

# vario MACRO cube

*The one and only CHNS macro analyzer*



Great flexibility




High data quality



Extreme durability



Ease of use

vario MACRO  cube

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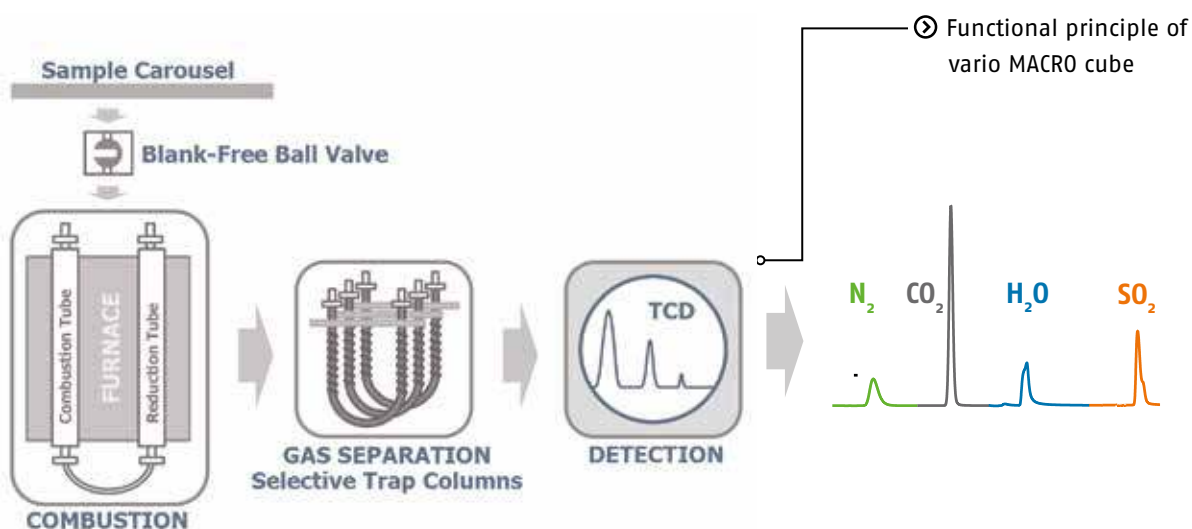
*High performance  
at a small footprint*

## KEY FEATURES

- Industry-leading performance and versatility
- C / N elemental ratios of up to 7000 : 1
- Outstanding robustness
- 10 year warranty on furnace and thermoconductivity detector cell
- Integrated 60 position autosampler as standard
- Patented ball valve for blank-free sample transfer
- Measurements according to ASTM D5291 and D5373

There is only one macro analyzer available for simultaneous, one-sample CHNS determination on the market: the vario MACRO cube! It is designed to offer industry-leading versatility in elemental analysis. No add-on modules or extra furnaces are required for sulfur analysis. Four elements from just one sample.

The instrument is capable of measuring samples with even the most challenging C / N elemental ratios of up to 7000 : 1. This is achieved thanks to the Advanced Purge and Trap technology provided exclusively by Elementar. The vario MACRO cube addresses all customer needs with macro sample volumes and weights.





## *Outstanding versatility*

The possible applications range from testing solids such as petroleum coke, lignite, and bituminous coal to viscous and liquid samples, such as tar or marine residual / bunker fuels of all various types. Combined with its outstanding precision, the vario MACRO cube is a versatile and reliable workhorse for the analysis of fossil fuels and derived products.

## *One instrument for multiple tasks*

For the determination of very low S concentrations down to 2 ppm, the vario MACRO cube can be equipped with an optional IR detector. Even total inorganic carbon (TIC), oxygen and chlorine can be detected. All optionally available conversion kits allow upgrading the vario MACRO cube at any time for special applications.

### **HIGH-TEMPERATURE COMBUSTION**



All elemental analyzers from Elementar are designed for minimal sample preparation and secure, unattended 24 / 7 operation. They use the safe, simple, and environmental friendly high-temperature combustion principle. The proven Elementar furnace technology, combined with efficient oxygen dosing, guarantees quantitative conversion of the sample to measuring gas – a prerequisite for highly precise and matrix-independent elemental analysis.

## *Save valuable time in sample preparation*

The vario MACRO cube is one of a kind and allows straightforward CHNS determination from one sample. In addition, sample weights of up to several hundred milligrams give rise to analyzing inhomogeneous species as is – tedious grinding or milling procedures may often be omitted.

## *Future-proof investment*

Thanks to the outstanding robustness and longevity for all elemental analyzers a 10 year warranty on furnace and thermoconductivity detector (TCD) cell is granted. With our well-known, long-term oriented dedication to technical support, Elementar provides spare parts for a minimum of 10 years after the end of production. This results in outstanding low total cost of ownership and gives customers confidence in return of investment.

### **ADVANCED PURGE AND TRAP**



Elementar's proprietary APT technology is the leading chromatographic technique for the determination of non-metal elements. In conjunction with the detection of the complete combustion gas without gas splitting and dilution, the APT technology is capable of resolving even C / N ratios of up to 7000 : 1. The distinct peak separation assures absolutely reliable and trouble-free data acquisition. The data analysis can therefore be easily automated for larger sample amounts while maintaining highest possible data quality and accuracy. Elementar's unique purge and trap columns are optimized to provide unmatched robustness and longevity compared to GC columns. Furthermore, they can be loaded up to 250-fold higher, resulting in outstanding sample flexibility. The analysis of samples with an absolute carbon content of up to 150 mg is therefore possible. Thus, customers enjoy industry-leading accuracy, sensitivity, and versatility.

# Elemental analysis has never been easier!

SAMPLE	CARBON [%]	HYDROGEN [%]	NITROGEN [%]	SULFUR [%]
OIL	86.3 ± 0.30	13.4 ± 0.029	0.054 ± 0.008	0.13 ± 0.018
COAL	78.8 ± 0.103	4.79 ± 0.010	2.09 ± 0.003	0.54 ± 0.005
FLY ASH	3.41 ± 0.09	0.039 ± 0.001	1.76 ± 0.003	-
DDGS*	45.1 ± 0.21	6.92 ± 0.06	5.47 ± 0.03	0.94 ± 0.028
SOIL	0.137 ± 0.003	0.199 ± 0.012	0.032 ± 0.002	0.005 ± 0.001
SOY	41.20 ± 0.027	-	7.96 ± 0.057	0.415 ± 0.01
ALGAE	45.1 ± 0.026	-	10.0 ± 0.02	0.798 ± 0.012
FERTILIZER	0.23 ± 0.003	-	12.4 ± 0.06	8.87 ± 0.05

\*Dried Distiller's Grain with Solubles  
Sample weight between 40-500 mg

## HIGH PRECISION HYDROGEN MEASUREMENTS

The vario MACRO cube is optimized for highly precise hydrogen concentration measurements. Through detection with a reliable thermo-conductivity detector, possible interferences and imprecisions of H<sub>2</sub>O measurements encountered with infrared detection are avoided. Furthermore, all tubing in contact with water is heated to avoid condensation of trace water inside the system and thus low results.

## 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.

## IDEAL SOLUTION FOR

- Chemical contract laboratories
- Quality control laboratories
- Academic research groups

## SAMPLE TYPES ANALYZED

- Coal
- Coke
- Biomass
- Waste



### Great flexibility

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



### High data quality

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



### Extreme durability

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



### Ease of use

Easy, labor-saving instrument operation and sample preparation. Simplified maintenance.

## Elementar – your partner for elemental analysis

Elementar is the world leader in high performance analysis of organic 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.de](mailto:info@elementar.de) | [www.elementar.de](http://www.elementar.de)

