



SPECTRO

AMETEK

MATERIALS ANALYSIS DIVISION

SPECTRO **GENESIS**

ICP-OES SPECTROMETER



The preferred solution for
routine elemental analyses

SPECTRO GENESIS

INDUCTIVELY COUPLED PLASMA
OPTICAL EMISSION SPECTROMETER (ICP-OES)



Perhaps no other instrument hits the elemental analysis sweet spot like SPECTRO's entry-level SPECTRO GENESIS analyzer.

Unlike FAAS analyzers, it's fast and covers a wide range of elements. And unlike most other ICP-OES analyzers, it's easy to use, delivers industrial-grade durability and throughput, and is surprisingly affordable to purchase and operate.

Additionally, SPECTRO GENESIS is the only ICP spectrometer in its class that's available with a complete set of factory-installed methods for a number of common applications. No wonder it's become the instrument of choice for so many environmental, industrial, and academic laboratories — easily analyzing liquid environmental, petrochemical, and chemical samples, and more.

Call your SPECTRO representative today. Find out when and how to send your samples to our analytical technology centers in Europe, Asia, and the Americas to arrange a personal SPECTRO GENESIS demo — virtual or on-site!





Exceptional advantages **SPECTRO GENESIS** brings winning benefits to users worldwide.

Most advanced ICP-OES measurement technique.

Instead of analyzing elements in a sample one at a time, SPECTRO GENESIS uses essentially the same simultaneous measurement technology as top-of-the-line ICP-OES analyzers. This gives it numerous advantages — including outstanding performance in the UV range — over FAAS models and low-end ICP-OES units that employ sequential measurement.

Simultaneous capture of the complete spectrum.

SPECTRO GENESIS measures the entire relevant spectrum simultaneously, regardless of the number of elements present. It also records and stores each spectrum. This is critical for users who need retrospective capability; results can be re-evaluated/recalculated at any later time, even if samples have been consumed.

Higher speed.

If more than 10 elements are analyzed, SPECTRO GENESIS's simultaneous capture and ultra-fast readout can deliver results in 90 seconds — more than 2x as fast as FAAS or sequential ICP-OES. Its fast readout also allows greater dynamic range, to measure high signals on intense spectral lines without difficulty. Throughputs: up to 700 samples per day.

Convenient factory methods

The instrument's unique factory-installed methods are standards-compliant and complete with sample introduction system plus full documentation. So users can simply install, calibrate — and start analyzing, without the trouble of first developing a method for a given material. Packages include:

- Wastewater / industrial wastewater
- Soil / sewage sludge
- Lube oil (wear metals and additives)
- Crude oil
- Distillation fuels
- Biodiesel.

Excellent price/performance ratio.

SPECTRO GENESIS offers probably the best price-to-performance relationship in its class for routine applications. Purchase is competitive with other CCD-based ICP-OES analyzers. And it offers the lowest operating cost, due to factors such as the optical system: It requires no expensive chiller, and its ultra-low gas consumption saves up to \$3000 (€2500) in yearly running expenses when operated 8 hour per day.

Minimal installation and training.

With convenient connections and controls, simple software, and its unique factory-installed application methods, SPECTRO GENESIS offers a short learning curve plus maximum ease of setup, operation, and maintenance.

Compact design.

Despite its exceptionally rugged build, SPECTRO GENESIS is a small, lightweight benchtop unit, enabling seamless integration into tight laboratory spaces.

Revealing comparisons

Versus FAAS analyzers

Despite some well-known limitations, *flame atomic absorption spectrometers (FAAS)* are still widely used as inexpensive solutions for many routine analyses. However, SPECTRO GENESIS offers superior ICP-OES performance — at not much more than FAAS cost.

Greater throughput. If a lab now processes no more than 50 samples a day, with fewer than 10 elements per sample, FAAS can offer faster analyses (10 seconds per element) at somewhat lower costs. However, as operations evolve, labs may need to analyze more elements or increase throughput. Consider SPECTRO GENESIS. In 90 seconds, working simultaneously, it can analyze any number of elements and store their results, whereas an FAAS instrument — working sequentially — can analyze only about 10. So at 16 elements per sample, FAAS can handle only 180 samples in an 8-hour shift. In that time, ICP-OES technology lets SPECTRO GENESIS analyze up to 320 samples — regardless of how many elements are in each sample! And make that close to 700 samples in a two-shift schedule.

More analyzable elements. With a wider, much higher linear dynamic range than FAAS units, SPECTRO GENESIS can analyze amounts from parts per billion (ppb) levels to percent levels. That includes elements such as silicon (Si), aluminum (Al), phosphorous (P), and sulfur (S) — where FAAS analysis falls short, or fails.

Easy sample preparation. Where FAAS suffers from a limited linear range, with SPECTRO GENESIS a single sample dilution is normally sufficient to measure all elemental concentrations. Furthermore, like other ICP-OES instruments, it avoids chemical and ionization interferences, and its relative freedom from matrix effects means buffers or matrix modifiers (common in FAAS) are typically not required.

High stability and tolerance. Unlike FAAS analyzers, which may require several calibrations over an 8-hour shift, SPECTRO GENESIS — with less than 2 percent long-term instability over an 8-hour period — avoids the need for frequent recalibration. It also handles high levels of total dissolved solids (TDS), which FAAS instruments can't tolerate.

Ensured safety. Using no flammable gas, SPECTRO GENESIS is easily automated for safe unattended operation.

Versus Other ICP-OES analyzers

A number of other workhorse analyzers share SPECTRO GENESIS's fundamental ICP-OES technology. But most are low-performance models that lack many of its other advantages.

Good value and speed. Compared to low-end sequential ICP-OES units with legacy photomultiplier tube (PMT) technology, SPECTRO GENESIS — using more advanced charge coupled device (CCD) technology — offers much greater flexibility and faster, simultaneous full-spectrum analysis, at a similar price. Even for certain applications where midrange ICP-OES models might otherwise be considered, SPECTRO GENESIS may offer comparable performance plus considerable time savings at a lower price.

Excellent UV measurements. Limited by their Echelle optical designs, competitive ICP-OES systems can't match SPECTRO GENESIS's ORCA system optical performance in the UV range (below 190 nm). (See "Optical excellence" section below.)

Lowest gas consumption. Competitive ICP-OES optical systems demand high rates of gas purging. They consume about 3 liters of expensive argon per minute while operating, and 1 liter per minute on standby, plus a boost purge to tackle UV measurements. By contrast, the unique small-volume SPECTRO GENESIS optical system runs with only 0.5 liter per minute, and no gas purged during standby. Result: the lowest gas consumption in its class, for savings of approximately \$3000 (€2500) per year.

Less time and effort. Numerous other intelligent hardware and software features make SPECTRO GENESIS a standout for fast, easy installation and training.

Targeted design

SPECTRO GENESIS ensures just the right fit for today's crowded laboratories. With aluminum construction that's sturdy but lightweight (150 kg / 330 lb), it can be easily transported, and installed on the same standard benchtop as an FAAS analyzer.

In addition, all connections points are located on the instrument's right side, for convenience and ease during installation, maintenance, and use. In tight laboratory spaces, it can be positioned flush with a wall.

Unlike some lower-level ICP-OES systems that may use lesser-quality parts, SPECTRO GENESIS features many of the same critical components — such as the generator technology, gas controller, readout system, and user interface — utilized in higher-performing products such as SPECTROGREEN and the flagship SPECTRO ARCOS system. So it offers the stability and robustness of a premium performer.



Optical excellence



SPECTRO GENESIS utilizes what is likely the industry's best-selling ICP-OES optical system — based on technology common to topline models such as SPECTROGREEN and SPECTRO ARCOS. The main difference: a smaller optical space, which saves gas consumption while still delivering optimized performance for a wide array of routine analyses.

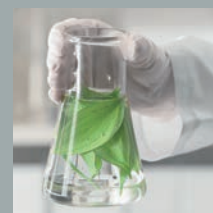
Almost all other ICP-OES analyzers use a traditional Echelle design. Unfortunately, these suffer limitations such as needing up to eight internal reflective components — leading to loss of sensitivity, excessive stray light, and variable resolution. In addition, these systems' larger optical compartments consume high levels of expensive purged gases, and can be subject to problems with cooling and wavelength measurement stability.

By contrast, SPECTRO ICP-OES analyzers such as SPECTRO GENESIS utilize unique yet proven optics based on *Optimized Rowland Circle Alignment (ORCA)* technology.

This high-performance system utilizes only three optical surfaces (slit, grating, and detector) to maximize light throughput. So its more direct light path achieves greater light throughput and best-in-class sensitivity for UV elements. It delivers constant resolution across a wide spectral wavelength range, thus avoiding interferences and improving accuracy. Its low level of stray light allows low limits of detection, as well as trouble-free analysis of higher matrix samples containing metals or organics.

The analyzer's small-volume optical space cuts gas consumption and contributes to high wavelength stability for continued accuracy, with no cooling problems. Results: fewer calibrations or control samples, and less need for rework.

SPECTRO GENESIS's side-on interface for radial plasma observation is robust, and ideal for high and varying sample loads. Its vertical torch arrangement is rugged enough to deal with high amounts of total dissolved solids, and perfect for the analysis of organic solutions. The optical system furnishes full spectrum capture/storage; rapid cycles times (90 seconds or less) for high throughput; and wavelength coverage in the range between 175 nm and 777 nm



Further highlights



Proven detectors: The CCD detector arrays used in SPECTRO GENESIS are a modern yet well-proven technology, with high reliability. They're thermally stabilized (via the optical system) at 86 °F (30 °C) — requiring no on-chip cooling, and eliminating cooling-related problems other ICP-OES systems may suffer.

High-speed readout: Utilizing SPECTRO's latest ultrafast readout, the system delivers a shortest time of integration of 0.1 millisecond (ms). A full-spectrum processing/readout is realized in less than 100 ms, allowing a complete sample analysis (with preflush and two replicates) in less than 3 minutes.

Additionally, dynamic range can reach up to 9 orders of magnitude.

Latest generator: A new *laterally diffused metal oxide semiconductor (LDMOS)* generator delivers up to 1700 W of proven power. This solid-state power gives SPECTRO GENESIS great agility. It allows plasma robustness for high matrix compatibility, which helps enable less sample preparation; the capability of running samples at lower dilutions; and better limits of detection. It also contributes to the instrument's ability to easily run samples from process streams with high total dissolved solids or organic solutions like lube oils with additives or wear metals.

Finally, this generator's innovative air-cooled system operates without an external chiller, for low running costs

SPECTRO GENESIS

ICP-OES SPECTROMETER



Range of solutions

SPECTRO's complete line of spectrometers includes three leading ICP-OES models. Our entry-level instrument SPECTRO GENESIS offers the ideal mix of performance, value, and design for many routine analyses.

Where more analytical power is needed, three versions of our SPECTROGREEN analyzer specialize in ultra-reliable, accurate analyses — trace as well as higher concentrations — for challenging matrices such as certain wastewaters, soils, and sludges, as well as organic, high-salts, and metal samples.

And for the pinnacle of productivity and performance, our flagship SPECTRO ARCOS analyzer is probably the most advanced in its class. It excels in industrial and academic applications for the most advanced elemental analysis of metals, chemicals, petrochemicals, and other materials.

Outstanding support



AMECARE Performance Services maximize uptime for SPECTRO GENESIS and other SPECTRO Analytical products. The program is staffed by more than 200 experienced service engineers in 50 countries. They provide high-value, customized services designed to ensure optimum performance plus the longest possible equipment life. Ask about AMECARE demos, proactive performance maintenance, performance upgrades, applications solutions, consultation, targeted training, and ongoing support.

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