



# Instruments

Laboratory products and services



**OMD detector**  
**MicroGCI gas analyzer**  
**GCI-2019 training chromatograph**



European Union  
European Regional  
Development Fund



# 1

## GCI-2019 training chromatograph

The training gas chromatograph developed by GC Instruments was created mainly for users getting acquainted with the gas chromatography technique.

It is a ready-to-implement product that should be on the equipment of every teaching laboratory. The friendly interface of the dedicated software allows for easy operation, and the aesthetically made modular construction of the device fits into the latest trends in the design of laboratory devices.

The whole device is enclosed in a stainless-steel casing, which more than a timeless appearance guarantees the resistance of the device to mechanical damage as well as to those of a chemical origin.



Fig. 1. GCI 2019



Fig. 2. GCI 2019

The device consists of three modules: injector, oven with column and detector.

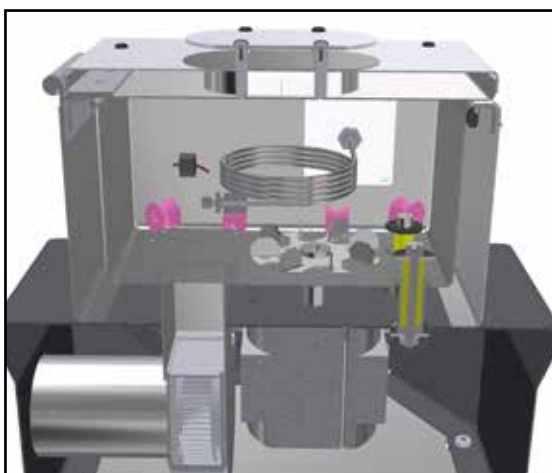


Fig. 3. GCI 2019

The device uses an on-column type injector, which is a standard solution applied in gas analysis, allowing the whole sample to be dosed directly onto the column, which is its undoubted advantage. In addition, thanks to the simple design it is practically trouble-free solution - which is especially important when unexperienced users operate the device. The only replaceable element of the device is septa (membrane).

The oven module with a column is equipped with an air circulation system standard in this type of equipment. The undoubted advantage of this module are its compact dimensions, which, apart from greater mobility of the device, enabling more efficient transport, e.g. to the place of sampling for analysis, also gives the opportunity to place more devices on a usually limited laboratory space. The oven is also equipped with the option of fast cooling, thanks to which the time of analysis was significantly reduced.



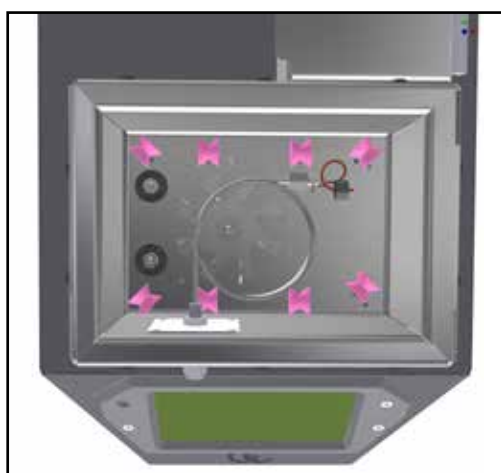


Fig.4. GCI 2019

The last module of the device is a thermostated detector. In this case, it was decided to use a thermoconductometric detector (TCD) due to its universality, resulting from its ability to detect all gases, as well as due to its structural simplicity. The thermoconductometric detector is a two-channel detector - consisting of a measuring channel and a reference channel. The reference channel is powered by prior the injector gas. The whole device uses a pneumatic system based on a pressure regulator. The carrier gas leaving the regulator goes to the detector reference channel, then goes to the injector, to finally return to the detector measuring channel- through the column- as the eluate. This solution distinguishes it from the most commonly used ones, where the carrier gas is lost after passing the column. The use of such a solution enabled significant carrier gas savings to be achieved - for one analysis, about 50% of consumption compared to conventional applications.

In terms of operation, the device is equipped with user-friendly intuitive software, created specifically for the need to operate the proposed solution.

**The GCI-2019 training chromatograph can be operated via three integrated interfaces:**

- A convenient 7" touch display
- Through a web browser as well as with help of
- A dedicated graphic application prepared for Windows, Mac and Linux.

In addition, the device has a built-in support for Ethernet and Wi-Fi networks, which allows remote control of the sample analysis process.



Fig.5. GCI 2019

The user interface allows flexible creation of the heating curve during the course of the test and enables smooth



control of the detector signal amplification.



Fig.5. GCI 2019

The generated data can be conveniently exported to external software that allows the analysis of collected data.

Unlike specialized devices available on the market, the training chromatograph allows you to clearly present the process and facilitate the understanding of training participants. The use of a training gas chromatograph eliminates the problems caused by specialized devices of this type, in which the complicated construction may hinder the proper reception of the conducted process.

In combination with its attractive low price, the proposed training chromatograph is a “must have” in every analytical laboratory with a teaching offer.



# 2

## OMD detector

In addition to the production of chromatographs/microGC analyzers, GC Instruments has developed a new type of oxidation/methanization detector (OMD) (or rather a pre-detector).



Fig.1. OMD detector

The general operating principle of the detector consists in the first stage of catalytic oxidation of all organic compounds eluting from the column to carbon monoxide (IV), and then in the next stage of their reduction to methane in the presence of a metal catalyst. Both catalytic processes require elevated temperatures (above 150°C). The final stage is the determination of the methane formed using a flame ionization detector (FID). This type of new detector is characterized by a constant response factor for all analyzed compounds. Calibration is performed only for one compound (e.g. methane). Thus, no multi-point calibration curves are required, which significantly reduces analysis time. The device allows the expansion of any gas chromatograph with an FID detector, regardless of its manufacturer.

This detector is used when analyzing compounds containing heteroatoms in a molecule for which the response rate of the detector is different for each compound. The use of an oxidation/methanization detector (OMD) allows the determination of the response factor of the FID detector based on the summary formula (carbon content).

This detector works on the principle of "post-column derivatization". The eluate containing the organic analyte when leaving the chromatographic column goes with the air to an oxidizing catalytic bed, where it is burned to carbon dioxide, water and possibly other products. The resulting mixture is mixed with hydrogen and goes to the second bed - methanizing. The carbon dioxide resulting from the combustion of the sample undergoes methanation and then goes to the flame ionization detector (FID).

Thanks to this solution, the FID detector signal is in each case proportional to the amount of methane formed, which is proportional to the carbon content of the analyte. Briefly, the FID detector response factor is proportional to the carbon content of the analyte molecule.

The detector has been designed to cause minimal peak blur and is compatible with any gas chromatograph.

The possibility of condensation of analytes has been minimized by placing the detector in the oven of the chromatograph.



# 3

## MicroGCI gas analyzer

The MicroGCI-2019 industrial micro GC-type gas chromatograph- for industrial applications.

The laboratory needs are not the same as those of the industry. Therefore, another option proposed by GC Instruments is the possibility of modifying the training gas chromatograph to the industrial version - a micro GC device dedicated for industrial applications in order to adapt to the specific needs of a control room or production plant.



Fig.1. Micro GC



Fig. 2. Micro GC

This version of the chromatograph differs from the training version mainly due to the casing, adapted to a rack-mountable microGC analyzer, although it is also possible to make the free-standing (desk-top) version. The design of the device is a closed structure, without the possibility of easy interference inside the unit. The MicroGCI-2019 analyzer is a solid

The device consists of three modules: injector, oven with column and detector.

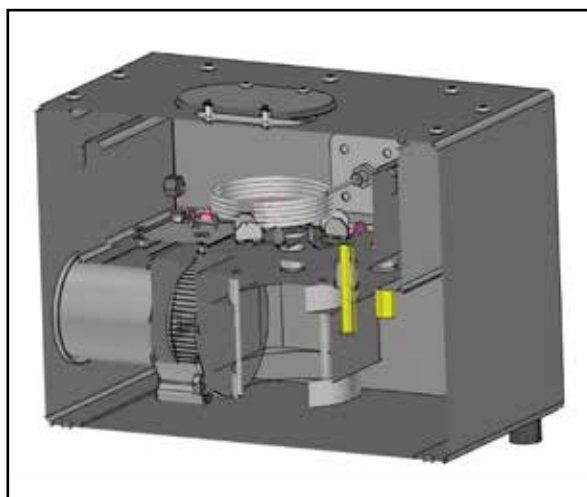


Fig.3. Micro GC

Unlike the training chromatograph, however, the industrial version is equipped with a different (than on-column) dosing system. The sample is delivered to the column through a six-way valve, with an independent electric drive, a dosing loop and pressure equalizing solenoid valves. Thanks to this solution it is possible to collect a sample directly from an industrial installation (from a pipeline, tank, etc.) in a cyclical (on-line measurement) and maintenance-free (automated) manner.



The oven module with the column, as in the case of the training gas chromatograph, is equipped with an air circulation system. It is also characterized by a compact design, ensuring the mobility of the device. The oven also has the option of fast cooling, thanks to which it was possible to shorten the time of analysis.

The last module of the device is a thermostated thermoconductometric detector - TCD applied prior of its universality enabling the detection of all gases, as well as because of the simplicity of design. It is also a two-channel detector that allows savings in the amount of carrier gas consumed (about 50%).

**The MicroGCI-2019 industrial chromatograph can be operated via three integrated interfaces:**

- Convenient 7" touch display
- Through a web browser and via
- A dedicated graphic application prepared for Windows, Mac and Linux.

Moreover, the device is equipped with a built-in support for Ethernet and Wi-Fi networks, which allows remote control of the sample analysis process. The user interface allows flexible creation of the heating curve during the course of the test and enables smooth control of the detector signal amplification. Finally, generated data can be also exported to external software, simplifying the analysis of collected data.

**Moreover, the MicroGCI device can be configured at the production stage for the analysis of specific components. Proposed sample configurations are the following:**

- Hydrogen purity analyzer;
- CO, CO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub> analyzer;
- Oxygen analyzer;
- Analyzer of C1-C5 hydrocarbons.

Thanks to attractive, modern design, ease of use, affordable price and technical support these devices have a chance to become a bestseller!





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