



АНАЛИЗАТОР УГЛЕРОДА / ВОДОРОДА / СЕРЫ

## ELEMENTRAC CHS-r

**For the safe, precise and reliable analysis of carbon (C), sulfur (S) and hydrogen (H) in predominantly organic matrices such as soils, waste, wood, oil, coal and coke, ELTRA offers the elemental analyzers ELEMENTRAC CHS-r with IR detection.**

The CHS-r with up to 3 infrared cells is designed for carbon, sulfur and hydrogen measurement over a very wide concentration range. It uses a horizontal resistance furnace with ceramic tube, which operates in a range from 600 °C to 1550 °C.

The CHS-r combustion analyzer meets or exceeds the requirements of all common ASTM, DIN, EN or ISO standards for elemental analysis.



**АНАЛИЗАТОР  
УГЛЕРОДА /  
СЕРЫ  
ELEMENTRAC  
CHS-R**

- | Fast, simultaneous measurement of carbon, sulfur and hydrogen
- | High sample weight possible
- | Optimized (low blank) sample port
- | IR path made of solid gold for extended lifetime
- | Wide measuring range from 20 ppm to 100%

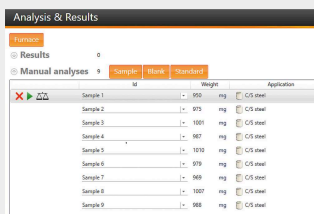


АНАЛИЗАТОР УГЛЕРОДА / СЕРЫ ELEMENTRAC CHS-R

**OPERATION AND ANALYSIS PROCESS**

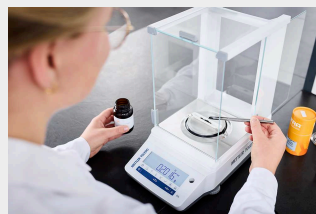
The ELEMENTRAC CHS-r elemental analyzer determines the elements carbon, sulfur and hydrogen by combustion of the sample in an oxygen stream and subsequent measurement of the combustion gases CO<sub>2</sub>, SO<sub>2</sub> and H<sub>2</sub>O in selective infrared measuring cells. A high sample weight of up to 500 mg ensures excellent reproducibility of the measurement results, even for heterogeneous samples.

The high combustion temperatures and electronic monitoring of the oxygen flow allow complete oxidation of the sample and help to avoid too low results even with challenging materials like cement. Regardless of the selected configuration (carbon - sulfur - carbon/sulfur - carbon/hydrogen/sulfur), operation is identical in all versions.



**Step 1: Logging the sample into the ELEMENTS software**

The sample ID is logged into the software and the weight is automatically transferred (see step 2).



**Step 2: Weighing and adding of accelerators**

Volumes of 50 mg to 500 mg are typical for analysis of carbon, hydrogen and sulfur. The sample is directly applied to a carrier (ceramic or Inconel boat) and analyzed without addition of accelerators.



**Step 3: Analysis**

The sample is placed in front of the furnace opening and the measurement is started in the software. Subsequently, the shutter opens, and the material can be introduced into the hot furnace. At the same time, the ELEMENTS software continuously records measured values during combustion. Closing the furnace during the measurement is optional and can improve reproducibility.



**Step 4: Data output and export**

60 to 240 seconds after the analysis has started, the measured carbon, hydrogen and sulfur concentrations are available for export as a report or via LIMS. Depending on the selected configuration, carbon, sulfur and hydrogen values are available for the individual sample.

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## SOLUTIONS & OPTIONS IN DETAIL

The ELEMENTRAC CHS-r analyzer comes with various solutions for reliable, and precise carbon, hydrogen and sulfur analysis.

### Included: Two Anhydronne Columns

For reliable analysis of carbon and sulfur, the combustion gases must be freed from water vapor prior to IR detection. The CHS-r elemental analyzer has two drying columns filled with magnesium perchlorate to reliably prevent absorption effects in large sample volumes.



### Included: Low blank sample port

The ELEMENTRAC CS-r and CHS-r analyzer series ensures safe and precise elemental analysis even of samples with low carbon content in the resistance furnace. Due to the optimized geometry of the sample port with reduced diameter, as well as an oxygen purge at the sample inlet, the CO<sub>2</sub> blank value of the atmosphere during sample introduction is drastically reduced, thus enabling reliable carbon analysis in the low measuring range.



### Option: Second Furnace (ELTRA Dual Furnace Concept)

The CHS-r elemental analyzer can be connected in any configuration to an additional furnace without detectors. This principle, known from the ELEMENTRAC CS-d, allows fast fractionated analysis by applying different temperatures and provides



safety for high sample throughput.

## Option: Monitor Holder

To make the most of laboratory space, the ELEMENTRAC CHS-r analyzer offers various operating options:

- | External monitor and keyboard
- | Monitor holder, wireless keyboard
- | Operation via touchscreen



## Option: TIC Module

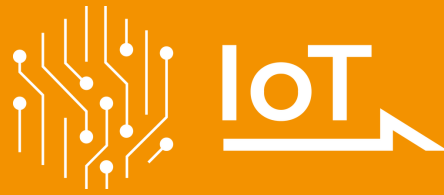
Depending on the sample, carbon can also be present in the two different fractions TOC (Total Organic Carbon) or TIC (Total Inorganic Carbon). The CHS-r elemental analyzer can be combined with ELTRA's TIC module to determine the TIC content via acidification. This combination enables reliable, direct TIC analysis in soils, building materials and other products in compliance with DIN EN 15936.



IOT - INTERNET OF THINGS

## THE PLATFORM FOR REMOTE ACCESS TO YOUR DEVICES

All ELTRA analyzers seamlessly integrate with the Verder Scientific IoT platform, providing enhanced functionality, seamless connectivity, and additional benefits:



- | **Real-time Monitoring:** Gain insight into the status of your machines at any time thanks to immediate access to important data.
- | **Live Notifications:** Stay up to date on the status of your devices with instant notifications.
- | **Effortless Backup:** Whether you need to back up a single device or an entire fleet, back up your data effortlessly and minimize downtime.
- | **Automatic Software Updates:** Verder Scientific IoT keeps your device software up to date, optimizing performance and reliability.
- | **Access to Analysis Data:** ELTRA analyzers offer remote access to analysis data. This allows you to conveniently access important data while on the move.
- | **Autoloader Efficiency:** Get the most out of remote analysis preparation with our autoloader feature, which ensures uninterrupted operation and increased productivity for all instruments equipped with it.

Experience the power of the Verder Scientific IoT platform today and unlock the full potential of your ELTRA analyzers!



**FREE SOFTWARE  
DOWNLOAD**

АНАЛИЗАТОР УГЛЕРОДА / СЕРЫ ELEMENTRAC CHS-R  
**ПРОГРАММНОЕ ОБЕСПЕЧЕНИЕ ELEMENTS**

**The comprehensive Windows-based ELEMENTS software is an essential part of all ELEMENTRAC generation elemental analyzers.**

A central window (analysis and results) is the starting point from which all functionalities required for the daily routine are easily accessible. From here it is possible to group and export analyzed samples, or register and analyze new ones. The user may call up various subordinate functionalities like application settings, calibration, diagnosis, or status.

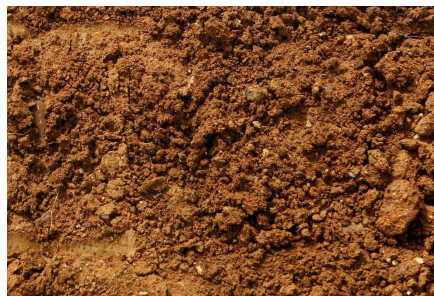


АНАЛИЗАТОР УГЛЕРОДА / СЕРЫ ELEMENTRAC CHS-R  
**ТИПИЧНЫЕ ОБРАЗЦЫ МАТЕРИАЛОВ**

биомасса, строительные материалы, coal/кокс, fuels, нефть, руды, растения, пластмассы, резина, почва, сажа, табак, отходы, ...



*coal*



*почва*



*plastic*

## АНАЛИЗАТОР УГЛЕРОДА / СЕРЫ ELEMENTRAC CHS-R

**ПРИНЦИП РАБОТЫ**

In the elemental analyzer CHS-r the sample is burnt in an oxygen atmosphere at temperatures up to 1,550 °C. The furnace temperature can be freely selected in steps of 1 °C. The combustion gasses (CO<sub>2</sub>, H<sub>2</sub>O, SO<sub>2</sub>) coming from the furnace and first pass through a dust filter and then into the heated H<sub>2</sub>O infrared cell. After the water vapor is chemically absorbed, the dried CO<sub>2</sub> and SO<sub>2</sub> gas is detected in the additional infrared cells. Depending on the configuration, it is possible to combine up to three infrared cells with different sensitivities.

## АНАЛИЗАТОР УГЛЕРОДА / СЕРЫ ELEMENTRAC CHS-R

**ХАРАКТЕРИСТИКИ**

<b>Измеряемые элементы</b>	водород, сера, углерод
<b>Материал проб</b>	органические материалы
<b>Направление ввода пробы в печь</b>	horizontal (resistance furnace)
<b>Подача пробы в печь</b>	керамические лодочки
<b>Область применения</b>	биология, медицина / фармацевтика, окружающая среда / переработка, сельское хозяйство, строительные материалы, угольная промышленность / энергетика, химическая промышленность / пластики
<b>Печь</b>	печь сопротивления с керамической трубкой, температура настраивается с шагом 1 °C максимум до 1550 °C
<b>Принцип детектирования</b>	метод инфракрасной абсорбции
<b>Количество ИК кювет</b>	1 - 3
<b>Материал ИК кювет</b>	золотые
<b>Типичное время анализа</b>	60 - 180 с
<b>Требуемые реактивы</b>	гидроксид натрия, перхлорат магния
<b>Требуемый газ</b>	кислород качества 99,5% или лучше (2 - 4 bar)
<b>Требование к электропитанию</b>	230В, 50/60Гц, максимальный ток 20А
<b>Размеры (Ш x В x Г)</b>	58 x 52 x 75 cm
<b>Вес</b>	~ 77 kg
<b>Требуемое оборудование</b>	ПК, монитор, весы (точность 0.0001г)
<b>Опции</b>	Контур управления






[www.eltra.com/chs-r](http://www.eltra.com/chs-r)

## ИНФОРМАЦИЯ ДЛЯ ЗАКАЗА

### ELTRA ELEMENTRAC CHS-R

Measuring ranges at 350 mg sample weight  
(alternative configurations on request)

2)

88200-3100		CHS-r	1xC + 1xH + 1xS	0.03 – 100 % C 0.002 – 4.2 % H 0.001 – 1.14 % S
88200-3101		CHS-r	1xC + 1xH + 1xS	0.03 – 100 % C 0.002 – 4.2 % H 0.01 – 3.42 % S
88200-3102		CHS-r	1xC + 1xH + 1xS	0.03 – 100 % C 0.002 – 4.2 % H 0.005 – 2.28 % S
88200-3103		CHS-r	1xC + 1xH + 1xS	0.004 – 21 % C 0.002 – 4.2 % H 0.001 – 1.14 % S
88200-3109		CHS-r	1xC + 1xH + 1xS	0.03 – 100 % C 0.002 – 4.2 % H 0.05 – 31.4 % S



Другие комбинации диапазонов измерения по запросу

### REQUIRED ACCESSORIES

УПРАВЛЯЮЩИЙ КОМПЬЮТЕР, МОНИТОР, ВЕСЫ

71015-1000	Computer with Intel Core i5-8400 Processor, 256 GB SSD; 8 GB RAM; Windows 10 operating system; keyboard; mouse
88400-0584	Monitor, TFT (23.8 inch)
88400-0645	Весы (разрешение 0.0001 г)


REQUIRED CONSUMABLES / CHEMICALS FOR FIRST OPERATIONS

88500-0004	ELEMENTRAC CHS-r Starter-kit for 500 analyses (500 disposable porcelain boats, 50 g glass wool, 50 re-usable boats, 100 g Combsolid)
90200	 Ангидрон (перхлорат магния), 454 г l)
90210	 Гидроксид натрия, 500 г l)


## FURTHER OPTIONS AND CONSUMABLES


### CHEMICALS (FILLINGS FOR GLASS AND QUARTZ TUBES)


90200  Ангидрон (перхлорат магния), 454 г 1)

90210  Гидроксид натрия, 500 г 1)

90331  Стекловата, 454 г

90332  Стекловата, 50 г

92610  Tube of high vacuum grease, 35 g

88600-0008  Акселератор Combsolid, 100 г 1)


91000-1005  Медь, стружка, 25 г


90840  Кварцевый песок, 100 г

88400-0508  Steel wool


### BOATS

90160  Disposable porcelain boats 86 x 13 x 10 mm, 1000 pieces

90153  Re-usable ceramic boats, premium, 58 x 22 x 14 mm, 500 pieces


88600-0011  Re-usable ceramic boats, 95 x 13 x 10 mm, 500 pieces

88400-0502  Re-usable inconel boat, 54 x 18 x 13.5 mm, 1 piece


88400-0503  Re-usable inconel boat, 54 x 18 x 9 mm, 1 piece

**TOOLS FOR OPERATION: SPATULAS, TWEEZERS, TONGS AND OTHER**


88400-0229  Пинцет (160 мм), скругленный, 1 штука

88400-0472  Пинцет (145 мм), прямой, 1 штука

88400-0475  Set with 6 spatula and 1 tweezers for multiple weighing procedures

90145  Tongs for ceramic crucibles and boats, 220 mm, 1 piece

88600-0009  Screen glass with edge guard

88400-0499  Safety glasses


36216-2001 Combustion boat insertion stick, 1 piece


36218-2001 Combustion boat removing stick, 600 mm, 1 piece

**TOOLS FOR STORAGE, TRANSPORTING AND WEIGHING**

88400-0477  Weighing boat, 1 piece for weighing and usage of granulates

**TOOLS FOR MAINTENANCE**

88400-0473  Powder funnel (plastics), 1 piece for easy filling of chemical tubes

88400-0490  Rubber plug 29 x 35 x 30 mm, 1 piece for sealing big glass tubes like 09090

71010  Brush, 16 mm, 1 piece for cleaning balance from dust

88600-0026 Anhydrone filter tube  
1) glass tube filled with Anhydrone


## CALIBRATION MATERIALS

Calibration materials may show slight variations depending on the current lot.


To see the current certification please visit [www.ELTRA.com](http://www.ELTRA.com).


### COAL: CERTIFIED SULFUR CONTENT


92511-3005 Уголь, 50 г, <0.1 % S

92511-3010  Уголь, 50 г, 0.1 – 0.5 % S


92511-3020  Уголь, 50 г, 0.5 – 1.0 % S

92511-3030  Уголь, 50 г, 1.0 – 1.5 % S

92511-3040  Уголь, 50 г, 1.5 – 2.0 % S

92511-3050  Уголь, 50 г, 2.0 – 3.0 % S

92511-3060  Уголь, 50 г, 3.0 – 4.0 % S

92511-3070  Уголь, 50 г, 4.0 – 5.0 % S

92511-3080  Уголь, 50 г, >5.0 % S

### COAL, PREMIUM, C/H/N/S, ASH, VOLATILE CONTENT, CERTIFIED

92550-3010 Уголь, премиум, 50 г, > 1 % S

92550-3020  Уголь, премиум, 50 г, > 1 % S

92550-3040  Уголь, премиум, 50 г, 1.0 – 3.0 % S

92550-3060  Уголь, премиум, 50 г, > 3.0 % S

### COKE, PREMIUM, C/H/N/S, ASH, VOLATILE CONTENT, CERTIFIED

92560-3010



Кокс, премиум, 50 г

PET COKE, PREMIUM, C/H/N/S, ASH, VOLATILE CONTENT CERTIFIED

92570-3020

Pet coke, premium, 50 g, > 1 % S

92570-3040

Pet coke, premium, 50 g, > 1 % S

OTHER

90812-3001



Известняк, 25 г, 0.04 % S

90812-3002



Известняк, 25 г, 0.4 % S

90812-3003

Известняк, 25 г, < 5 % C

90812-3004

Известняк, 25 г, 5 – 10 % C

90817-3001

Soil, 25 g, > 2 % C, S

90817-3002

Soil, 25 g, < 1 % C, S

90817-3003

Soil, 25 g, > 2 % C, S

90817-3004

Soil, 25 g, < 2 % C, < 1 % S, < 2 % C; < 1 % S

91900-1001



Руда, 30 г, ~1.4 % S

91900-1002



Руда, 30 г, ~4.2 % S

91900-1003

Руда, 30 г, ~3 % S

PRIMARY SUBSTANCES FOR CALIBRATION, 32 % S

90710-3010



ЭДТА, 50 г

90710-3030

Sucrose, 50 g

90810



Карбонат кальция, 100 г

90821



Сульфат бария, 50 г

90824



Сульфаниловая кислота, 50 г

91900-2001

Zinc sulfide, 50 g, 32 % S

LIQUID CALIBRATION MATERIAL

**Please note: Every analyzer requires PC, monitor, balance and some consumables (crucibles, chemicals) which have to be ordered separately**