

vario EL cube

Innovative micro to semi-macro analyzer for the simultaneous, single sample analysis of CHNS as well as O, Cl and TIC in solids. Suitable for organics and many inorganic liquids and solids. **The vario EL cube has the largest dynamical sample size of any commercial elemental analyzer, allowing measurement of samples from μg up to 1000 mg quantities.** It combines the precision and accuracy of micro analysis with the benefits of large sample sizes. Argon may be utilized as alternative carrier gas.



Elemental combustion analyzer

Analyzer

Concentration analysis of	Carbon, hydrogen, nitrogen, sulfur, oxygen*, chlorine*, TIC in solids*
Operating modes	CHNS, CNS, CHN, CN, N, S, O, Cl, TIC in solids
Design	Compact benchtop with single power supply
Sample introduction	Zero blank patented ball valve system
Furnace design	Double furnace system, 10 years warranty
Gas separation	Patented Advanced Purge & Trap (APT) technology
Detector type	High sensitivity thermal conductivity detector, infrared*, electrochemical cell*
Control	Fully digital via external PC (no additional control panel required)

Sample Introduction

Construction	One block, auto-aligned sample introduction system with integrated carousel
Access	Inert gas free easy access, no purging of sample carousel required
Movement control	Fully electrical
Carousel type	Non-stacked 60*, 80 or 120* position solid sampler 2 ml vial, 50 position random access liquid sampler with rinse and waste vial*
Solid sampling system	Compact integrated patented ball valve
Liquid sampling system*	Radial sample turret with central rotating sample injection arm
Liquid injection port*	Septum-free micro-seal injection port
Syringe injection*	User-exchangeable microsyringe with bubble elimination feature
Injection speed*	User selectable
Dosing resolution*	Min. 24 nl
Gas sampling system*	User controllable manual injection

Furnace

Type	Slide-out, double vertical furnace system for usage of 28 mm inner diameter quartz or steel**, reaction tubes
Furnace	Resistive heater element with 1200 °C maximum temperature
Electrical supply	48 Volt safety design for entire instrument including furnaces
Control	Automatic power output adjustment (no hardware change required)
Combustion/reduction reactor	Quartz tube long life design with separated combustion and reduction tube
Oxygen reactor*	Quartz tube with carbon black filling
Chlorine reactor*	Quartz tube with tungsten trioxide filling
Ash removal	Quartz easy removal ash finger
Reactor stability	No need for cooling down during routine maintenance
Carrier gas	Helium, argon*, forming gas*, synthetic air*
Connections	Quick swap clamp connections for fast maintenance with no tools required

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Gas Separation

Type	Dynamically heated chromatographic separation system using Advanced Purge and Trap technology (APT technology)
No of Columns	3**
Retention time control	N ₂ , Cl no control, all other gases user defined computer control
Baseline separation	1/7000 N/C and S/C elemental ratio
Column flush system	Full separation of all analytes with patented APT technology, no peak tailing or peak overlap
Recovery rate	100%

Detectors / Electronics

Type	Thermal Conductivity Detector (TCD), 10 years warranty
Design	Thermistor, oxygen proof, imbalanced flow, indestructable, double channel
Type	SO ₂ specific infrared*, CO specific infrared*, combined CO+SO ₂ specific infrared*
Design	Built-in, solely software controlled switching to TCD for alternative element detection
Type	Chlorine sensitive electrochemical cell*
Design	Exchangeable 200 ppm and 5000 ppm cell
Detection limit**	<40 ppm (TCD)
Calibration	Multipoint, multirange, matrix-independent calibration
Analysis time**	~3/4 min per element, self-optimizing according to element content and sample weight
Electronics	Fully digital, fully integrated in unit, no external control panels
Security norms	EU machinery directive 2006/42/EG

Software

Operating system	Windows® 10, Windows® 8, Windows® 7, minimum XP, other systems upon request
Analyzer software	Winvar proprietary software
Features	Automatic leak finding software Intelligent error indicator with sophisticated self-diagnostics Auto sleep and wake-up Statistical calculations Indication service cycle LIMS integration 21 CFR part 11 compliant* Comprehensive documentation for fast part identification
Data Storage	Non manipulated storage of experimental raw data and peak graphics
Balance	Automatic read out of weighing data*

* requires optional configuration **depending on sample type, analysis mode and configuration

Measuring Range and Technical Specifications

C:	0 – 40 mg absolute or 0 – 100 %	standard deviation**:	<0.1% absolute (homogeneous substance)
H:	0 – 3 mg absolute or 0 – 100 %	dimensions:	48 x 55 x 57 cm (W x D x H)
N:	0 – 15 mg absolute or 0 – 100 %	weight:	approx. 75 kg
S:	0 – 6 mg absolute or 0 – 100 %	electrical connections:	100/110/200/230 V, 50/60 Hz, 1.8 kW
O*:	0 – 6 mg absolute or 0 – 100 %	oxygen consumption**:	approx. 0.05 l / analysis
Cl*:	0 – 1.2 mg absolute or 0 – 100 %	required gases:	carrier gas and oxygen only