

# vario TOC cube

*Unmatched application flexibility in TOC analysis*



High sensitivity




High data quality



Great flexibility



Extreme durability

vario TOC  cube

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*TOC / TN<sub>b</sub> analysis  
without limitations*

## KEY FEATURES

- High sensitivity
- Choice between three detection methods (IR, CL, EC) for TN<sub>b</sub>
- 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.

④ Choice between three detection methods (IR, CL, EC) for nitrogen.



## *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 ultrapure 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 cube 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 cube 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 °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 ( $TN_b$ ).

## *Customized instrument versions*

Based on one very compact basic unit, the vario TOC cube can be adjusted to customers' demands. This could be manual or automatic sample feeding, analysis of liquids or solids as well as determination of TOC only or in addition with  $TN_b$ . The choice of different NDIRs, CL or EC detection is optional. For TIC analysis in solids, a separate unit can be attached. This allows the most cost effective solution for your analytical task.



### **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 cube can be operated at a permanent furnace temperature up to 1200 °C. In solid mode, the combustion enthalpy of the tin capsules results in a temporary temperature increase of up to 1800 °C. This allows the analysis of even refractory samples.

## *A workhorse for any laboratory*

The vario TOC cube is designed for maximum robustness and minimal maintenance effort, thus providing industry-leading system uptime. An 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.

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

SAMPLE	TC [mg/l]	TOC [mg/l]	TIC [mg/l]	TN <sub>b</sub> [mg/l]
ULTRAPURE WATER TYPE 2	-	0.069 ± 0.006	-	-
DRINKING WATER	-	0.634 ± 0.009	-	-
WELL WATER	21.53 ± 0.12	-	20.04 ± 0.25	-
MUNICIPAL WASTE WATER	-	27.96 ± 1.32	-	-
INDUSTRIAL WASTE WATER	-	41.84 ± 0.81	-	-
SEA WATER	-	0.54 ± 0.03	-	0.45 ± 0.02
SOIL EXTRACT	-	178.5 ± 0.30	-	30.7 ± 0.65
RIVER SEDIMENT*	8.496 W-% ± 0.136	-	-	-
SOIL STD. (3.5% C)*	3.515 W-% ± 0.039	-	-	-

\*Solids measurements

## IN ACCORDANCE WITH THE OFFICIAL STANDARDS

The vario TOC cube 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, EN 15936, 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 cube 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
- Pharmaceutical industry

## SAMPLE TYPES ANALYZED

- Ultra-pure water
- Tap water
- Drinking water
- Sea 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. Longterm 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 and the IR detector.

## 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.

### Elementar Analysensysteme GmbH

Elementar-Straße 1 • 63505 Langenselbold (Germany)

Phone: +49 (0) 6184 9393-0 | info@elementar.com | www.elementar.com

