Global Analyser Solutions

CompactGC 4.0

- Powerful gas analysis, minimal footprint
- Fast! Get instant insights
- Performance you can trust
- Flexible today; scalable tomorrow

*Get ready for **tomorrow's analytics***

Find out more on **www.gassite.com**

Powerful gas analysis, minimal footprint

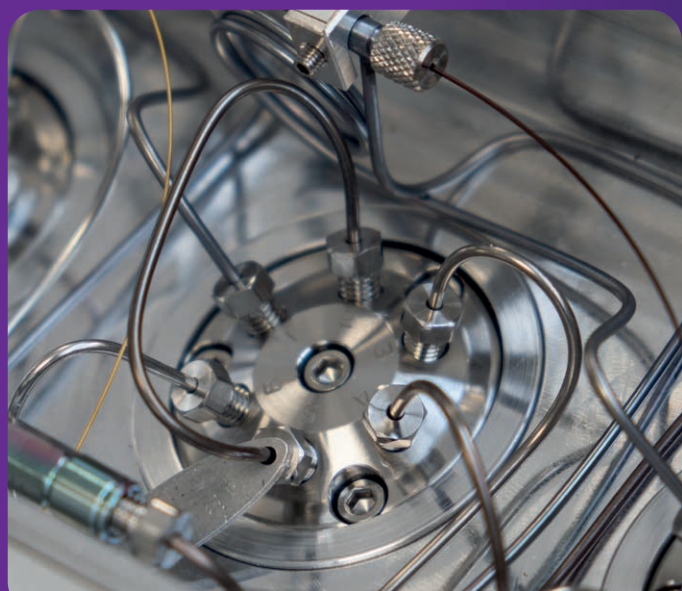
The CompactGC$^{4.0}$ brings high-performance gas analysis to your lab in a sleek, space saving design in the industry standard 19" rack. Offering up to four independent analysis channels and a wide variety of detectors, it delivers outstanding flexibility to meet diverse application needs.

FAST - get instant insights

CompactGC$^{4.0}$ delivers fast and reliable chromatographic results, with typical runtimes ranging from 2 to 120 seconds. This enables precise monitoring of chemical processes and efficient execution of analytical experiments. With run time equal to cycle time, the system is instantly ready for the next analysis - ideal for high-throughput environments where speed and accuracy are critical.

Performance you can trust

CompactGC$^{4.0}$ is designed for uncompromising reliablity - rugged diaphragm valves ensure millions of consistent injections, while maintenance-free detectors deliver stable, long-lasting performance. Maintenance is minimal and cost-effective. All components can be replaced individually, reducing downtime and keeping service expenses low. Integrated backflush options prevent contamination and agressive components are handled with ease.

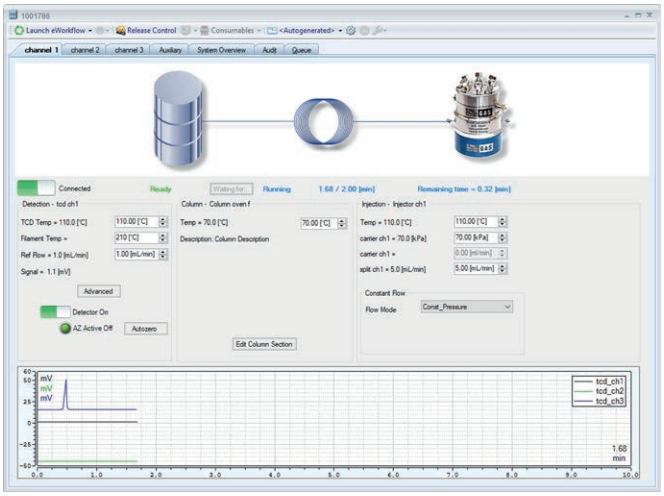


Flexible today; scalable tomorrow

With its modular design, CompactGC$^{4.0}$ can be precisely configured to match your current analytical needs - selecting the right combination of analytical channels, separation columns, and detectors. As your application requirements evolve, the system adapts effortlessly.

Intelligent & easy to use

The CompactGC$^{4.0}$ integrates seamlessly with Chromeleon CDS, offering instrument control, automated workflows, advanced data processing, intuitive visualisation, regulatory compliance, and efficient reporting.



Flexibility at its best

Every device - injector, detector, temperature controller, output bit, etc. - can be fully programmed in CompactGC$^{4.0}$'s runtime timetable, enabling unlimited method control. You can, for example, perform multiple injections on one channel during the runtime of another, modify method settings mid-run, or trigger and control external devices.

Robust | Reliable | High uptime

Can handle water and agressive components

CompactGC$^{4.0}$ provides the robustness of a process-grade instrument by rigid, long-lifetime hardware. Sample injection is performed using durable diaphragm valves, designed to guarantee millions of injections. Advanced column switching techniques, such as backflush and heart-cut effectively protect the analytical column. Robust detectors ensure long-term stability, The durable setup allows analysis of agressive compounds, for example high percentages hydrogen sulfide, ammonia or water.

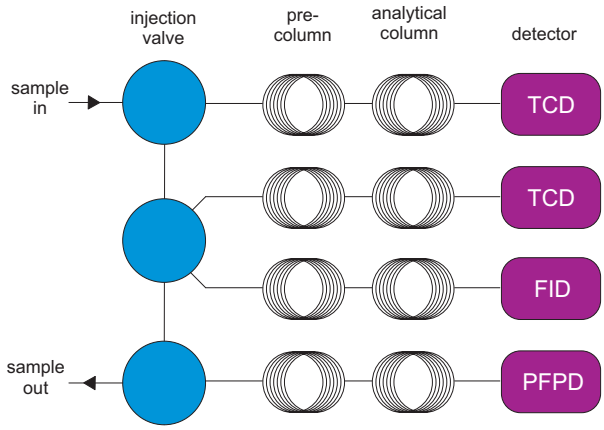
Inert flow path

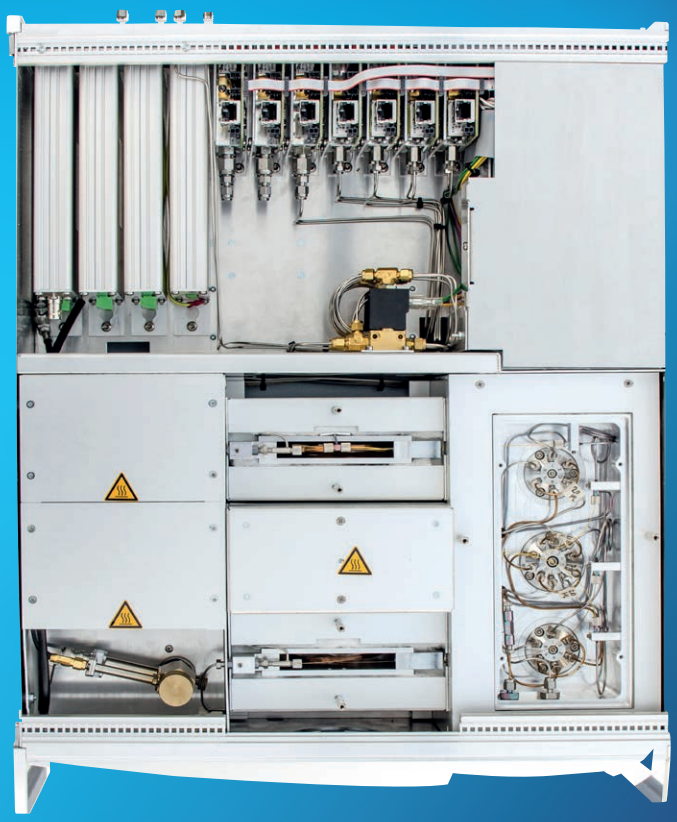
Polar components readily adsorb onto various surfaces, resulting in the loss of components and irregular peak shapes. An inert sample path is essential to preserve sample integrity, particularly when working with low concentrations. This is ensured through the use of high-quality surface passivation techniques, such as Sulfinert®/SilcoNert® and Dursan® coatings.

How many analytical channels do you need?

Gas analysis often requires multiple analytical channels with different separation columns and detectors to accurately detect and quantify a wide range of components. That's why the CompactGC$^{4.0}$ is designed to accommodate 1 to 4 independent channels.

Each channel is a miniaturised GC, equipped with its own sampling loop, separation column(s), and detector, enabling flexible and efficient analysis of complex gas mixtures. The figure next to this shows an example of a CompactGC$^{4.0}$ configuration using 2 TCD's (with different carrier gases) for permanent gases, a FID for hydrocarbons and a PFPD for sulphur components. This is an example; many other combinations are available. Each system is custom-built in-house, offering a highly flexible and tailored approach to gas analysis.





Detectors | Ovens with separation columns | Gas sampling valves

Transparency in every detail

The instrument features a transparent design with a logical injector-column-detector arrangement for the analytical channels. This layout provides a clear overview that makes operation more intuitive and maintenance simpler.

Low cost of ownership

Cost-efficient over time

With standard, user-replaceable columns, the CompactGC 4.0 simplifies upkeep and reduces long-term operating costs. This design minimises ownership costs by allowing quick, low-cost exchange instead of full channel replacements. Columns can be changed in minutes using finger-tight couplings for tool-free, leak-tight installation (see picture below). Both capillary columns (for fast analyses in 3–120 s) and packed columns are supported.

Another key cost-saving and high-quality feature is the use of rigid diaphragm valves, designed for prolonged operation with minimal servicing. The rigid detectors utilise proven technology that ensures stable, long-term performance without the need for maintenance. Rotary valves are available on request.

High flexibility

User-replaceable columns offer flexibility, making it easy to adapt to changing application requirements. They allow efficient method changes with minimal downtime and cost, so the instrument can be quickly prepared for other experiments.

Isothermal and temperature programmed

An isothermal column oven enables rapid gas analysis by avoiding cooldown times, delivering the shortest cycle time for components within a limited boiling point range. For more complex mixtures, two options are available:

- parallel channels with different volatily ranges, maintaing the shortest possible runtime, or
- temperature-programmed analysis with heating rates up to 500 °C via direct resistive heating along the analytical column.

Smart detection starts here

Don't limit your gas analysis to a single detector. CompactGC$^{4.0}$ offers a wide range of highly sensitive and selective detection options.

TCD

Thermal Conductivity Detector

A common choice for gas analysis, capable of accurately measuring many components from low ppm to high percentage levels.

FID

Flame Ionisation Detector

Ideal for compounds containing carbon-hydrogen (C–H) bonds. Significantly higher sensitivity (high ppb range) than the TCD, excellent linearity (up to 10^7), and robust, stable performance. Well suited for the detection of hydrocarbons in environmental, petrochemical and food applications.

PDD

Pulsed Discharge Detector (PDHID)

Designed for ultra-trace analysis, the PDD detects permanent gases well below the TCD's limit of detection. The detector of choice for measuring impurities at low ppb levels across a wide range of matrices, and widely used in bulk gas purity analysis

PFPD

Pulsed Flame Photometric Detector

Offering selective detection of sulphur compounds in the low ppb range, the PFPD is commonly applied in the (petro)chemical, energy, environmental and food sectors.

ePD

Plasma Emission Detector

Capable of detecting permanent gases and other volatile species at low ppb levels, the ePD allows selection of up to four different wavelengths for specific detection of target compounds. In addition to helium, argon can also be used as the carrier gas, making the detector suitable for monitoring impurities in bulk argon.

PID

Photo Ionisation Detector

PID detects VOC's and some inorganic gases at low concentrations, useful for environmental monitoring, industrial hygiene, and hazardous material detection. It is sensitive to double bonds or aromatic rings, enabling detection of unsaturated hydrocarbons and aromatic VOCs.

LUMA

VUV-LUMA

LUMA is a UV detector capable of detecting a wide range of components in the mid-ppb range. Using 12 discrete wavelength bands, it enables both universal detection and selective measurement.

MS

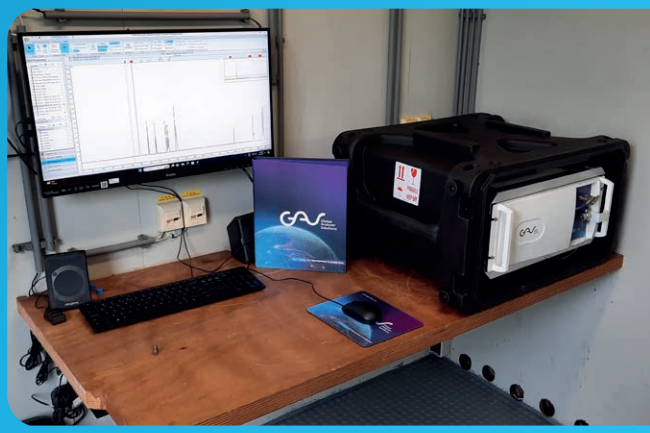
Mass Spectrometer (MS)

The CompactGC$^{4.0}$ can be coupled with an external mass spectrometer for ultra-sensitive detection below 1 ppb, and positive identification of components, expanding its analytical capabilities even further.

Space saving
Easy to transport
Measure on location

The 19″ form factor makes the CompactGC$^{4.0}$ suitable for use in a wide range of locations:

- Laboratory use: Its small footprint allows for space-saving installation, whether in a rack or in a vertical setup.
- Process/reactor monitoring: CompactGC$^{4.0}$ can be easily integrated into an existing rack alongside other instruments.
- Portable applications: Suitable for transport in a vehicle or Peli case, enabling easy relocation or on-site measurements.



On-site measurement & remote monitoring

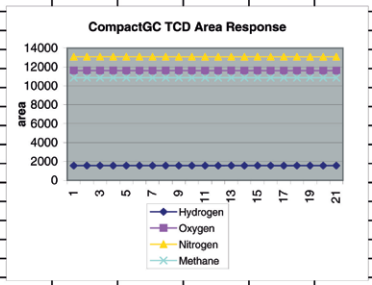
CompactGC$^{4.0}$ delivers fully automated, unattended on-site measurements. From instrument control and sampling to data acquisition, reporting, and queries, every function is seamlessly managed remotely - saving time and maximising efficiency.

Photo: mobile testing unit with CompactGC$^{4.0}$
(photo consent: DNV The Netherlands B.V.)

Stable & accurate & repeatable data

The CompactGC$^{4.0}$ features high-performance injectors, advanced detectors, and precision-engineered electronics, ensuring precise control of the chromatographic process and delivering exceptional stability, accuracy, and repeatability.

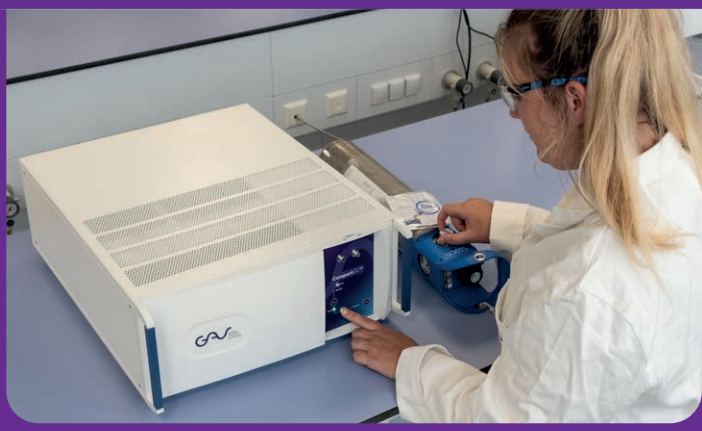
H_2	O_2	N_2	CH_4						
562	11623	13082	10866						
565	11625	13085	10874						
566	11629	13090	10863						
562	11622	13087	10867						
562	11621	13086	10871						
565	11620	13086	10874						
562	11620	13082	10868						
562	11623	13084	10869						
562	11623	13077	10870						
562	11619	13084	10872						
562	11617	13080	10866						
560	11617	13080	10868						
565	11627	13085	10871						
563	11617	13078	10871						
566	11623	13088	10867						
562	11616	13082	10866						
559	11617	13083	10871						
561	11615	13085	10872		H_2	O_2	N_2	CH_4	
564	11620	13076	10869		1.87	3.70	3.67	2.98	STDEV
564	11619	13079	10867		1563	11621	13083	10869	AVERAGE
562	11618	13082	10865	n=20	0.12	0.03	0.03	0.03	%RSD



Twenty consecutive analytical runs of permanent gases using Molsieve column and TCD demonstrate excellent repeatability, with very low relative standard deviation.

Options

Multiple features extend the applicability of CompactGC$^{4.0}$

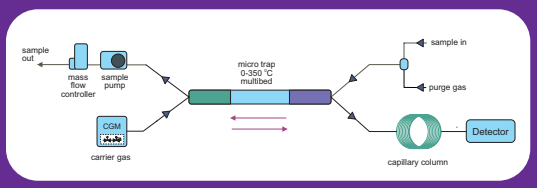


Thermal desorption

When sub ppb level sensitivity is required

The CompactGC$^{4.0}$ offers sensitive analysis from ppb to percent levels using various detectors. For even higher sensitivity, a pre-concentration module focuses large sample volumes (25 ml to 1 litre) onto an electrically cooled trap.

Rapid trap heating (100 °C/s) enables fast injection of target components. Multi-segment adsorbent traps allow ppt-level detection across a broad boiling range.



Small sample volume

Only 1 ml sample is sufficient

Experiments often rely on small-volume reactors with limited sample availability. The CompactGC$^{4.0}$'s vacuum sampling option evacuates loops and lines to 4 mbar before taking the sample, then restores the sample loop to atmospheric pressure. This process enables accurate quantification from only a few millilitres of sample and also makes it possible to sample directly from low-pressure points.

Pressure correction

Automatic sample pressure correction

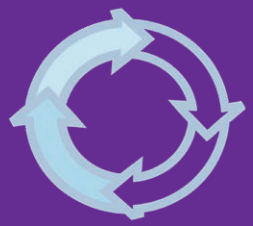
The pressure in the sample loop directly determines the injected amount, and therefore the accuracy of quantification. Correction is essential to ensure reliable results when barometric pressure shifts or sample pressures vary. The CompactGC$^{4.0}$ provides two solutions:

- Hardware control - valves and (back-pressure) regulators maintain a stable loop pressure, independent of ambient changes.
- Software correction - loop pressure is measured and automatically adjusted using a post-run correction factor.

24/7

Roundabout tool for infinite acquistion and simplicity

Roundabout software tool for Chromeleon CDS provides infinite data acquisition and reporting, ideal when 24/7 monitoring is required. It also offers easy continuous display of the last measured data.



Options

Various features increase the flexibility of CompactGC$^{4.0}$

Modbus 4-20mA

Modbus and 4-20mA data output

CompactGC$^{4.0}$ supports Modbus and other industrial field bus protocols (e.g. Profibus) to seamlessly communicate results from the GC - via Chromeleon CDS - directly in Modbus format. This enables PLCs, PCs, or other receiving devices to understand and process the data without additional conversion steps. Data transfer using 4-20mA analog output is also available.

Sample stream selection

Sample stream selection

Sample stream selection is available when multiple samples need to be analysed - for example during automated overnight analysis of sample cylinders or for monitoring the inlet and outlet streams of a reactor. The sequence can be flexibly programmed using a chromatography data system (CDS), such as Chromeleon.

Sample integrity

Sample inlet options

Proper sample treatment and injection are essential for accurate quantitative analysis. Available options include heated interfaces, pressure control, and filters. Our workshop can tailor the setup to meet specific requirements. For polar components, passivating the sample path with treatments such as Sulfinert is crucial to prevent adsorption and ensure reliable results. GAS also offers a vaporiser for handling liquefied gas samples.

Custom IT solutions

GAS IT specialists are ready

In addition to providing extra calculations such as calorific value, GAS IT specialists can develop fully customised calculations tailored to your needs. They also enable seamless integration with process control systems. Data from external devices, including sensors, can be imported and combined with GC data for comprehensive reporting.

Market segments

The CompactGC$^{4.0}$ is a versatile instrument designed for a broad range of applications. It supports many different components, a wide concentration range, and multiple detector options, offering excellent flexibility. With options for sampling point interfacing and strong reporting and communication features, it is easy to use and adaptable. From academic research to industrial processes, the CompactGC$^{4.0}$ serves diverse needs. The following sections explore its use across key market segments.

Energy

Reliable testing is vital for producing gas from fossil and renewable sources. With large volumes at stake, accurate calorific value measurement is essential. For renewable gases such as hydrogen, high purity ensures safe handling and processing. The compact 19" design integrates easily into existing systems. Alongside TCD and FID for permanent gases and hydrocarbons, CompactGC$^{4.0}$ offers highly sensitive, selective detection of sulphur compounds, even at low ppb levels, using Pulsed Flame Photometric Detector (PFPD).

Petrochemical

The CompactGC$^{4.0}$ is an excellent solution for petrochemical applications, offering reliable and efficient analysis across a wide range of components. It can be equipped with dedicated applications for refinery gas, permanent gases, hydrocarbons, low sulphur compounds, and high-purity streams. This versatility makes it a powerful tool for both process control and quality assurance in demanding petrochemical environments.

Chemical / Food

The CompactGC$^{4.0}$ is ideal for the chemical and food industries, providing reliable gas analysis for quality control and safety. It ensures high-purity gas supplies, detects permanent gases, and monitors low sulphur levels critical to both sectors. In food production, it tracks fermentation gases, while in the chemical industry it monitors chlorine impurities and refrigerants, as well as ammonia for fertiliser and chemical processes. Its compact size and robust design make it perfect for industrial environments.

Environmental

Analysers are vital in the environmental field, providing accurate, continuous monitoring for sustainability and compliance. CompactGC$^{4.0}$ provides:
- VOC analysers for detecting volatile organic compounds that drive air pollution and pose health risks, especially in industrial and urban areas.
- Biogas analysers that track gas composition in renewable energy production from organic waste, improving efficiency and lowering emissions.
- CCUS (Carbon Capture, Utilisation, and Storage) gas analysis for measuring impurities in captured CO_2, ensuring safe storage and effective use.

Together, these analysers enable cleaner processes and a more sustainable environment.

Catalysis

CompactGC$^{4.0}$ delivers results in only seconds to a few minutes, allowing quick monitoring of reaction gases. Often limited space is available, and high robustness is essential because experiments may run 24/7 continuously. A flexible configuration is appreciated as well because the list of components to be separated may change over time and easy method adjustment is needed. The GAS CompactGC$^{4.0}$ is a proven and widely appreciated solution for these requirements.

Testimonials

The CompactGC$^{4.0}$ is a versatile solution used across many markets. Its flexibility, reliability, and ease of use make it a trusted tool for professionals worldwide. Discover real user experiences and success stories below.

Shell Global Solutions International B.V. Amsterdam, The Netherlands, Dennis Roelofszen - Sr. Associate Researcher Experimentation
"Since the introduction of The GAS CompactGC in the early 2000's our research group is using the micro-GC to collect our experimental data. It has proven its reliability and robustness all those years in supporting our processes with high quality data. The design of the GAS CompactGC is very slim and still with numerous of options in the configuration to get the best possible application for your process. Together with the very good support and the low maintenance on the equipment we are still using the GAS CompactGC's in our research programs".

Messer Belgium nv/sa, Philip Dhooghe - Labo & Specialty Gases Manager
"At Messer, a leading gas supplier, we perform on a daily basis analyses of permanent gases and hydrocarbons across numerous of specificly produced customer blends. Previously, each analytical run could require up to half an hour to complete. However, with the implementation of the CompactGC$^{4.0}$ - which employs both TCD for permanent gases and FID for hydrocarbons - we have reduced analysis time to just a few minutes, resulting in a significant increase in operational efficiency. Additionally, we utilise other GC instruments from GAS/Interscience and appreciate their consistent reliability and professional support".

DNV Netherlands B.V., Angelo Fornerino - Specialist Gas Testing & Analysis
"We have been working with the CompactGC$^{4.0}$ from GAS for years and are impressed with its performance. Thanks to the PFPD detector configuration, it analyses sulphur components at ppb level in addition to the main components, meaning we need fewer instruments overall. The Chromeleon software makes it easy to adjust methods during the run, applying changes across the entire analysis sequence – a great advantage in our workflow. The instrument itself is robust and reliable. We have it mounted in a trailer that is moved frequently, yet it continues to run flawlessly. It delivers highly stable and consistent results, and has proven itself to be very dependable. We are very satisfied".

United Kingdom National Nuclear Laboratory, Robin Orr - Technology Manager, Radiochemistry: Plutonium and Radioisotopes Team
"GAS provided a turnkey solution for the UK National Nuclear Laboratory based on the CompactGC with a vacuum sampling technique for small, low pressure gas samples. This system was operated for 10 years supporting an application that required highly robust and reliable operation and fast analysis. The original system has recently been upgraded with the latest CompactGC$^{4.0}$ model".

TNO Biobased and Circular Technology, A.A. Toonen - TT Mr Researcher
"The CompactGC is a quick, accurate workhorse in our laboratory. This GC has our special preference because of its injection technique, which is based on volume rather than timed injection, resulting in significantly more accurate results when the bulk gas composition changes over time. The Chromeleon software makes it more user-friendly and provides good reporting possibilities".

LNE- Laboratoire national de métrologie et d'essais, Paris, France, Christophe Sutour - Technical Manager
"The technical choices made (valves, surface treatment ...) in the CGC's design ensure a high level of reliability and robustness. The rapid, repeatable and linear measurements allow a significant reduction in their uncertainty. These qualities make this equipment an obvious choice for a metrology laboratory such as the LNE".

Reacnostics GmbH Germany, Michael Schmidt - CEO
"The CompactGC$^{4.0}$ has proven to be a highly reliable instrument for our rapid screening experiments. Its fast and consistent performance has exceeded expectations and continues to be invaluable to our work. With easy access to the valve oven, column oven, and detectors, method adjustments for new applications can be made effortlessly by installing an alternative separation column - at minimal cost".

Specifications - 1

Analytical channels	1-4
Sample injection	GSV (Gas Sampling Valve)
Valve oven	independently heated, 40-150 °C standard up to 3 valves, extendable up to 5 valves valves used for sample introduction or column switching diaphragm valves with internal purge or rotary valves
Column oven	independently heated up to 3 isothermal: 40-250 °C programmable: 40-350 °C, maximum heating rate: 500 °C/min

Detectors

	Detector	MDA (v/v)[1]
TCD	Thermal Conductivity Detector	3-10 ppm
FID	Flame Ionisation Detector	30-100 ppb
PDD / PDHID	Pulsed Discharge Detector	10-25 ppb
PFPD	Pulsed Flame Photometric Detector	25-50 ppb
PED	Plasma Emission Detector	1-10 ppb
PID	Photo Ionisation Detector	10 ppb
MS	Mass Spectrometer	1-10 ppb
VUV LUMA	Vacuum UV detector	10-100 ppb

[1] MDA dependant on conditions and components

Columns	capillary: 0,32/0,25 /0,15mm ID wide bore MXT: 0.53mm ID micropacked: 1/16" OD packed: 1/8" OD
Heated zones	up to 10
Electronic Gas Control	up to 7 modules; up to 14 channels max inlet pressure: 1000kPa max outlet pressure: 350 or 700 kPa max splitflow: 100 ml/min carrier gas: He, N_2, Ar; H_2 with safety sensor gas inlet connectors (rear panel): 1/8" Swagelok, other on request
Power	100-240V AC, 47-63 Hz, 12A max
Dimensions	19" standard enclosure, 4HE 45 x 18 x 55 cm (w*h*d) weight: 22 kg (2 channel instrument)

Specifications - 2

Data communication	LAN
External events	8 (expandable to 12), 24VDC
Digital inputs	3 (remote start, stop, prep-run)
Digital outputs	4 (SSR); 24VDC available
Data systems	Chromeleon, OpenLab
Thermal Desorption Option	Peltier cooled trap low temperature: -5 °C (depending on ambient temperature) high temperature: 350 °C heating rate: 100 °C/sec inert glass trap suitable for multibed adsorbents various adsorbents are available Mass Flow Controller for precise sample loading
Sampling	max. 21 bar (depending on used valve) inlet connection (to GSV) : max. 150 °C inlet connector size: 1/8" Swagelok, other on request injection volume: 0.06 ul to 5ml (gas sampling loop) vacuum sampling option for low pressure/small available volume (only 1-2 ml sample required)
Options	Sulfinert®/SilcoNert® and Dursan® coating of the sample path calorific value calculation pack[2] Roundabout (continuous acquisition, reporting and display)[2] Modbus communication[2] 4-20mA analog output[2] sample stop-flow valve inlet (back)pressure regulator stream selector valve heated interface sampling from low pressure or low volume vaporiser inlet filter automatic sample pressure correction[2] various custom calculations[2]

[2] requires Chromeleon CDS

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