

## MAG Process Gas Chromatograph



**MAG** is a modern process gas chromatograph, developed by **BACS LLC** to simplify and improve the process measurement.

MAG GC is intended for on-line measurement and process control in oil and gas, refinery, coal, petrochemical, chemical, air separation and other industries.

### Our priorities

- Performance
- Reliability
- Flexibility
- Convenience
- Cost-efficiency

### Support & Service:

BACS provides various ways of warranty and support programs including factory & end-user side training, phone & web assistance and customizable solutions for wide range of applications.

For more information on any of our products or services please visit us at: [www.bacs.ru](http://www.bacs.ru)

### Key benefits

#### Superior Performance

- ✓ Three types of detectors: **TCD**, **CCD** and **ECD** (for sulfur)
- ✓ Analyzed media: gas, liquefied gas or liquid
- ✓ High measurement accuracy and fast analysis
- ✓ Built-in sample stream selector for up to 6 analyzed lines
- ✓ Compliance with international standards

#### Flexile Design

- ✓ Compact design with Ex d explosion-proof enclosure
- ✓ Flexible modular configuration with up to 4 analytical channels
- ✓ Integrated power supply unit 220V
- ✓ Optional injector-vaporizer for liquid samples
- ✓ Optional heated gas inlets for lossless heavy samples injection

#### Improved Usability

- ✓ 12" LCD touch screen with user-friendly interface
- ✓ Automatic operation due to built-in PC with nonvolatile memory
- ✓ Flexible PC software for remote access, settings and data acquisition
- ✓ Wide variety of the data transmitting opportunities
- ✓ External pressure sensors for carrier and test gas cylinders

#### Cost-efficiency

- ✓ Low power and gas consumption
- ✓ No instrument air or other auxiliary gases required
- ✓ Easy maintenance with low service cost

## CONFIGURATION FEATURES

### Modular configuration

MAG GC contains up to **4** independently heated **analytical channels**. Each channel consists of 1 detector, 1 sampling/switching diaphragm valve with backflush option and column system suitable for the particular application.

Flexible modular construction allows choosing proper configuration for wide variety of applications.



Analytical GC channel



Micro-volume TCD

### Detector types

- ✓ **Micro-volume thermal-conductivity detector (TCD)**  
Allows to use packed, micro-packed or capillary columns. Provides fast response and low detection limits.
- ✓ **High-sensitive catalytic combustion detector (CCD)**  
Provides accurate measurement of low concentrations of combustible compounds including hydrogen, hydrocarbons etc.
- ✓ **Selective electrochemical detector (ECD)**  
Allows to analyze low concentrations of sulfur-containing compounds using only air as a carrier gas. Provides great linearity in wide measurement range and low cross-sensitivity.

### Liquid sample injection system

Optional external **heated sampling valve** or **injector-vaporizer** provide direct introduction of vaporized liquid sample into analytical column without any losses of analyzed compounds. Maximum temperature of the injector is 185°C.



Injector-vaporizer



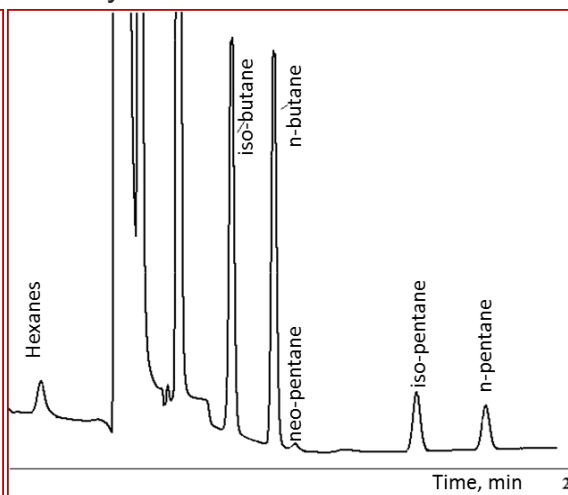
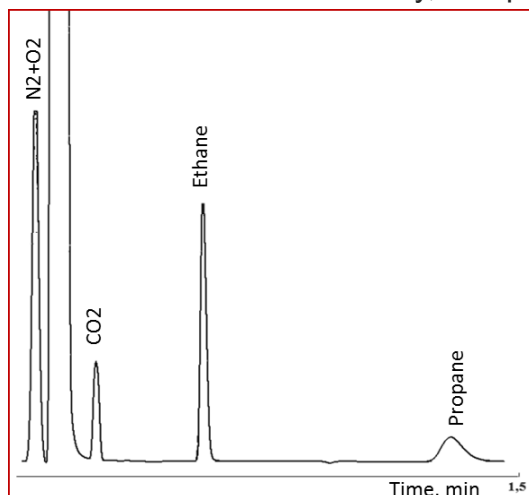
Heated cabinet for MAG GC with cylinder's cabinet

### Heated cabinet embodiment

MAG GC can be placed into a heated cabinet instead of using instrument's shelter which is more cost-efficient solution. The cabinet includes everything that is needed for GC: sample conditioning system, calibration gas cylinder, cylinders with carrier gas, controlled heating and lighting systems.

## EXAMPLES OF APPLICATION

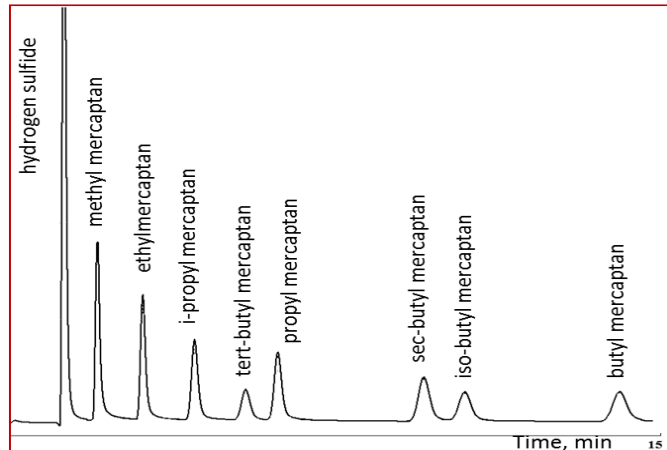
**Analysis of natural gas composition** according to **ISO 6974** with calculation of calorific values, relative and absolute density, compressibility factor and Wobbe index in accordance with **ISO 6976**.



### Configuration and parameters

- ✓ Two analytical channels with  $\mu$ -TCD;
- ✓ C6+ backflush precolumn;
- ✓ Total analysis time – up to 5 min;
- ✓ Carrier gas (He) consumption – up to 12 ml/min (one 40 L cylinder per year).

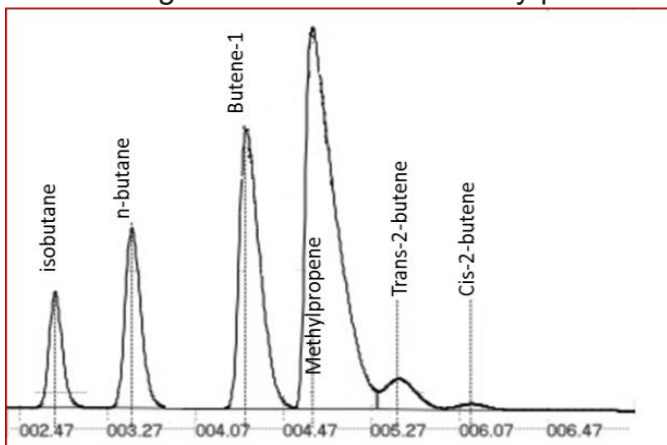
**Determination of sulfur-containing compounds** in natural gas including  $H_2S$  and mercaptans and following calculation of total and sour sulfur according to **ASTM D 7493, ISO 19739**.



### Configuration and parameters

- ✓ Analytical module with capillary column and high-sensitive electrochemical detector;
- ✓ No interference with hydrocarbons;
- ✓ Compressed air as a carrier gas;
- ✓ No auxiliary gases required;
- ✓ Detection limit – from 0,01 ppm;
- ✓ Analysis time – up to 15 min.

**Quality control of light hydrocarbons**, trade and technological NGL, LPG, olefins, pentane-hexane fraction, control of isomerization, quality control of incoming raw materials and final products at gas treatment and refinery plants.



### Configuration and parameters

- ✓ One or two analytical channels with  $\mu$ -TCD, depending on components list;
- ✓ Liquid sample injection system with an external heated pneumatic-actuated sampling valve;
- ✓ Vaporization and injection without losses of analyzed sample;
- ✓ Max. sample pressure: 70 bar;
- ✓ Max. valve temperature: 185°C.

## SPECIFICATION

### Technical characteristics

<b>Number of analytical channels</b>	Up to 4 (1 channel consists of 1 detector, 1 sampling valve with backflush option and column system)		
<b>Oven type and temperature</b>	Airless, isothermal, from 60 to 150°C		
<b>Chromatographic columns</b>	Capillary, micropacked, packed		
<b>Number of analyzed streams</b>	up to 6 analyzed streams (including calibration mixture)		
<b>Analyzed media</b>	Gas, liquified gas or liquid		
<b>Carrier gas</b>	He, Ar, N <sub>2</sub> , H <sub>2</sub> (for TCD) or air (for ECD and CCD)		
<b>Carrier gas consumption</b>	5 - 30 cm <sup>3</sup> /min (depending on application)		
<b>Operation mode</b>	Automatic, controlled by internal PC with integrated software		
<b>Display and data input</b>	12" LCD with touch screen (option)		
<b>Communication interfaces</b>	<b>Standard</b>	RS 232/485 (ModbusRTU) – 2 pcs., Ethernet (ModbusTCP) – 1 pc., Discrete inputs (NAMUR) – 4 pcs. (optionally extendable)	
	<b>Optional</b>	RS 232/485 – extra 1 pc., 4-20 mA – up to 16 pcs., Discrete outputs, optical Ethernet, GSM/GPRS	
<b>Power supply</b>	110-220 V, (50±1) Hz		
<b>Power consumption</b>	up to 180 W (warm-up); up to 80 W (steady mode)		
<b>Explosion protection, IP rating</b>	1Ex d IIB T4Gb or 1Ex d IIB+H2 T4 Gb, IP65		
<b>Ambient temperature range</b>	From -10 to +50°C		
<b>Weight, kg</b>	No more than 40 or 58 (depending on version)		
<b>Dimensions (L×W×H), mm</b>	400×300×481 or 436×318×607 (depending on version)		

### Performance capabilities

<b>Detector</b>	Thermal Conductivity (TCD)	Catalytic Combustion (CCD)	Electrochemical (ECD)
<b>Detection limit</b>	2 ppm (for hydrocarbons)	0,5 ppm (for hydrocarbons)	0,01 ppm (for H <sub>2</sub> S)
<b>Repeatability</b>	1% (for gas), 2% (for liquid)	1%	2%
<b>Analysis time</b>	From 2 to 20 minutes (depending on application)		

#### Custom solutions

We are able to design a custom analytical solution for your specific application. For more information please don't hesitate to contact us.

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