

SPECTRO ANALYTICAL INSTRUMENTS

A SPECTRUM OF INNOVATION

Elemental Analysis Solutions for
Industry, Research and Academia



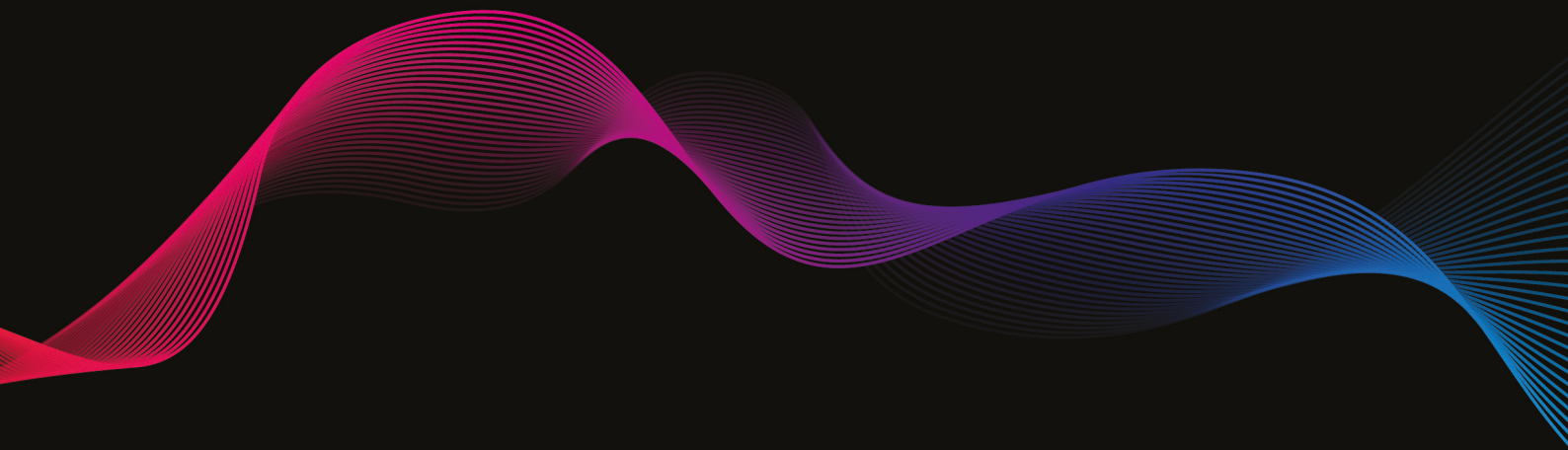
SPECTRO



AMETEK

MATERIALS ANALYSIS DIVISION

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.

4-5 **Stationary Metal Analyzers (Arc/Spark OES)**

Precise and accurate elemental analysis of all types of metals for process control and incoming/outgoing QC applications

6 **Mobile Metal Analyzers (Arc/Spark-OES)**

Fast and reliable on-site analysis, positive material identification (PMI), alloy verification and batch sorting of metals and metal alloys

7 **Handheld XRF Analyzers**

The ultimate in portability, ideal for metal analysis and sorting, compliance screening, environmental analysis and mining applications

8-9 **Inductively Coupled Optical Emission Spectrometers (ICP-OES/ICP-AES)**

For ppb to % elemental analysis of liquids and slurries. Extreme productivity with automated, unattended, analysis of large sample batches. From academic investigation and environmental compliance, to research and process control for a wide range of industries.

10-11 **Energy Dispersive X-ray Fluorescence Spectrometers (ED-XRF/XRF)**

XRF spectrometers offer unparalleled elemental analysis flexibility for the analysis of solids, liquids and powders. The analysis of completely unknown materials, regardless of the matrix, is possible with XRF. Dedicated application solutions are designed for high productivity process control requirements and compliance screening 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

The SPECTROLAB S has the world's first CMOS-based detector system that's perfected for high-end metal analysis — thanks to SPECTRO's proprietary CMOS+T technology. From trace elements to multi-matrix applications, it provides extremely fast, highly accurate, exceptionally flexible analysis. When it comes to sample throughput, SPECTROLAB S meets the metal market's need for speed. Example: when analyzing low-alloy steel, it can deliver highly accurate measurements in less than 20 seconds!

Typical Applications:

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

- Highly accurate results in less than 20 seconds (example: low-alloy steels)
- Regular maintenance intervention requirements (spark stand cleaning) reduced by a factor of 8
- On average factor 2 improvement in detection limits for low-alloy steels and a factor 5 improvement for pure aluminum metals versus previous models
- Instrument footprint reduced by 27%
- iCAL 2.0 — one sample standardization for the complete system, saves on average 30 minutes per day



SPECTROLAB

The SPECTROLAB OES analyzers delivers the greatest innovation in elemental analysis yet. Stability, flexibility, and analytical functionality combined in a high performance package that is in a class of its own. Available in hybrid PMT/CCD and all-CCD versions, this analyzer sets a new standard for R&D and process/quality control.

Typical Applications:

metal analysis applications with demanding requirements for high precision and ultimate stability

- Ultimate elemental flexibility — covering 15 matrices, 68 methods, 65 elements and 210 lines (not counting reference lines); quick addition of elements and methods without hardware changes (SPECTROLAB CCD version)
- Simple standardization with only one sample — based on SPECTRO's Intelligent Calibration Logic (iCAL) — saves on average 30 minutes per day
- Excellent ease of use for effortless operations — simplified operator view presents clear choices via dedicated toolbar buttons

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 carbon, phosphorus, sulphur and nitrogen. The high resolution CCD multi detectors cover the wavelength range 140-670nm. 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 – saves on average 30 minutes per days
- Measurement times reduced by 12% over the previous model (example: low-alloy steel measurement time reduced by 3 seconds)
- 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 54 elements, at lower operating costs and minimal maintenance requirements



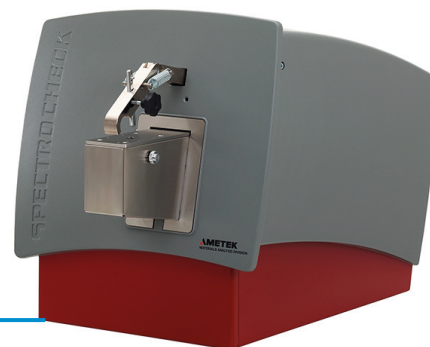
SPECTROCHECK

The SPECTROCHECK stationary metal analyzer is specifically designed to meet the performance requirements — and the budgets — of small and medium-size foundries and machining operations. This high-quality, compact, affordable instrument is ideal for routine analysis of elemental content in iron-, aluminum-, and copper-based metals. Companies using SPECTROCHECK can assure their customers 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

- Ideal for metal testing and quality control of iron-, aluminum- and copper-based samples; as well as dedicated solder bath analysis
- Ultra-fast one sample standardization — based on SPECTRO's Intelligent Calibration Logic (iCAL) — saves on average 30 minutes per day
- Industry unique app-like concept for user-friendly software operation



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

**SPECTRO****AMETEK**

MATERIALS ANALYSIS DIVISION

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:

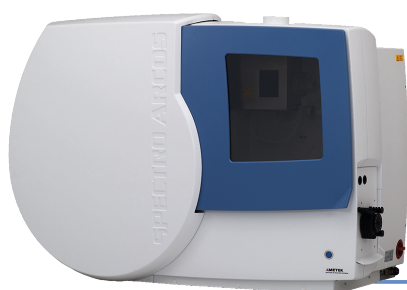
PMI, environmental screening, recycling alloys, precious metals, mining and compliance screening

- 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. Its unique new MultiView plasma interface option provides truly uncompromising axial-view and radial-view plasma observation in a single instrument. The periscopefree MultiView mechanism lets an operator literally „turn“ a radial-view instrument into an axial-view device, or vice-versa, in 90 seconds or less.

Typical Applications:

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

- One instrument instead of two: Only MultiView plasma instrument in the market — true axial AND true radial plasma observation in a single 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
- LDMOS Generator: Up to 2000 W power and robust enough to handle volatile organics and high dissolved solids with ease



SPECTROGREEN

SPECTROGREEN leverages more than 30 years of benchmark service and experience in inductively coupled plasma optical emission spectroscopy. Equipped with SPECTRO's proprietary DSOI technology, it delivers significant advantages in determining trace elements and handling samples with challenging matrices, including wastewaters, soils, and sludges, industrial chemicals, high salt samples, and metals.

Typical Applications:

ideal for routine analyses in environmental and agronomy applications, as well as consumer product safety; pharmaceuticals; petrochemicals; chemicals; and foods

- New revolutionary Dual Side-On Interface (DSOI) technology that achieves twice the sensitivity of conventional radial-plasma-view instruments
- 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 to lower limits of detection — faster warmup (~10 minutes) for higher productivity
- New SPECTRO ICP Analyzer Pro operating software delivers a simply intuitive ease-of-use



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.

Since the introduction of its first ICP spectrometer, SPECTRO has managed to continuously set performance benchmarks.

SPECTROBLUE

Compact mid-range ICP-OES spectrometer with twin interface plasma observation, addresses common laboratory analysis tasks with a whole new class of performance and affordability. Proven optics to deliver unmatched resolution and sensitivity combined with innovative gas purification to eliminate optic system purging. It has a breakthrough design to avoid any external cooling, simplified operation, maintenance and affordable price help to deliver the lowest cost of ownership.

Typical Applications:

drinking water, soil & sludge, waste water, aqueous solutions and environmental samples

- Highly transparent optical system: Highest sensitivity thanks to superior UV performance and constant resolution
- Saves thousands per year: no optic purge gas required, no water chiller necessary
- Faster out of the gate: less than 10 minutes warmup time (previously over 30) with the new LDMOS generator



SPECTRO GENESIS

The SPECTRO GENESIS is an ICP-OES spectrometers available with a complete set of factory methods — truly “plug & analyze” without needing to first develop a method. These factory methods cover all common environmental and industrial applications, like waste water, soil, sewage sludge, wear metal, additives in oil, crude oil, diesel fuel and biodiesel.

Typical Applications:

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

- Powerful alternative to sequential ICP and FAA: simultaneous spectrum capture in the 175-770 nm wavelength range with the capability to analyze up to 700 samples per day
- Low operating costs: minimal 0.5 l/min optic purge, no water chiller necessary
- Faster out of the gate: less than 10 minutes warmup time (previously over 30) with the new LDMOS generator



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.

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

- Outstanding sensitivity leads to up to a factor 3 improved precision — the basis for high accuracy when analyzing minor to major element concentrations
- Measure lower than ever: Adaptive excitation, advanced tube design and high-count throughput detection system result in significantly (typically a factor 3) lower limits of detection for a wide range of elements
- Master the unknown: The Turboquant II software tool provides an unprecedented ability to analyze unknown samples, regardless if they are liquid, solid or powder — whether tree leaves, plastics, oil, granite or glass



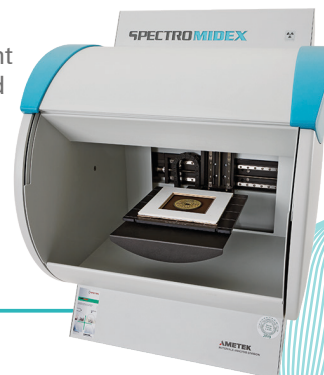
SPECTRO MIDEX

The SPECTRO MIDEX is known to be an all-round talent for the fast, non-destructive analysis of small spots and the rapid mapping of large surfaces (up 233x160 mm, 9.2x6.3") in research and development, compliance screening and precious metals applications. It offers fast and extremely sensitive, non-destructive measurements.

Typical Applications:

jewellery, precious metal alloys, forensic science, RoHS, automotive and aerospace 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 conventional 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.

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, precious metals

- Light weight and portable elemental analyzer for precious metal alloys; spot size is only 1 mm
- 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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China (3,189,726); xSORT: EU (7058456), USA (3,767,555); „SPECTROLAB”: EU (1069339), USA (4,103,747); „SPECTROBLUE”: USA (4,200,588),
EU: (1099910); „Arcos”: EU (005326566), USA (3,451,924); „SPECTRO Genesis”: EU (004206165), USA (3,170,644); SPECTROGREEN: EU (017931732) ;
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