

EMA 502

Elemental Analyzer CHNS-O

Precise, versatile, cloud-enabled micro elemental analyzer for Carbon, Hydrogen, Nitrogen, Sulfur and Oxygen determination with Helium and Argon as carrier gas.

velp[®]

Driven by curiosity



EMA 502 CHNS-O Analyzer

The EMA 502 Elemental Analyzer is the accurate and reliable solution for determining carbon, hydrogen, nitrogen, sulfur, and oxygen in sectors such as pharma, life science, chemistry, petrochemistry, energy, environment, agronomy, and food & feed. It combines high performance, versatility, and ease of use, with combustion analysis fully compliant with AOAC, AACC, ASBC, ISO, DIN, IFFO, OIV, ASTM, and EPA standards.

One Solution for Multiple Analytical Challenges

- All-in-one system for Carbon, Hydrogen, Nitrogen, Sulfur, and Oxygen determination
- Combustion and pyrolysis integrated in a single analyzer
- No need for external modules – compact and efficient design
- Ideal for laboratories handling diverse organic matrices

Versatility & Productivity

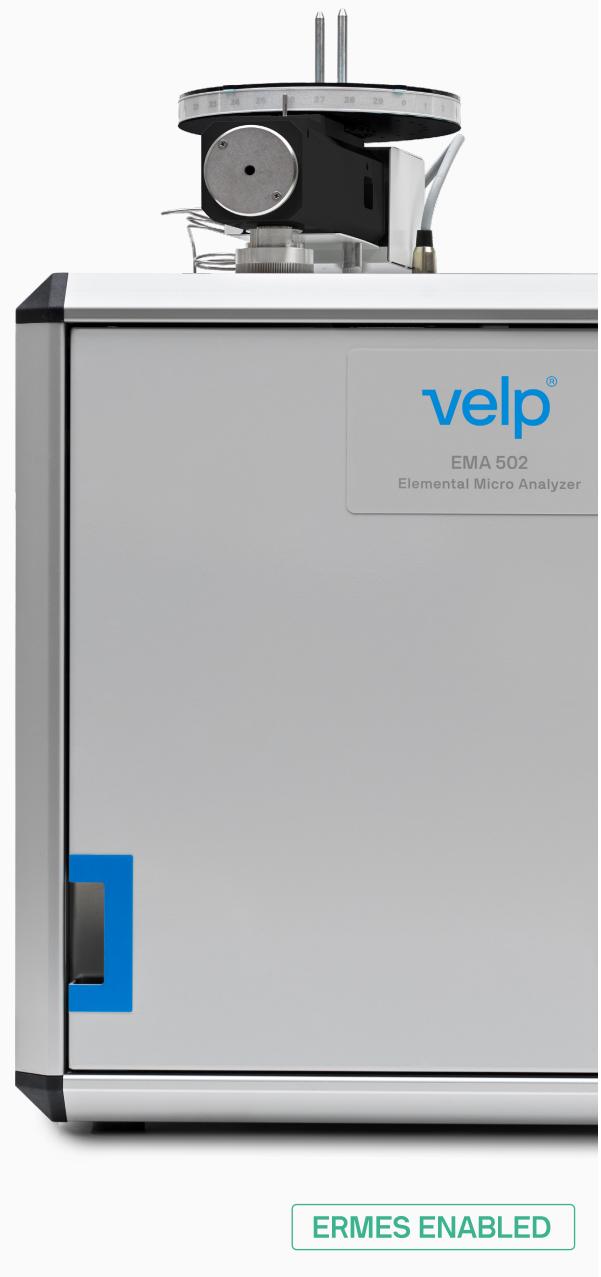
- 30-position electronic autosampler, expandable with 3 additional discs
- Effortless switch between CHNS and O modes via the exclusive connection panel
- Works with Helium and Argon as carrier gases
- Designed for continuous, high-throughput workflows

Reliability & Accuracy at Every Level

- Exclusive Thermal Conductivity Detector (TCD) for top-tier precision
- Accurate measurements from ppm to 100%
- Suitable for solid, paste, and liquid samples
- Gas Chromatographic separation for real-time, reliable peak data

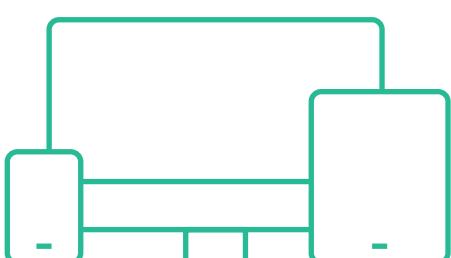
Smart Software & Connected Workflow

- EMASoft™: powerful, intuitive control software
- Real-time graph to monitor your analysis at every step
- Comprehensive report generation for clear, compliant documentation
- Velp Ermes Cloud Platform for remote monitoring, data access, and premium technical support



C 12.011 H 1.008 N 14.007 S 32.07 O 16

Velp Ermes Connection



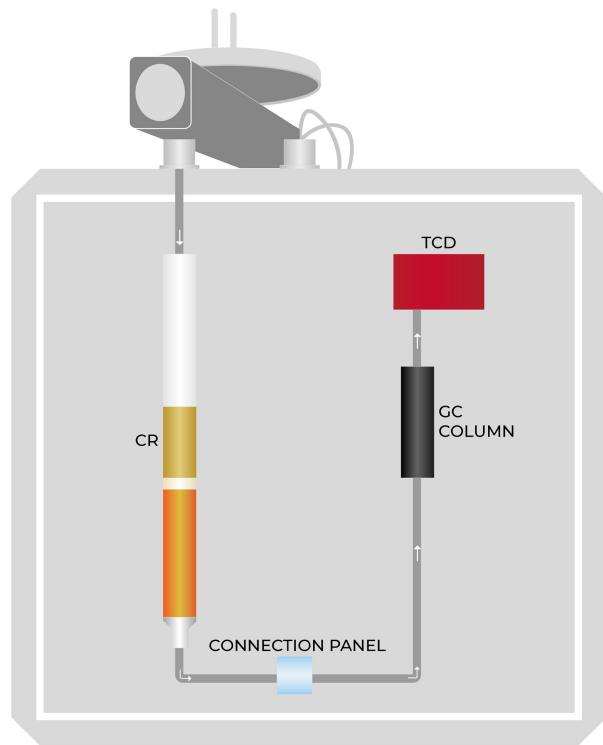
Connect the EMA 502 CHNS-O Analyzer to the exclusive Velp Ermes Cloud Platform to improve your laboratory experience. The Velp Ermes Cloud Platform connection will unburden you from tedious tasks improving your lab productivity.

- Enhanced service support
- Real time monitor and control of the instrument from PC, smartphone and tablet whenever you want, wherever you are
- Immediate alert and notification with the possibility to stop the instrument for maximum safety
- Regular software updates will guarantee the best performance and new features with just one-click

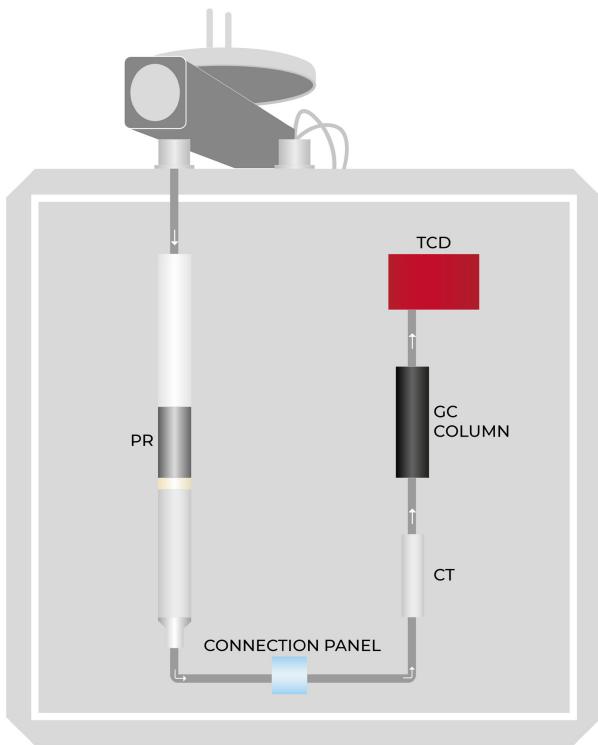
EMA 502

Analysis Process

CHNS Determination



O Determination



- **CR**
(Combustion Reactor) Allows complete combustion at 1030 °C in order to convert all of the sample into its elemental substances. Vcopper in the lower part of the reactor helps the reduction of NOx into N₂.
- **GC COLUMN**
(Gas Chromatographic Column) Analyzes the gases and let them flow out of the column with different retention times.
- **TCD**
(Innovative TCD) Determines the content for all the elements without the need for a reference gas. Maintenance-free.

- **PR**
(Pyrolysis Reactor) Allows complete pyrolysis at 1060 °C in order to convert all of the sample into its elemental substances.
- **CT**
(Chemical Trap with Anhydride) Absorbs all the impurities from pyrolysis and conveys the flow to the GC Column for O analysis.
- **GC COLUMN**
(Gas Chromatographic Column) Analyzes the gas flow before O quantification.
- **TCD**
(Innovative TCD) determines the content for oxygen without the need for a reference gas. Maintenance-free.

Fields of Application

The EMA 502 is extremely versatile, being suitable for carbon, hydrogen, nitrogen, sulfur and oxygen determination in several types of sample, in accordance with official AOAC, AACC, ASBC, ISO, ASTM, EPA, DIN and OIV methods.



Chemical & Petrochemical

Rubber, Plastic, Lubricants, Petroleum products, Coal fuels, Coke



Environmental & Agro

Soils, Plants, Fertilizers, Waste, Wastewater, Water, Sludges, Sediments



Pharmaceutical & Life Science

Pharmaceutical products, Vaccines, Active ingredients



Food, Feed & Beverage

Meat, Fish, Poultry, Cereals, Bakery products, Milk, Dairy, Oils, Fats, Brewery products, Oils Seeds, Pet food

Optional Accessories

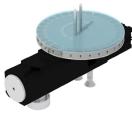
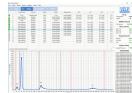
Tin Foil Cups, 5x9 mm 250 pcs	A00000436
Silver foil 35x35 mm, 100 pcs	A00000371
Pre-packed CHNS reactor	A00000443
Pre-packed O reactor	A00000444
Quartz reactor tube diam. 18 mm	A00000435
Quartz ash collector diam. 13 mm	A00000445
Kit approx. 1000 analysis for CHNS	A00000432
Kit approx. 1000 analysis for Oxygen	A00000433
Quartz wool, 50 g	A00000154
Nickel wool, 5 g	A00000447
Nickel Carbon wool, 5 g	A00000440
Anhydrene, 454 g	A00000225
EDTA Certified, 100 gr	A00000149
Sulphanilic acid certified, 5 gr	A00000434
Vcopper High Reduction Efficiency, 470 g	A00000240
Tungsten oxide, 25 g	A00000439
Quartz Chips, 50 g	A00000441
High temperature sealing grease	A00000236
Super-Absorbent Powder, 10 g	A00000317
GC column for CHNS 2 m PTFE	A00000438
GC column for oxygen SS 1 m	A00000437
Disc 2 for autosampler	A00000199
Disc 3 for autosampler	A00000200
Disc 4 for autosampler	A00000201
21 CFR part 11 package for EMA 502	A00000455
IQ/OQ/PQ EMA 502 Manual	A00000442
PM kit EMA502	40003081
Fluorine Absorber, 15g	A00000456
Vanadium pentoxide, 10g	A00000457
Velp Ermes 1 Year Connection	E00010012
Velp Ermes 3 Year Connection	E00010036

Instrument - Code

EMA 502 230 V / 50-60 Hz F30800100

Supplied with

The EMA 502 Elemental Analyzer is supplied with all necessary parts to perform up to 1000* analyses CHNS (inclusive of catalysts, copper, quartz wool, reagents and seals). In addition, it contains chemicals and small consumables spare for maintenance.

	A00000438 GC column for CHNS		40001693 USB cable for PC, 5m
	40003062 Autosampler with disc 1		10003926 RS232 Cable for balance
	40003064 EMASoft™ Software		E00010012 Velp Ermes 1 Year Connection

Oxygen Determination

For Oxygen analysis, the following codes must be ordered in addition to the instrument code F30800100

	A00000433 Kit approx. 1000* analysis for Oxygen		A00000437 GC column for oxygen
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GLP Good Laboratory Practice

AOAC	AACC	ASBC
ISO	DIM	IFFO
OIV	ASIM	EPA

21 CFR Part 11 Compliance

The EMA 502 Elemental Analyzer is fully compliant with FDA's Code of Federal Regulations Title 21 Part 11 that defines the requirements for using electronic records and electronic signatures on computerized systems.



- Track and record of settings and any changes to settings with the system log function running permanently, serving as an audit trail
- Track who performs any operation as analysis results are automatically signed with the user information. Each user has a unique identification and electronic signature
- Ensure the quality and incorruptibility of recorded data with backup procedures. Exported files are protected from unwanted or improper alteration
- Ensure the right delegation of responsibilities at the right level with the user management system with three access levels

EMASoft™ Software

The EMASoft™ software is the powerful Velp solution that controls and operates the EMA 502 analyzer. The EMASoft™ comes with a user-friendly interface that displays all the relevant information at a glance: results, database and instrument conditions. It is possible to choose from a library of pre-installed methods and create customized ones.

Before the Analysis

1

- Create or choose a calibration curve for C, H, N, S and O
- Fill in the required data (sample name, analysis type, weight...)
- Select a method and calibration curve

During the Analysis

2

- Monitor of the working parameters
- Real-time graph with all the element peaks for a comprehensive understanding of the analysis as it progresses
- Immediate readout of the results in mg and %

After the Analysis

3

- Multiple data comparison in graph
- Data export in .xls, .txt and .csv to PC or LIMS
- Create, print and download reports of single or multiple analyses
- When necessary, set the instrument in Stand-by mode or Sleeping mode
- Short statistical analysis in one click: result table displaying average, SD, and RSD of the analysis with direct selection on the graph



Technical Data

EMA 502	
Method of analysis	CHNS: Combustion O: Pyrolysis
Analysis time	CHNS: 12 minutes O: 6 minutes
Detector	TCD (Thermal Conductivity Detector)
Sample weight	Up to 100mg (depending on C content)
Autosampler type	Electronic
Autosampler capacity	Up to 4 discs, 30 positions each (up to 117 samples)
Detection range	C: ppm up to 20 mg abs. (or 100 %) H: ppm up to 5 mg abs. (or 100 %) N: ppm up to 20 mg abs. (or 100 %) S: ppm up to 6 mg abs. (or 100 %) O: ppm up to 6 mg abs. (or 100 %)
Precision	≤ 0,5 % for Sulfanilic Acid Standard (Helium 5.0, 6-digit balance)
Combustion / pyrolysis temperature	1100 °C 2012 °F
Carrier gas	Helium or Argon (grade 5.0)
Combustion gas	Oxygen (grade 5.0)
Connectivity	Ermes Cloud Platform via Wi-Fi or LAN connected to a PC
21 CFR Part 11 Compliance	Yes, optional package available
Interfaces	USB; RS232
Official references	ISO 16948; ISO 21663; ISO 10694; ISO 15178; ISO 13878; ISO 20620; ISO 2287; ISO 29541; EN 13654; EN 13654-2, EN 15936; ASTM D 5373; ASTM D 5291; ASTM D 4239; ASTM D 5622; AOAC 993.13; AOAC 2017.08, etc.
Dimensions (W X H X D)	500 x 510 x 410 mm (H 680 mm with autosampler) 19.7 x 20.1 x 16.1 in (H 26.8 with autosampler)
Weight	45 kg 99 lb

Service & Support

Velp products are designed by our engineers to resist years of laboratory use.

Our products are manufactured with premium materials to guarantee the best performance with maximum safety.

According to our experience, a proper and regular maintenance is necessary to ensure the highest performance of analytical instrument. Velp Service Department and Velp Official Partners are always ready to offer you maintenance and service support tailored to your needs.

Get the support you need choosing the options:

- Help-desk and Remote support
- Technical Assistance
- Analytical Support

We reserve the right to make technical alterations
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