

rapid CS cube



Elemental Analysis for a Better Environment

Elementar holds the world's longest tradition in the analysis of the "organic" elements CHNS and O. Today we are all aiming for a cleaner environment which requires more and more the analysis of sulfur and carbon, e.g. in coals, soils and organic samples. Therefore with our special experience a dedicated C/S analyzer has been developed which combines the highest analytical performance with high automatic sample throughput.

The concept is straight. Samples are wrapped and automatically fed to a 1200 °C catalytic combustion in pure oxygen. Contained sulfur is converted to SO₂ which is measured by means of an NDIR-detector. Carbon compounds are oxidized to CO₂ which is again measured via IR detection. From IR-signal and sample weight the computer calculates the sulfur concentration.

Automatic analysis of solids and liquids

The rapid S cube has an integrated autosampler which automatically feeds up to 60 or even 120 samples. Solids are wrapped in tin foil or paper and liquids sealed in tin capsules.

Full sulfur recovery

Combustion takes place in a quartz tube which has advantages compared to ceramics for lower S- concentrations. A permanent temperature near 1200°C and temporarily near 1800°C results in 100 % conversion of S into SO₂ even in case of BaSO₄.

Large range special NDIR detector

The NDIR detector utilizes a gas absorption chamber instead of the more typical solid detector. This results in reduction of noise and an interference free detection. Detection of up to 20 mg absolute sulfur or 40 mg absolute carbon, with a single absorption cell and one detector range is achieved.

Closed system for high analytical sensitivity

The entire analytical operation takes place in a closed system with no influence from the ambient atmosphere. This also serves for the highest sensitivity of less than 1 ppm S or C.

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State of the art microelectronics

The rapid CS cube has full digital control of all functions. This results in completely new possibilities of automatic operation as well as remote control and diagnosis over the internet.

High class software

The Windows® based software allows full instrument control from a PC. Continuous monitoring of real time conditions of the analyzer in both numerical and graphical form. Data safety and validity can be assured with the available 21 CFR Part 11 option.

Large variety of applications

The rapid CS cube is able to analyze e.g. 400 mg of coal, less than 1 mg of fine chemicals or 100 mg of plant material. Results are accurate even without similar standards. Complicated sample preparation is normally not required.

Easy to use and maintain

Removal of ash residues after 60–100 samples only takes a few minutes. The only regular weekly maintenance is the replacement of the water scrubber. The analyzer does not require special skills for chemical analysis or the software.

Low cost per analysis

Operational supplies are low cost tin foil or paper, desiccant and low grade oxygen carrier gas. The quartz combustion tube and ash crucible have longer lives and are lower cost compared to ceramics. The 10 year furnace guarantee at 1200°C results in further savings.

Low installation requirements

Only 48 × 55 cm laboratory bench is sufficient even including autosampler. Just one gas supply and a regular, electrical connection from 100 to 230 V is required.

Elementar instruments work naturally

Analysis method:	High temperature sample combustion and conversion of total sulfur into SO ₂ , total carbon into CO ₂ , both to be measured with NDIR-detector
Standards:	ISO 15178:2000 (S in soil) DIN 51724-3 (S in solid fuels), DIN 38409 (TOC in solids) Safety: CE label, EN 61010-1, EMV low voltage directives 73/23/EEC
Digestion temperatures:	furnace temperature at 1200 °C, during combustion temporarily 1800 °C are reached
Measuring range*:	0–100 % S (or 20 mg S absolute), 0–100 % C (or 40 mg C absolute)
Detection limit*:	< 1 ppm (at 200 mg sample weight) for S and C
Precision*:	< 1 % RSD (at 1 w-% for S and C)
Calibration*:	single point, up to 4 th grade regression multipoint
Analysis time*:	approx. 5 min
Sample weight*:	up to 1 g (eg. soil) or 100 mg organic material
Sample feeding:	integrated autosampler with 60 positions, optional 80 or 120 positions for smaller samples
Instrument control:	Operation and control via PC under Windows®; software includes e.g. statistical functions and almost unlimited memory capacity. Remote control via internet is possible. In full compliance with 21 CFR Part 11 (option).
Gases:	O ₂ : 99.5 % purity, 0.8 l/min
Reagents:	Sicapent or magnesium perchlorate
Electrical connections:	100/110/200/230 V, 50/60 Hz, 1.8 kW
Dimensions:	48 × 55 × 55 (W × D × H)
Weight:	approx. 60 kg

* depending on sample type and analytical conditions