

# vario TOC select

*Enter the world of versatile TOC analysis*



High sensitivity



High data quality



Great flexibility



Extreme durability

vario TOC  select

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*Unmatched robustness  
and system uptime*

## KEY FEATURES

- Wide measuring range
- Economic electrochemical detection for  $TN_b$
- Easy switching from liquid to solid mode
- Automatic sample feeding for solids
- Unique matrix separation
- Furnace temperatures up to 1200 °C for cracking even stable carbon fractions
- Integrated autosampler with up to 80 positions for liquids

For over 30 years, Elementar has been the German pioneer in high temperature TOC analysis. Elementar's high temperature combustion method to measure organic contaminations provides a multitude of advantages compared to other methods.

It is optimized to deal with compounds hard to oxidize, such as humic acids or other rather persistent compounds. This always guarantees full recovery of every organic component and an outstanding precision and accuracy.

④ Clearly arranged and easily accessible components for fast and easy maintenance.

④ Optional autosampler for solid samples.



## *No limitations in sample nature*

All parameters such as TOC, NPOC, TC, TIC, DOC, POC and  $TN_b$  can be measured with the same basic unit. Analysis of drinking water, industrial waste water or solids represents a sample range which cannot be met by any other instrument. Injection volumes can be changed without modifications of the instrument hardware and for samples with unknown concentrations appropriate amounts can be calculated automatically via the software.

The vario TOC select has an optimized tubing and connection system that gives rise to a reliably, trouble-free handling of liquid samples containing particles. With the unique matrix separation concept, concentrated salt solutions can be analyzed even with larger injection volumes. In addition, the vario TOC select is one of the very few analyzers on the market that allows measurement of solid and liquid samples with a single instrument – mode switching is done within minutes.



### **TOTAL ORGANIC CARBON**

The measuring principle is based on the high temperature combustion of the sample in an air or  $O_2$  stream above  $680\text{ }^\circ\text{C}$ . Totally bound or dissolved carbon is converted into  $CO_2$  which is quantitatively determined by means of a NDIR detector. The advantage of this method as opposed to the wet chemical UV / persulfate digestion is the absolute assurance that even stable compounds, particles or salt containing solutions will be completely detected. Additionally, the high temperature method enables the determination of bound nitrogen ( $TN_b$ ).

## *A workhorse for any laboratory*

The vario TOC select is designed for maximum robustness and minimal maintenance effort, thus providing industry-leading system uptime. The advanced matrix separation technology enables customers to run hundreds of samples without the necessity of maintenance work. For unattended overnight operation, optional autosampler configurations with up to 80 positions for liquids and up to 120 positions for solids are available.

## *Next generation NDIR detection*

A completely new high performance detector for  $CO_2$  is used in the vario TOC select. The actual realization of the non-dispersive infrared (NDIR) principle means a minimization of spectral interferences and a vastly low-noise characteristic. A dynamic detection range for TOC from ppb into the percentage range is achieved by the 24 bit digital resolution of the measuring signal without the need for measuring range gain adjustments.

## *Minimum operating costs*

The vario TOC select has been developed to save operating costs. Consumables like drying agent, halogen absorber or the catalyst are low-priced and can be easily exchanged by the operator. Routine maintenance is done within a few minutes, because of the all-side access and well arranged instrument components.



### **HIGH TEMPERATURE DIGESTION**

A high combustion temperature is crucial for a quantitative oxidation of bound or dissolved carbon to  $CO_2$  and a precondition for the decomposition of stable compounds and particles. The vario TOC select can be operated at a permanent furnace temperature up to  $1200\text{ }^\circ\text{C}$ . In solid mode, the combustion enthalpy of the tin capsules results in a temporary temperature increase of up to  $1800\text{ }^\circ\text{C}$ . This allows the analysis of even refractory samples.

# TOC / TN<sub>b</sub> analysis has never been easier!

SAMPLE	TOC [mg/l]	RSD [%]	TN <sub>b</sub> [mg/l]	RSD [%]
MUNICIPAL WASTE WATER INFLUENT	131	1.6	36.8	1.5
MUNICIPAL WASTE WATER EFFLUENT	6.18	1.8	13.7	1.3
INDUSTRIAL WASTE WATER INFLUENT	458	0.88	54.8	5.4
INDUSTRIAL WASTE WATER EFFLUENT	34.9	0.52	25.5	6.8
DRINKING WATER	0.92	2.9	-	-
MIXED WASTE*	54.4 w-%	5	-	-
MINERAL (SCHEELIT)*	1.26 w-%	0.49	-	-

\*Solids measurements

## IN ACCORDANCE WITH THE OFFICIAL STANDARDS

The vario TOC select operates in full compliance with all important standards for TOC/TC/TIC/TN<sub>b</sub> in liquids or solids like ISO 8245, ISO 10694, EPA 415.1, EN 1484, ENV 12260.

## QUALITY YOU CAN TRUST

Our consumables and spare parts are designed to meet the highest quality standards and reliability. They are certified and validated in accordance with international norms and standards. We do not compromise on quality of our parts and chemicals – this is the prerequisite of a guaranteed long lifetime of our instruments.

## EASE OF USE

The vario TOC select is optimized to significantly simplify the daily routine operation. Clearly arranged, easily accessible system components minimize maintenance efforts. The tool-free clamp connection system ensures a reliably leak-tight instrument at any time. Thus, customers can enjoy smooth analyses and confidence in their results.

## IDEAL SOLUTION FOR

- Environmental laboratories
- Academic research groups
- Quality control laboratories

## SAMPLE TYPES ANALYZED

- Tap water
- Drinking water
- Surface water
- Waste water (influent, effluent)
- Waste
- Soil



### High sensitivity

Outstanding sensitivity thanks to high performance, state-of-the-art technology.



### High data quality

Outstanding precision and accuracy through high performance combustion. Matrix-independent results. Long-term stability of calibration.



### Great flexibility

Wide range of optional conversion kits available for special applications. Upgradeable at any time.



### Extreme durability

Outstanding robustness and longevity thanks to state-of-the-art technology. 10 year warranty on the furnace.

## Elementar – your partner for excellent elemental analysis

Elementar is the world leader in high performance analysis of organic and inorganic elements. Continuous innovation, creative solutions and comprehensive support form the foundation of the Elementar brand, ensuring our products continue to advance science across agriculture, chemical, environmental, energy, materials and forensics markets in more than 80 countries.

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