iso TOC cube

Fully integrated TOC / TN_b isotope ratio analysis

High sensitivity

High data quality

Extreme durability

High sample throughput

elementar

EXCELLENCE IN ELEMENTS

iso TOC cube

The only fully integrated TOC-IRMS system on the market

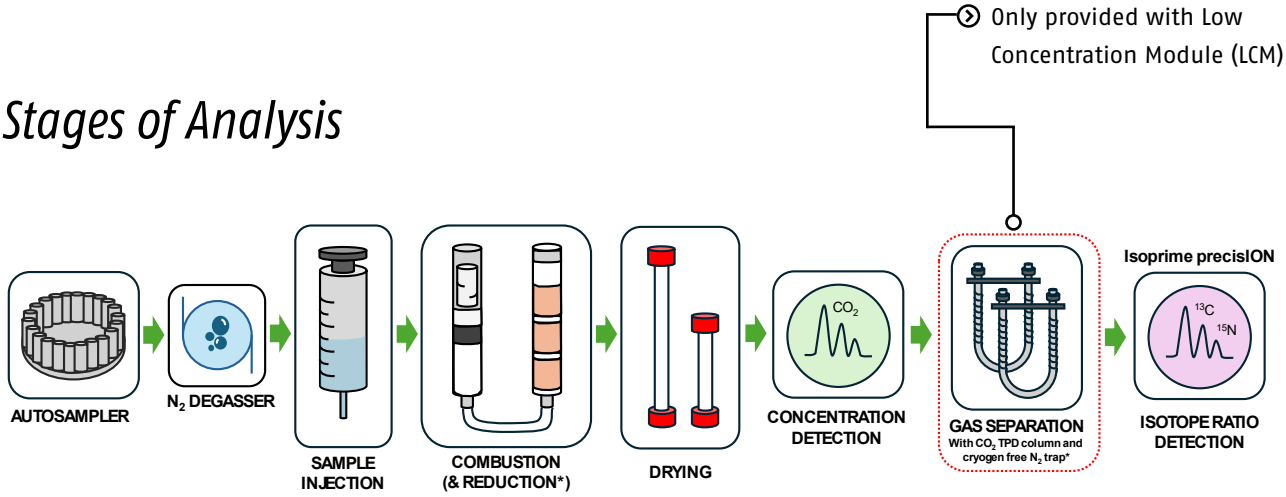
KEY FEATURES

- Optimised for precise measurements of TC, TOC, TIC, and TN_b isotope ratios
- Wide range of applications for IRMS analysis of TOC and TN_b
- 100% C and N recovery independent from sample type and matrix
- Wide range of sample matrices such as freshwaters, seawaters and soil extracts
- Liquid injection volume of up to 3 ml
- Intuitive software with sophisticated self-diagnosis features
- Integrated 32 position autosampler for liquids

The iso TOC® cube elemental analyzer inlet combines decades of experience in elemental analysis of liquids via high-temperature combustion and high performance IRMS systems. Designed for the quantitative and isotopic analysis of dissolved total organic carbon (TOC) and total bound nitrogen (TN_b) in aqueous solutions.

It remains the only solution on the market ready-configured for IRMS measurements of aqueous samples, making it an indispensable tool for ecologists, limnologists and oceanographers. All types of liquids from drinking water, industrial waste water, soil leachates, or marine samples are determined reliably and with the highest isotopic precision.

Stages of Analysis



Simple operation

The iso **TOC®** cube utilises hand tight ball clamp technology to ensure easy maintenance of the system. With the SALTTRAP technology, even analytically challenging samples with high salinity can be analysed with ease.

Measure abundance and isotopes

The instrument can be easily configured for both abundance and isotope ratio measurements for a range of aqueous samples. From freshwaters to saltwaters, the system provides full flexibility to meet your analytical needs.

FROM TRACE TO HIGH CONCENTRATION, FROM FRESH TO SALINE SAMPLES

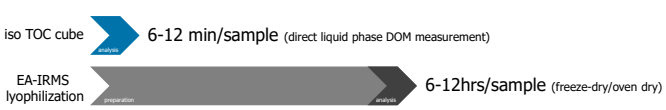
Oxidation temperatures of up to 1200 °C provide 100% C and N recovery independent from sample type and matrix. The specially designed Low Concentration Module (LCM) utilizes Elementar's proprietary Advanced Purge and Trap technology to guarantee highest sensitivity and clean baseline separation of C and N peaks. Thus, simultaneous determination of dissolved $\delta^{13}C$ and $\delta^{15}N$ at concentrations as low as 1 mg/L and 15 mg/L, respectively, is achieved – with matrices ranging from dilute freshwaters to salty seawaters to soil leachates.

Future-proof investment

Elementar commits to providing the highest quality of instruments and the iso **TOC®** cube comes with an extended warranty of 10 years on the furnace. With our well-known dedication to technical support, Elementar also stocks 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.

High sample throughput

Save valuable time in sample preparation. The direct determination of dissolved C and N out of the liquid phase ensures quantitative conversion of all dissolved compounds. Cumbersome offline sample preparation through freeze drying can therefore be omitted. Equipped with the most user-friendly operating software on the market and optimized for safe unattended overnight measurements, the iso **TOC®** cube is redefining isotope ratio analysis of dissolved C and N.



CRYOGEN-FREE NITROGEN TRAPPING

The measurement of low-TN samples has always been hindered by the combination of high dissolved gases (i.e., N_2) with the lack of an easy-to-use preconcentration system. Through utilization of the Low Concentration Module (LCM), Elementar has invented a new N_2 trap which allows N_2 peak focusing without the need for a cryogenic liquid. Together with a unique degasser to remove the physically dissolved gases from the sample and an optimized purification of formed CO_2 and N_2 through a halogen trap with subsequent 3-step intensive gas drying, the iso **TOC®** cube guarantees superior peak focusing of both CO_2 and N_2 – a prerequisite for the high-level performance required in IRMS measurement.

Dissolved carbon and nitrogen IRMS analysis has never been easier!

SAMPLE* (DOM EXTRACT)	TOC-IRMS $\delta^{13}C$ (‰ VPDB)	EA-IRMS $\delta^{13}C$ (‰ VPDB)
BLACK HUMUS LAYER (H, FIMIC ANTHROSOL)	−26.29 ± 0.03	−26.39 ± 0.03
SUBSOIL (HAPLIC CAMBISOL)	−26.50 ± 0.08	−26.54 ± 0.01
ERODED SEDIMENT (PETRIC CALCISOL)	−25.28 ± 0.07	−25.30 ± 0.01
BURIED ILLUVIAL HORIZON (2BC, HAPLIC PODZOL)	−26.61 ± 0.03	−26.69 ± 0.12
ASH LEAVES	−29.37 ± 0.07	−29.36 ± 0.02
PINE NEEDLES	−30.77 ± 0.08	−30.87 ± 0.04
SPRUCE NEEDLES	−31.72 ± 0.07	−31.78 ± 0.02
RICE STRAW	−29.43 ± 0.11	−29.44 ± 0.05
MOSS	−27.56 ± 0.01	−27.60 ± 0.07
HUMIC ACID	−32.66 ± 0.03	−32.69 ± 0.02

EASE OF USE

The iso **TOC** cube is optimized to significantly simplify the daily routine operation. Clearly arranged, easy accessible system components as well as a furnace that slides out minimize maintenance efforts. The tool-free clamp connection system ensures reliable leak-tightness of the instrument at any time. Thus customers can enjoy smooth analyses and confidence in their 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.

*0.5 mL liquid injection

Comparison between $\delta^{13}C$ values determined by TOC-IRMS and by conventional EA / IRMS of lyophilized DOM extracts. Source: Kirkels et al., 2014, RCM 28, 2574-2586.

IDEAL SOLUTION FOR

- Environmental laboratories
- Academic research groups
- Quality control laboratories
- Contract laboratories

SAMPLE TYPES ANALYZED

- Drinking water
- Sea water
- Waste water (influent, effluent)
- Brine
- Soil leachate

High sensitivity

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

Hight 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.

High sample throughput

Designed for 24 / 7 unattended operation. Industry-leading system uptime for highest laboratory efficiency.

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.

Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag

Elementar Analysensysteme GmbH
Elementar-Straße 1 · 63505 Langenselbold (Germany)
Phone: +49 (0) 6184 9393-0 | info@elementar.com | www.elementar.com

elementar
EXCELLENCE IN ELEMENTS

Art.-No. 200008345, 10 / 2025 A