count on Agilent 990 Micro GC biogas analyzers for immediate gas analysis. They are factory tuned and include final test data, method parameters, user's manual, and checkout sample.

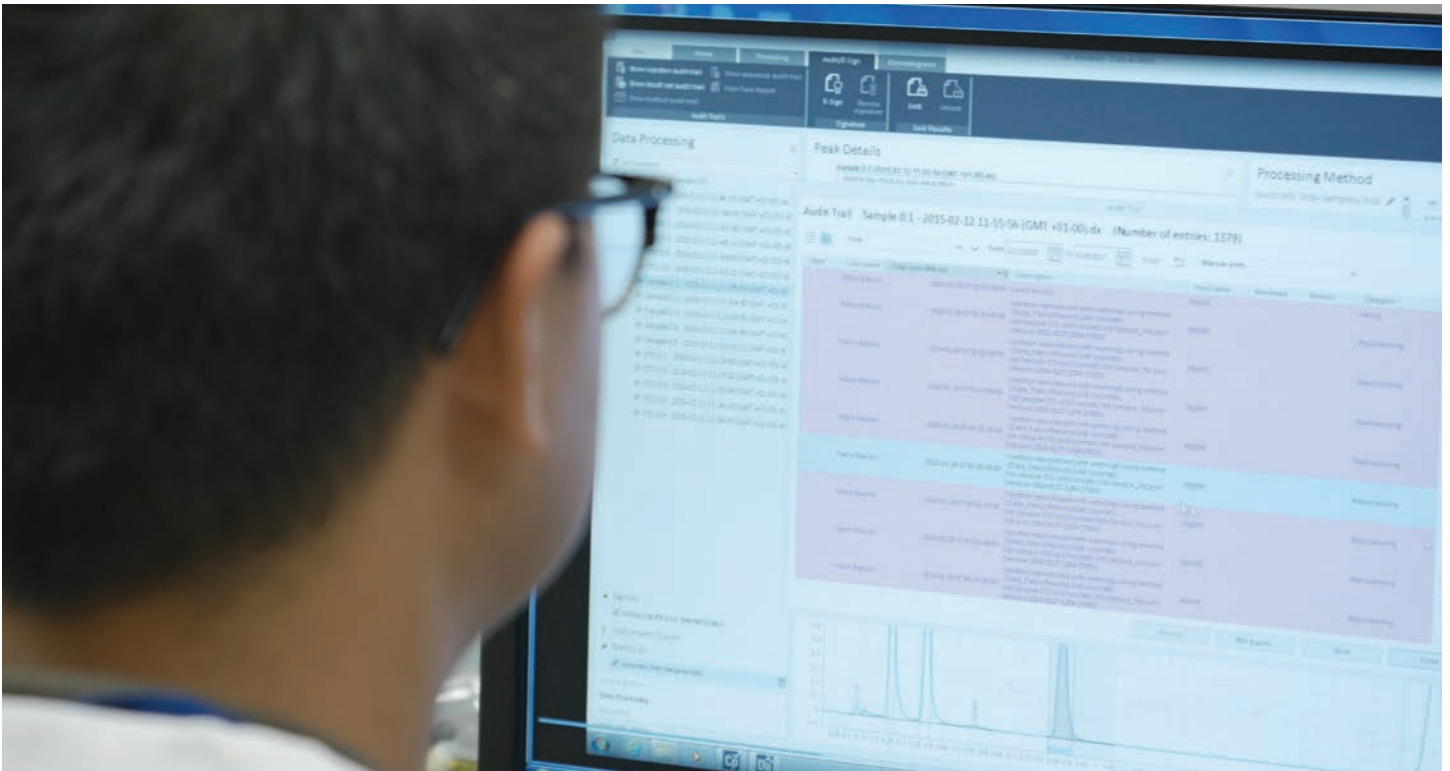
## Refinery gas analyzers

Designed to provide valuable information for monitoring and optimizing catalytic and other processes, the 990 Micro GC refinery gas analyzer (RGA) offers fast results in a portable footprint.



The Agilent 990 Micro GC is able to measure 17 different refinery gases in under two minutes.





## Capture, Analyze, and Share Data



Agilent 990 Micro GC systems work with Agilent OpenLab CDS software for optimal results. OpenLab CDS supports instrument control and digital data acquisition from chromatography systems and hardware manufacturers around the world.

- **Single platform for all instruments:** no need for costly deployment of multiple software packages from different vendors.
- **Scalable and easy to use:** all versions share a common user interface and formats for data and method files.
- **Grows with your lab:** no costly retraining or method revalidation.



Sample preparation accessories

## Reduce Pressure Without Jeopardizing Sample Integrity



### Micro-gasifier

**Expand the range of samples you can analyze**

The Agilent Micro-Gasifier controls liquid petroleum gas (LPG) and liquefied natural gas (LNG) sample evaporations before introduction into the GC injector. High-pressure samples can also be reduced without creating cold spots, preventing sample discrimination.



### Syringe injection

**Improve sample handling flexibility**

Syringe injection lets you inject gas samples via the optional inlet on the front of a 990 Micro GC. You can also introduce the sample through a septum cap, or by using a luer-lock connection. Ideal for labs with small sample amounts or different samples originating from various places.



### Genie membrane filter

**Ensure reliable particle removal**

The Genie membrane filter uses a semipermeable membrane to remove droplets and particles from the sample gas stream. So you can ensure proper injector function for long-term reliable results. It is suitable for ppb up to percentage-level analysis, is fully inert, and is compliant with calorific value determination methods. For dual gas streams, an option with two Genie membrane filters is available. You can also equip the Genie filter with a rotameter for a quick check of the sample flow.



### Stream selection valve

**Increase your analytical flexibility**

Using a dead-end or flow-through automated stream selection valve simplifies and automates sample switching. By eliminating the need to manually monitor and switch valves, the automated valves free you to spend more time on what matters.

Additionally, the consistency of these valves enables you to accurately cross-reference data from multiple sample streams on the same GC. You can also use the stream selection valves to connect a calibration and/or verification gas standard. Both the dead-end and flow-through valves offer 6, 10, 12, or 16 ports.



### Pressure reducers

**Expand your application options**

Beswick pressure reducers are factory tuned to 0.7 bar (10.1 psi), and the needle valve flow is set at 20 mL/min. That means trouble-free compatibility with your Micro GC injector. The Beswick pressure reducer is mounted on a bracket either with or without a Genie filter. Working range of the pressure reducer is between 0.5 bar (7.25 psi) and 200 bar (3000 psi).



### Optional touch screen

**Get the information you need in real time**

This 4.3" wide screen is the perfect choice if you want a quick status overview of your instrument. A start/stop function is also available. What's more, this display is a useful addition to your 990 PRO system. After the 990 PRO has completed the analysis, results can be displayed on the screen until they are refreshed by the next run.

## Agilent CrossLab services. From insight to outcome.

CrossLab is an Agilent capability that integrates services and consumables to support workflow success and important outcomes like improved productivity and operational efficiency. Through CrossLab, Agilent strives to provide insight in every interaction to help you achieve your goals. CrossLab services include method optimization, flexible service plans, and training for all skill levels. We have many other products and services to help you manage your instruments and your lab for best performance.

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