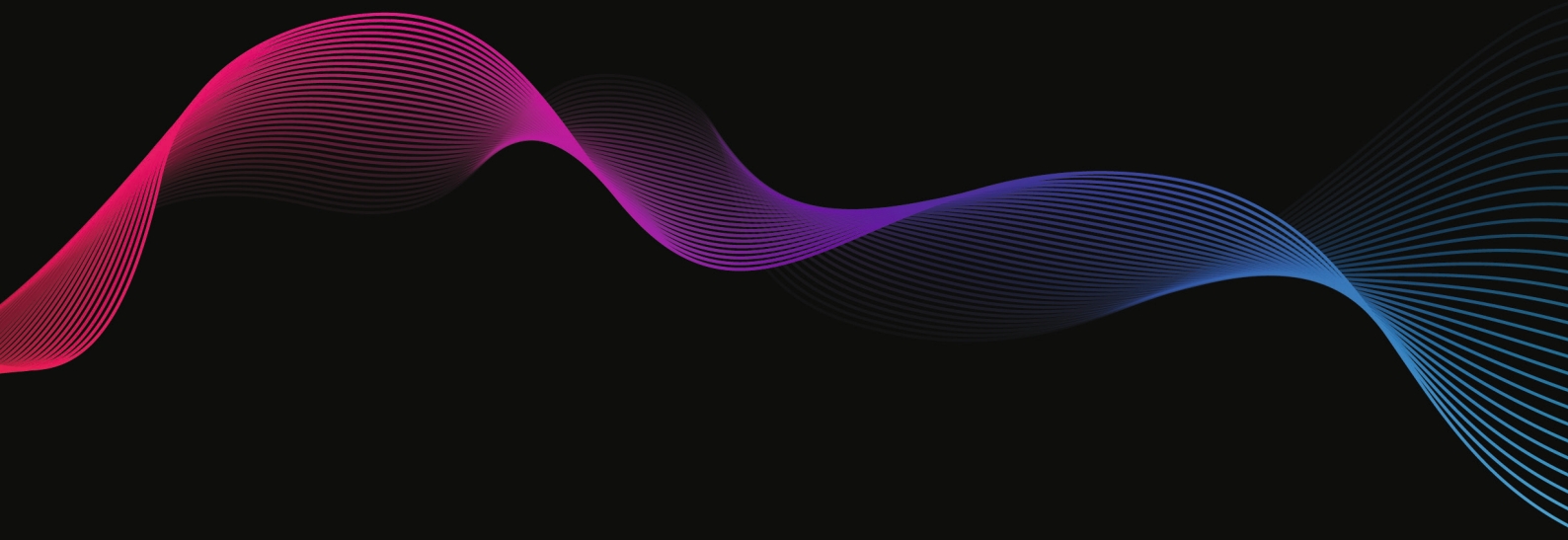
SPECTRO ANALYTICAL INSTRUMENTS

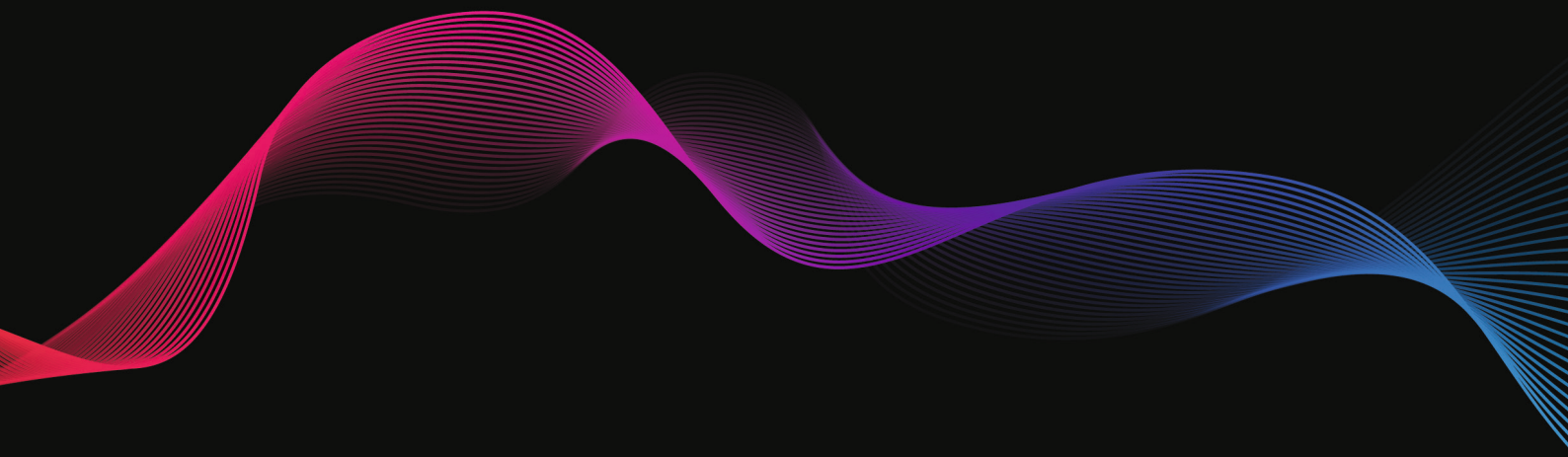
A SPECTRUM OF INNOVATION

Elemental Analysis Solutions for
Industry, Research and Academia



SPECTRO
AMETEK®

When results matter.



PRODUCT OVERVIEW

Founded in 1979, SPECTRO has a proven track record as the leading innovator of Arc/Spark-OES, ICP-OES and X-ray fluorescence technologies

SPECTRO is a leading supplier of X-ray fluorescence (XRF), ICP-OES and Arc/Spark-OES instruments for science and industry. SPECTRO's floor standing, benchtop, portable, and handheld spectrometers are used for wide ranging elemental analysis tasks in process control, incoming/outgoing QC, on-site & field, research, remediation, valuation and compliance testing applications.

STATIONARY METAL ANALYZERS

To meet the divergent needs of industry, SPECTRO offers advanced optical emission spectroscopy metal analyzers with arc and spark excitation (arc spark OES)

SPECTROLAB S

This instrument's efficiency and economy are continuously improved by systematic voice-of-customer inputs and rigorous usability testing. So now a fully reimagined software suite brings even more functional, customizable ease of use. Argon consumption is reduced by up to 50 % in standby mode and by 13 % when measuring samples. A fast analysis program enables 12-second measurement of main alloying elements in some key metals. And trace limits of detection (LODs) for high-purity copper are improved by 30 %.

Typical Applications:

primary metal producers, secondary metal producers, automotive and aerospace manufacturers

- **Highly accurate results in under 20 seconds (example: low-alloy steels) and analysis of main alloying elements in under 12 sec. (example: iron, aluminum and copper materials)**
- **Unique iCAL 2.0 one sample standardization helps maintain the same standardization — regardless of most temperature shifts and saves on average 30 minutes per day**
- **Up to 50 % reduced argon consumption than previous models in standby mode and 13 % less during full-flow operation**
- **30 % improved detection limits for high purity copper analysis compared to its predecessor**

Arc spark spectrometers

can be used for many aspects of the production cycle including in-coming inspection of materials, metal processing, quality control of semi-finished and finished goods and many other applications where a chemical composition of the metallic material is required.

SPECTROMAXx

Compact stationary spark OES analyzer used to determine all elements used in the metal industry including trace analysis of nitrogen (N), carbon (C), sulfur (S), and phosphorus (P) — as well as hydrogen (H) and oxygen (O) in titanium (Ti) base materials. The high resolution CMOS multi detectors cover the wavelength range 120-766 nm. Reliable analytical performance that is precisely tuned for the incoming and outgoing material control and future demands.

Typical Applications:

foundries and casting companies for incoming/outgoing inspections and material control

- **Unique iCAL 2.0 one sample standardization helps maintain the same standardization — regardless of most temperature shifts and saves on average 30 minutes per day**
- **Up to 64% reduced argon consumption during standby, compared to previous models**
- **Ideal for routine analysis and precise analysis of all incoming/outgoing materials and for process control (including nitrogen) in foundries — covering 10 matrices, 65 methods and 59 elements**

SPECTROCHECK

The SPECTROCHECK stationary metal analyzer is designed to meet the performance requirements — and budgets — of small foundries, both ferrous and non-ferrous; plus automotive suppliers and other metal fabricators. This high-quality, compact and affordable instrument is ideal for routine analysis of elemental content in a variety of metal samples such as iron-, aluminum-, or copper-based metals. Organizations using SPECTROCHECK can rest assured that their metals have been reliably tested to meet the most rigorous specifications for content and quality.

Typical Applications:

casting companies for incoming/outgoing inspections and material control

- **Ultra-fast one sample standardization – based on SPECTRO´s Intelligent Calibration Logic (iCAL) – saves on average 30 minutes per day**
- **Advanced optics technology for high performance and affordability**
- **70% reduced argon consumption during standby, compared to the previous model**
- **Space savings: 35% smaller footprint than the previous model**

MOBILE METAL ANALYZERS

A full range of metal analyzer products for onsite metal analysis tasks

SPECTROTEST

The SPECTROTEST is a mobile arc spark spectrometer ideal for many applications in the metal producing, processing, and recycling industries. This metal analyzer flaunts its superior performance especially when exact metal analysis is required, when materials are difficult to identify or when there is a large number of samples to be tested. The new readout system and iCAL 2.0 diagnostics software upgraded the SPECTROTEST and allows users perform a single-sample standardization (in less than 5 minutes).

Typical Applications:

metal producing, metal processing
and metal recycling industries

- **No compromise: high resolution optical system for probably widest element range (even N, Li, Na), all elements necessary for a complete metal analysis on the spot are available**
- **Unique new iCAL 2.0 one sample standardization helps maintain the same standardization — regardless of most temperature shifts and saves on average 30 minutes per day**
- **Flexible point-and-shoot analysis with various quick to change sample probes, battery powered operation — up to 800 measurements on a single charge**

SPECTROPORT

When handhelds aren't enough, the amazing new SPECTROPORT portable metal analyzer applies more advanced OES technology — in a unit as easy to use as a handheld analyzer. SPECTROPORT delivers many advantages of SPECTRO's portable OES flagship, SPECTROTEST, in a smaller, lighter package. It accurately analyzes elements such as carbon, sulfur, phosphorus, and boron. It enables effortless point-and-shoot performance, to minimize operator intervention and decision-making.

Typical Applications:

metal producing, metal processing
and metal recycling industries

- **Unlike handheld XRF, accurately analyzes elements like C, P, S, B, Li, Be, Ca, Si, Mg and Al even at low and critical levels, in only a maximum of 10s**
- **Consistent results with unique new iCAL 2.0 one sample standardization combined with self-adjusting optical system — resilient to ambient temperature changes and saves on average 30 minutes per day**
- **Effortless point-and-shoot analysis, battery powered operation — up to 800 measurements on a single charge**

HANDHELD XRF ANALYZERS

Designed for high-throughput testing and spectrochemical analysis

Field-proven Quality

SPECTRO xSORT spectrometers are used in the plant, on the jobsite, or in the most challenging field location. They deliver laboratory-quality results in a matter of seconds. SPECTRO xSORT models are optimized for fatigue-free, on-site measurements. A focus on long-term reliability is evident in every facet of their design. Example: its shutter and unique iCAL standardization system allow SPECTRO xSORT to continuously correct for drift — eliminating the need for tedious annual recalibration!

SPECTRO xSORT

The SPECTRO xSORT family of handheld ED-XRF spectrometers supplies elemental testing and spectrochemical analysis of myriad materials in widely varying conditions. These energy-dispersive X-ray fluorescence devices are recognized for ruggedness and reliability on the job. They offer metals or nonmetals identification in seconds, with innovative technologies and designs that provide repeatable, laboratory-quality results.

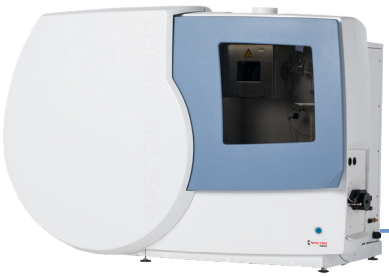
Typical Applications:

PMI, environmental screening, recycling alloys, precious metals, mining and compliance screening

- **Robust tool, analyzes most alloys in 2 seconds, and identifies alloys containing light elements in 7 seconds, standard calibration captures alloys and precious metals for 16 matrices with 46 elements**
- **Instrument usually ready to measure within 10 seconds after switching on, offers simultaneous result storage in various formats at different destinations (USB drive, network, or printer)**
- **Compliance testing and quick screening of non-metallic samples. Video-camera for exact sample positioning and documentation of measured spot.**

ICP-OES SPECTROMETERS

The performance benchmark for ICP-OES/ICP-AES spectrometers



SPECTRO ARCOS

The SPECTRO ARCOS ICP-OES excels in industrial and academic applications for the most advanced elemental analysis of metals, chemicals, petrochemicals, and other materials. The periscope-free MultiView mechanism lets an operator literally „turn" a radial-view instrument into an axial-view device, or vice-versa, in 90 seconds or less. MultiView now includes dual side-on plasma observation. The two optical interfaces add sensitivity and eliminate contamination/matrix compatibility issues.

Typical Applications:

for the most demanding requirements in industrial, environmental, chemical, petrochemical and academia elemental analysis

- **New dual side-on interface (DSOI) adds sensitivity and eliminates contamination/matrix compatibility issues**
- **One instrument instead of two: Only MultiView plasma instrument in the market – true axial AND true radial (single or dual) plasma observation in one instrument**
- **ORCA Optical System: Simultaneous spectrum capture in the 130-770 nm wavelength range with up to 5x more sensitivity than Echelle based systems – delivers best in class performance in the UV/VUV range**

SPECTROGREEN

The SPECTROGREEN ICP-OES analyzer is available in three versions: Revolutionary Dual Side-On Interface (DSOI), Twin Interface (TI) and Side-On Plasma (SOP). All three SPECTROGREEN versions deliver ultra-reliable, accurate analyses of elements — at trace as well as higher concentrations — in challenging matrices, such as certain wastewaters, soils, and sludges, as well as organic, high-salts, and metal samples. SPECTROGREEN is ideal for routine elemental analyses in environmental and agronomy, consumer product safety, pharmaceutical, chemical/petrochemical, and food applications.

Typical Applications:

water, waste water, industrial waste water, soil, sewage sludge, wear metals in oil and additives in oil

- **New revolutionary Dual Side-On Interface (DSOI) technology that achieves twice the sensitivity of conventional radial-plasma-view instruments**
- **TI technology enables highest sensitivity for trace elements, as well as freedom from matrix interferences plus good accuracy for challenging environmental matrices**
- **New GigE readout system that enables spectra transport in less than 100 ms for faster analysis speeds, shorter sample-to-sample times, and more samples per hour**
- **Extremely agile, LDMOS generator that makes external cooling unnecessary: analyze difficult sample matrices in lower dilutions for lower limits of detection — faster warmup (~10 minutes) for higher productivity**

ICP-OES spectrometers

Over the last 25 years ICP-OES spectrometers, also known as ICP-AES or ICP plasma spectrometers, have become an indispensable tool for chemical elemental analysis. Optical emission spectrometers with inductively coupled plasma (ICP plasma) excitation sources offer ease of use, high sensitivity and precision and relative freedom from interferences. ICP-OES systems have now become the analytical method of choice for a wide range of applications.

SPECTRO GENESIS

The SPECTRO GENESIS ICP-OES is considered the „gold standard" among entry-level elemental analyzers. It is easy to use, delivers industrial-grade durability and throughput, and is surprisingly affordable to purchase and operate. Its linear dynamic range allows analysis from parts per billion (ppb) to percent levels. And its exciting DSOI plasma optics furnish high sensitivity. So it can deliver fast, accurate analysis for a wide range of emission control and process control applications.

Typical Applications:

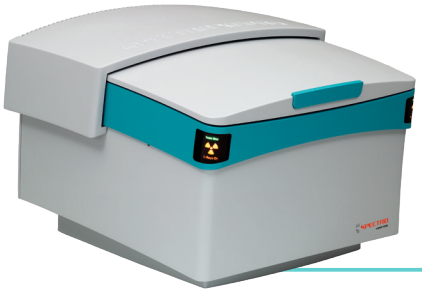
water, waste water, industrial waste water, soil, sewage sludge, wear metals in oil and additives in oil

- **Dual Side-On Interface with up to factor 2 improved sensitivity: no second measurement, reduced matrix effects, improved accuracy, high matrix tolerance**
- **High measurement speed: Fast, simultaneous spectrum acquisition enabling short sample to sample time and the analysis of up to 700 samples per day**
- **Low operating costs: minimal 0.5 l/min optic purge, no water chiller necessary**

XRF SPECTROMETERS

For X-ray fluorescence spectrometers for elemental analysis or trace element analysis, SPECTRO is a world leader

SPECTRO XEPOS



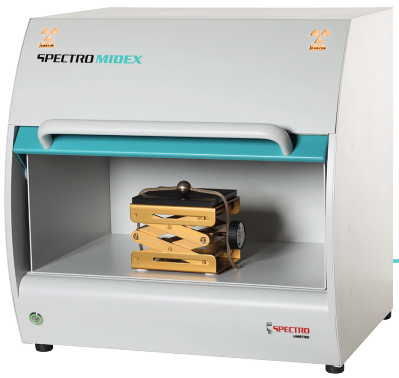
The SPECTRO XEPOS spectrometer represents a quantum leap in energy dispersive X-ray fluorescence technology. It leads SPECTRO's newest generation of ED-XRF instruments, providing breakthrough advances in multi-elemental analysis of major, minor, and trace element concentrations. New developments in excitation and detection deliver outstanding sensitivity and detection limits — yielding remarkable gains in precision and accuracy. A multi-layer analysis package and the powerful Ident Software complete the analytical capabilities of the SPECTRO XEPOS.

Typical Applications:

geological and mining samples, waste, soil, sewage sludge, additives in oil, cosmetics, food, cement, slag, clinker, refractories, air filters and compliance screening applications

- **Measure lower than ever and faster than ever: Adaptive excitation, advanced tube design and high-count throughput detection system result in outstanding low detection limits for a wide range of elements at even shorter measurement times (up to a factor 2)**
- **Improved accuracy based on optimized spectra handling: Master the unknown using the benchmark in ED-XRF screening, SPECTRO's TurboQuant II application package for the unprecedented ability to analyze unknown samples, whether they are liquids, solids or powders – whether they are tree leaves, plastics, oil, granite or glass…**
- **Application range extended to multilayer analysis, up to 8 layers and up to 55 elements**

SPECTRO MIDEX



The SPECTRO MIDEX is known to be an all-round talent for the fast, non-destructive analysis of small spots in research and development, compliance screening and precious metals applications. It offers fast and extremely sensitive, non-destructive measurements. In addition, the SPECTRO MIDEX can also be used to analyze multi-layer structures for the layer thickness and the composition.

Typical Applications:

precious metal alloys from production to recycling, compliance screening applications, forensic science, analysis of defects and debris small particles in various industries

- **The market recognized gold standard for element analysis of precious metals using XRF**
- **Wide scope of > 30 elements backed by extensive factory calibrations providing the best accuracy for traces and majors**
- **Up to a factor of 3 shorter measurement times: choose exceptional results at coventional measurement times, or conventional results at exceptional measurement times**

ED-XRF spectrometers

Energy dispersive X-ray fluorescence technology (ED-XRF) provides one of the simplest, most accurate and most economic analytical methods for the determination of the chemical composition of many types of materials. It is non-destructive and reliable, requires no, or very little, sample preparation and is suitable for solid, liquid and powdered samples. It can be used for a wide range of elements, from sodium (11) to uranium (92), and provides detection limits at the sub-ppm level; it can also measure concentrations of up to 100% easily and simultaneously.

SPECTROCUBE

The new SPECTROCUBE ED-XRF analyzers delivers easy, reliable, accurate, high-throughput analysis for a variety of applications, e.g. analysis of precious metals, compliance screening or analysis of fuels and lube oils. The SPECTROCUBE can also be used to analyze layer thickness and composition.

Typical Applications:

precious metals, fuels & oils, compliance screening, polymers, chemicals and more

- **Fastest in its class: Twice as fast as typical testing, high precision with high speed**
- **Excels in scope and accuracy: Optimized application packages**
- **Unparalleled ease-of-use: Just three simple steps to accurate results**

SPECTROSCOUT

SPECTROSCOUT ED-XRF portable analyzers deliver much of the analytical power of top-grade laboratory benchtop analyzers: fast, dependable, truly lab-quality results in the field or on the production floor — all at a surprisingly low cost. The SPECTROSCOUT analyzers provide exceptional performance, at wide concentration levels, for all of the relevant elements in the range of Na-U. SPECTROSCOUT impresses with unprecedented precision and speed making it the ideal portable XRF for onsite applications where results matter.

Typical Applications:

geochemical, environmental screening

- **Light weight and portable elemental analyzer**
- **Fast and on-site: Elemental analysis of rock, sediment and soil. Element range starting from Na, detection limits for relevant trace elements significantly lower compared to other portable and handheld XRF instruments**
- **At the production line: High productivity with application specific packages. Small footprint with high analytical power**

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