

EuroEA3000

*Compact, fully automatic Elemental Analyser
for the most exacting CHNS-O determinations.*

Smash the Combustion Barrier!

At last... the instrument that fits your real needs, now and into the future



EuroEA3000 Series represents a quantum leap in Oxygen pyrolysis and state of the art of CHNS dynamic flash combustion. It is based on an innovative operating principle.

EuroVector EA's are based on well-known Dynamic Flash Combustion principle. This way of operating has been improved by EuroVector introducing the US Patented TurboFlash® Combustion Technology, allowing for automatic Pressurised Oxygen injection of any Oxygen volume independently from carrier gas flow rate: difficult matrices are broken with ease, analytical precision improved and analysis time cut down with simultaneous CHNS analysis completed in 5 minutes and O in 2 minutes.



Compact design. Due to modern design principles and analytical miniaturisation, EuroEA has the smallest footprint while maintaining an enviable ease of access. Installation takes place with the minimum of disruption.

Easy configuration. The system is available in Single or Dual Furnace and standard protocols CHNS,CNS, S,O,CHN,CN,N are configured in a matter of minutes.

Sample size. Due to high sensitivity and optimal combustion, EuroEA can use low sample size for the lowest level of ash and residues production, granting the highest sustained automation without user intervention.

Superior Specifications. Linearity, due to low sample size, is achieved for a wider dynamic range. The lower detection limit is less than 0.5 microgram for each element.

Cost effectiveness is achieved by proven reliability and energy/gas savings in standby mode, reducing furnace temperatures and switching off gases.

Sustained automatic operation combined with shorter analysis time are lowering cost per test.

Gas consumption during AutoRun is less than 1/3 of competitive EA instruments.

AutoSamplers. Two types of electrically actuated Models are offered for solid and liquid samples. Either 40 or 80 positions of regular or large sample can be selected. VectorSAS, the new generation of AutoSamplers, offers a patented full-purge system providing Zero Blank in seconds. Operation is straightforward allowing for additional samples to be added during AutoRun. New fittings and the Ash & Residue Removal Device have been made available. Sample admission is synchronised by electronic count-down and a wide viewing mirror allows the operator to clearly see the brighter flash generated by TurboFlash® Combustion Technology.



AutoReady, Wake-up routine & Gas leak test. The instrument allows for automatic standby at a preset time or sample position in the carousel as well as a wake-up routine at a preset time. Monitored by an intelligent electronic pressure probe, a fast and accurate fully automatic leak test procedure is available with one single key press.

Keypad operation. EuroEA can be operated from the keypad. Three function buttons and four command buttons allow full automatic control of the instrumentation and provide access to a series of diagnostic tests.



EA3000 is simple to operate. Easy access to the analytical layout is achieved via the front door. Exhausted reactors are replaced from the outside of the instrument through a bayonet-lock action. The Ash & Residue Removal Device allows the build up of ash to be removed without the need of extracting the reactor from the furnace. Storage of analytical methods, download of pre-set instrument parameters and pre-formatted results reports, contribute to greatly simplify operation.

Callidus SW: the most advanced Software dedicated to Elemental Analysis

Callidus SW. Callidus® is a mature Software dedicated to the EuroVector Series of Elemental Analysers. It represents a major step ahead for completeness and ease of use, providing the most elegant solutions on all functionalities. The SW provides full automatic instrument control from parameters downloading to results printout in one of the user-configured report formats. It also provides data reprocessing, preventive maintenance prompting, Leak Test and full Diagnostic.

EuroEA 3000 Status: Ready

Instrument Analysis Sample Manager Operator Password Help

AutoZero TCD Signal **974.9** μV

Carrier Flow **1.17** ml/min Carrier Pressure **79** kPa Purge Flow **80** ml/min
 Front Furnace **980** °C Rear Furnace **---** °C GC Oven **114** °C

Display. The above strip is always on view showing instrument status and parameters for monitoring operations.

Balance interface. Callidus SW provides a direct interface to the Sartorius family of balances. Pressing balance print key will transfer the weight directly to the Sample Table, eliminating transcription errors.

AutoRun concept. The AutoRun window below, divided in sections, provides information to perform samples sequences. The SW gives access to a truly intuitive tool allowing the operator to use Callidus from day one.

Sample Table. Powerful set of edit tools helps the operator to quickly fill sample details for analysis.

Method. Instrument parameters are stored and can be recalled to run another sample sequence with the same method.

Report configuration. Report format and printouts are user defined through the powerful and flexible Callidus reporting system (see also Report configuration window on the next page).

Real-time digital display in the AutoRun window allows for monitoring the analysis progress.

Data Processing. Calibration type is selected as single point (K-Factor) or linear regression. Reference Standard Materials including their elemental compositions are selected from a library. AutoCal allows the operator to import calibration from acquired AutoRuns to perform another sample sequence using the same calibration. Data for each element are processed and integrated versus calibration.

AutoRun name selection. The SW allows for the creation of AutoRun names from a user double entry table. This facility provides a simple and efficient way to retrieve acquired Autoruns.

AutoRun: L Cystine-Organic Div.-(0001016)

Sample Table

Pos.	Sample Name	Type	W (mg)
1	L-Cystine-1	Std	0.5610
2	L-Cystine-2	Std	1.0560
3	L-Cystine-3	Std	1.4520
4	Sample-4	Smp	0.7010
5	Sample-5	Smp	0.8360
6	Sample-6	Smp	1.2210

Rows: 6 Incomplete: 0 Complete: 6 Calibrations: 1 CAL

Method

Parameter	Applied	Set to
Carrier	80 kPa	80
Purge	80 ml/min	80
Oxygen	20 ml	20
$\Delta P O_2$	35 kPa	35
Oxidation time	8.7 sec	8.7
Sample Delay	10 sec	10
Run time	320 sec	320
Front Furnace	1020 °C	1020
Rear Furnace	OFF °C	OFF
GC Oven	115 °C	115

Report Configuration

CHNS Configuration

Additional Information: 1000

Print options:

- Default reports
- Custom
- All reports
- No reports

Data Processing

Calibration Type: K-Factor Linear

Component Table

Element	N	C	H	S	O
Retention time (s)	33	50	114	201	-
Window (±s)	3	10	46	40	-
Interval from (s)	-	-	-	-	-
Integration to (s)	-	-	-	-	-

Integration Parameters

Start Integr.	Peak Thr.	Peak Width	Min. Area	Baseline
1	1	1	1000	V.Valley

Time Event Functions

From	To	En.Int.	PT	PW	MA	Bsl

Autarun

Save Import Load

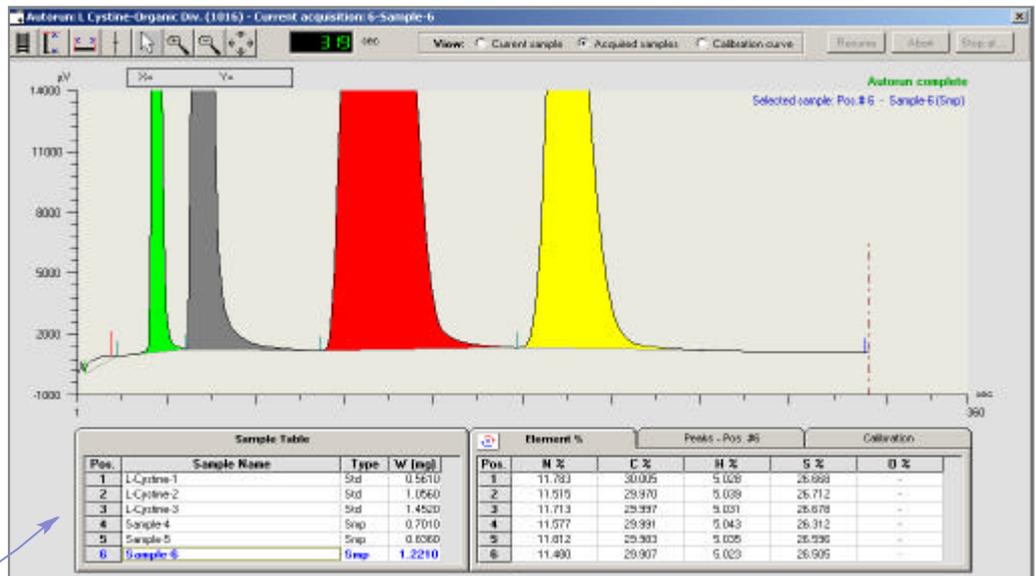
Start

Stand-by at the end of Autorun

Graphics. Tools to review and finely inspect Integrated chromatograms.

Acquisition. During the analysis, chromatogram acquisition is followed in real time.

Samples appending is enabled during the analysis.



Results are presented in real time in the acquisition window, together with all the relevant integration data.

Acquisition window includes color coded chromatogram acquisition and results presented in real time. The window also includes possibility of appending samples and using graphics for chromatogram fine inspection.

Sample Manager engine allows to search and retrieve acquired AutoRuns.

Reprocessing. AutoRuns can be reprocessed after acquisition: results can be recalculated using the best selection of data processing parameters. Fast scroll facility is available.

Calibration review provides calibration curves for each element and related correlation factors. The function allows for reviewing points for optimal calibration procedure completion.

Printouts are sent directly to printer or to screen for preview. Export to PDF format and disk storage is enabled.

Options. Empirical Formula determination, Heat Values Calculator for fuels, Quadratic Calibration and CFR21.11 compliance are available.

Report configuration

Results Summary

Element % Area Retention Times

K-Factors Area % All

Include statistics

Calibration

N C H

S O All

Samples

Print all samples Print Chromatogram

Select samples to print

No sample printouts

Scale

AutoScale Y min [0] μV

Y max [0] μV

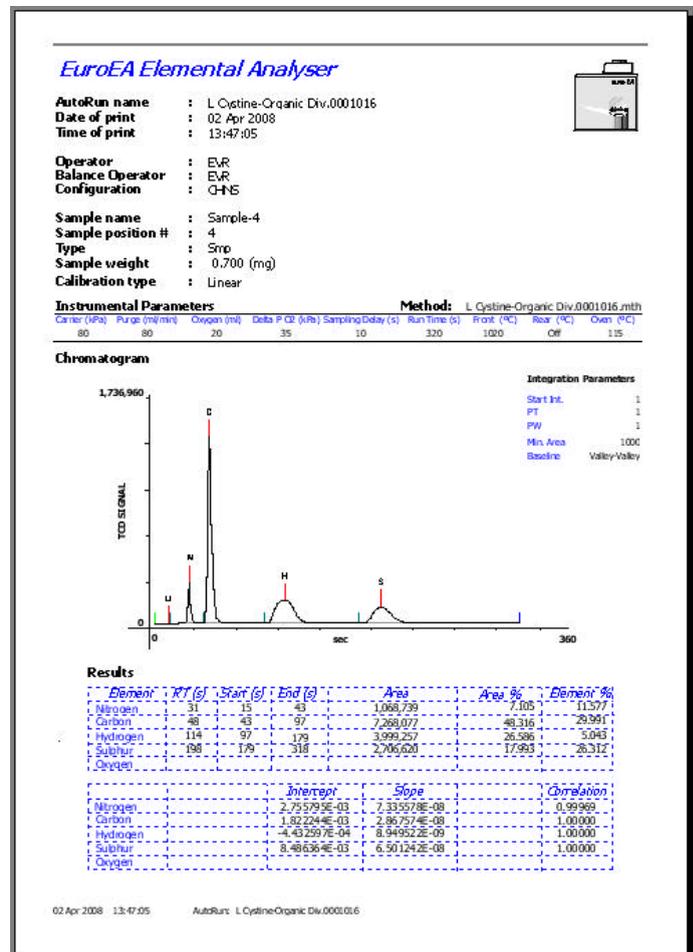
Method & DP

Method & DP

Destination

To printer Preview (manual print)

Store as defaults OK



EA and HT-PyrOH for Continuous Flow (CF) - Isotope Ratio Mass Spectrometry (IRMS)

In the year 2000 EuroVector introduced a dedicated line of Elemental Analysers (EA) and Pyrolytic Unit (PyrOH) for very stringent requirements of the IRMS. Since then, EuroVector have been regarded as innovation leader in CF-IRMS.



EA-LAS for (O)(H) in water analysis

Today EA and PyrOH are the most versatile sample preparation Unit for IRMS. Independently from sample size and organic content, EA-PyrOH allows IRMS system to deliver high precision measurement, exhibiting excellent linearity and reproducibility.

Combustion applications (NC) (S). VectorSAS Solid and Liquid AutoSampler, 80 positions, is feeding the analyser and a combination of Isotope Ratios for ^{15}N and ^{13}C is obtained in a single run. In only 7 minutes, Nitrogen and Carbon Isotope Ratios are determined in peak jumping granting high throughput automation. Present Elemental Analysers offered are:

EA3024-IRMS: up to 1100°C for (NC),(S) in solids, (H) in water

EA3028-IRMS: up to 1200°C for (O) in water at 1150°C

VectorSAS, the patented open architecture for instantaneous Zero Blank AutoSampler, is positioned on top of the EA and PyrOH allowing to add samples any time during AutoRun.

Pyrolytic applications for (O) and (H) in water. LAS (Liquid AutoSampler), fully independently programmable and interfaced with EA, have improved IRMS accuracy for water analysis, shortening analysis time avoiding water equilibration long process. The water analysis system includes Heater, Injector Port and microsyringe to run up to 110 samples into the EA reactor, at temperature up to 1150°C, in a fully automatic way.

HT-PyrOH. This Unit is featuring fixed heating rate from standby temperature up to 1500°C, assuring constant temperature for the entire length of the hot zone. Ability, by design, to keep integrity of the analytical circuit is limiting IRMS background increase and, together with higher Thermal Conversion rate, have achieved superior level of performances for Carbon Reduction applications.

HT-PyrOH is interfaced to EA3024/EA3028-IRMS models to take advantage of the automation facilities built in the EA's.

CF-IRMS advantages. The capability of Continuous Flow (CF) interfaced to Isotope Ratio Mass Spectrometry (IRMS) to measure Isotope Ratios at natural and enriched abundance, in organic and inorganic samples of variable concentrations, offers significant advantages to analysts in a diverse range of application areas.

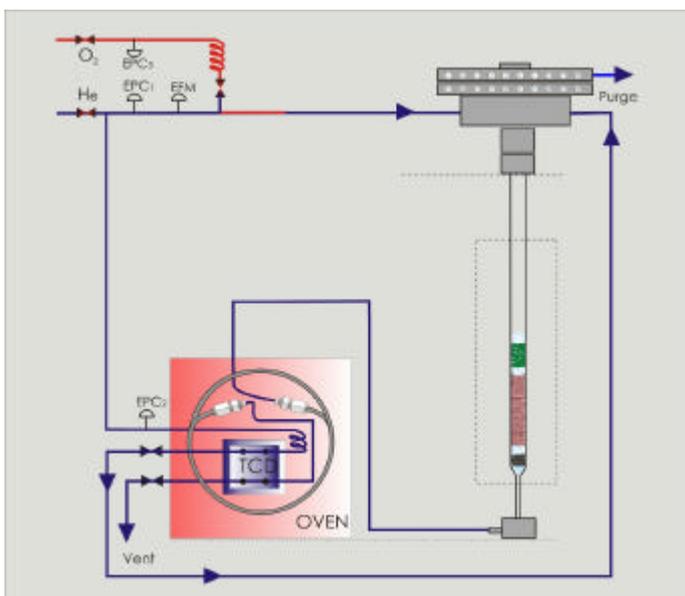
Oxygen Isotopes in organic materials, Sulphates, Nitrates and Phosphates are analysed using EA and HT-PyrOH applicable in environmental and hydrology studies. Sulphur, Carbon and Oxygen are used in combination for investigating geological and biological environments.

Hydrogen isotope data has been used successfully in animal migration, forensic and ecological studies, whilst Nitrogen is widely applicable in ecosystem dynamics, agrochemicals and physiological investigations.

HT-PyrOH interfaced to Control Unit Mod 03 allows to work independently from EA. The modular and compact System provides improved actuation of the VectorSAS AutoSampler and control of pressure/flow of the carrier/reference gas. Additional features include GC Oven temperature control, chromatography GC column separation of gases produced by the Carbon Reduction and supersensitive TCD to detect the resulting well shaped and separated peaks for the most accurate IRMS determination.



HT-PyrOH interfaced to EA



How EuroEA works. In line with dynamic Flash Combustion Principle, a continuous flow of Helium is assured in the analytical circuit. Helium gas is split into carrier gas and TCD reference arm flow.

Sample is dropped from the AutoSampler into the reactor, together with synchronised injection of pressurised Oxygen provided by TurboFlash® optimal combustion: gases such as N_xO_x , CO_2 , H_2O , SO_2/SO_3 are the results of the combustion stage. Reduction step allows for elimination of the Oxygen excess converting the gas mixture into N_2 , CO_2 , H_2O , SO_2 . The gases are time separated by GC column in less than 5 minutes with peaks detected by TCD.

The entire operation is driven by Callidus Software downloading instrument parameters, setting Oxygen volume as per optimal TurboFlash combustion.

Well shaped, baseline separated peaks are then integrated and results printed out in one of the report formats selected by the user. All AutoRuns are automatically archived.

Ash & Residues Removal Device. Designed to eliminate ash and residues without extracting the reactor from furnace, the device maximises the effectiveness of the Patented TurboFlash® Combustion Technology.

The System includes disposable quartz liner that is removed together with ash and residues, allowing full exploitation of the catalyst life.

The device is easily installed on regular AutoSampler connectors, due to existing commonality and is generally used on samples such as soils, sediments, rocks, etc.



Catalysts and Consumables. EuroVector is manufacturer and supplier of a complete line of catalysts and materials for advanced instrumentation. In many application areas catalysts have been proven to be the key factor for competitive performances and cost effectiveness.

Prioritising quality of consumables, EuroVector have developed a dedicated line of Isotope Grade (IG) consumables for EA-IRMS applications requiring highly demanding specifications.

World-wide distributor network. EuroVector maintains an international network of accredited distributors with solid background in Elemental Analysis. EuroEA is well established in more than 50 countries over 5 continents. Distributors play an important role in exploiting new areas of applications, granting effective technical support and quick service on consumables deliveries.

Company Profile. EuroVector design, manufacture and sell scientific instruments focusing in the field of Elemental Analysis. They are committed to excellence in CHNS-O analysis through continuous innovation and the generation of new products.