SPECTRO
AMETEK

# SPECTRO **ARCOS**

FHX 32 AND FHX 36 ICP-OES ANALYZER

## Evolving Elemental Analysis to the Next Level





# SPECTRO **ARCOS**
## Safeguarding your ability to get ultra-reliable results

The newest, top-of-the-line SPECTRO ARCOS represents the next generation of SPECTRO's industry-leading *inductively coupled plasma optical emission spectrometer (ICP-OES)* technology. It precisely analyzes the elemental composition of metals, chemicals, petrochemicals, and more — to deliver the accurate measurements on which industrial processors and academic researchers depend.

Extensive inputs from customers worldwide, coupled with ongoing evolution in multiple proven technologies, have inspired numerous design enhancements. All further safeguard your ability to get the right analytical results. Besides performance and productivity, key refinements provide even greater flexibility and usability. Along with its existing MultiView plasma viewing option, additions such as a new DSOI plasma viewing option, CMOS detectors, and an ultra-high-speed readout bring SPECTRO ARCOS to a whole new level.

An enhanced solid-state generator offers the industry's highest power.  Other proven features include no-purge UV-PLUS sealed gas purification, and air-cooled technology that eliminates the need for an external chiller.

Intuitive software offers unequaled ease, speed, and traceability. And the latest models further highlight ergonomics with significant usability enhancements: delivering easy operation, simplified sample introduction, and direct maintenance accessibility.

*SPECTRO AI QUANT* takes usability to the next level by delivering fast, semiquantitative ICP-OES results at the click of a button. Powered by AI and machine learning, it enables reliable identification of unknown samples within minutes—without complex setup or calibration. Fully integrated into ICP Analyzer Pro, SPECTRO AI QUANT combines speed, simplicity, and confidence in one smart solution.

SPECTRO has produced world-class analytical instruments for more than 40 years. The new SPECTRO ARCOS is our finest ICP-OES analyzer yet.

# SPECTRO **ARCOS** advantages for next-level elemental analysis

## Exceptional resolution and sensitivity

SPECTRO ARCOS delivers high continuous optical resolution over the widest spectral range. This enables easy separation of neighboring lines in line-rich spectra, minimizes spectral interferences, simplifies method development, and improves accuracy. Via features such as direct light paths, the system offers world-class sensitivity, especially in VUV/UV — critical for sub-ppm analyses in metals or material science applications.

## Optimized usability

Customer inputs have helped maximize ease of use. A new intelligent valve option cuts sample introduction times. A new cassette-style pump also keeps sample introduction simpler, and optimizes peristaltic pump pressure on sample tubes. An optional new camera kit allows users to remotely monitor key points to catch issues immediately. And SPECTRO ARCOS software is simple, intuitive, speedy, and fully traceable.

## Wide flexibility

The analyzer is now available in six versions, depending on choices of plasma viewing technology and elemental wavelength range. Examples: new DSOI plasma observation provides twice the sensitivity of conventional radial views — without the complexities and costs of vertical dual-view models. Whereas choosing the MultiView option lets users easily switch between true axial or true radial single or dual side-on observation.

## Higher speed

Other spectrometers may struggle to deliver one measurement a minute. With its fully simultaneous performance and powerful generator/readout capabilities, SPECTRO ARCOS can completely analyze simpler matrices in as little as 30 seconds. Whatever the matrix, the user can analyze more samples in less time.

## Rock-solid stability

Thermally and pressure stabilized optics, a high-powered generator, and software-controlled gas flows deliver the plasma stability and freedom from drift so crucial for reliable measurements. The instrument adjusts instantly to changing and/or high sample loads, measuring even volatile organics and samples containing high total dissolved solids (TDS) with ease.





## Lower cost of ownership

The SPECTRO ARCOS design optimizes long-term cost savings. Proprietary air-cooled technology eliminates an external chiller's continuing energy expenses and early replacement risks. A sealed optical system may save thousands of dollars a year in gas consumption, compared to other analyzers' constant-purge systems.



# Innovative technologies for **spectacular flexibility**

## Dynamic DSOI

Proven in the popular SPECTROGREEN environmental analyzer, a ***dual side-on interface (DSOI)*** option now brings innovative sensitivity enhancement and remarkable flexibility to SPECTRO ARCOS.

Its vertical plasma torch is observed via direct radial-view technology. Two optical interfaces capture emitted light from both sides of the plasma (using only a single extra reflection), achieving added sensitivity and elimination of contamination / matrix compatibility issues that can plague vertical-torch dual-view models. So DSOI provides twice the sensitivity of conventional radial systems — without the complexities, drawbacks, and costs of vertical dual-view approaches. Users get matrix tolerance, freedom from matrix effects, and high linear dynamic range — all with one single simultaneous measurement. DSOI may make a crucial difference in many fine chemicals, geological, environmental, and research applications.



## Amazing MultiView

High-sensitivity axial plasma observation excels at trace analysis, whereas high-precision radial plasma observation is ideal for high matrix loads and organic solutions. MultiView lets an operator literally "turn" SPECTRO ARCOS from true radial view into true axial view, or vice-versa — in 90 seconds!

And for even greater flexibility, MultiView now also offers DSOI. In minutes, the assembly can simply be swapped in or out in the lab to switch to normal radial view.

All interface changes are faster, with easier steps plus automatic software recognition of each mode.

Where DSOI or MultiView are not needed, a standard SPECTRO ARCOS side-on plasma (SOP) version features a dedicated radial, single side-on interface for stability and precise performance.

## Exceptional ORCA

SPECTRO ARCOS escapes the shortcomings of other spectrometers' echelle-based plasma observation systems. Instead, SPECTRO's innovative ***Optimized Rowland Circle Alignment (ORCA)*** polychromator optical technology utilizes few mirrors, providing a direct, high-luminance light path that minimizes light loss.

So SPECTRO ARCOS deliver a more constant resolution over a wide spectral range — 130 to 770 nanometers (nm) — with the industry's best transparency below 180 nm. This simplifies method development, even in heavy metal matrices, allowing greater accuracy and easier processing of line-rich spectra.

Finally, a new stainless steel torch box resists acids and harsh environments, while enabling better plasma performance.

# Top technologies for **performance** and **power**




## Advanced CMOS detectors

Based on ***complementary metal-oxide-semiconductor (CMOS)*** technology, revolutionary new CMOS line-array detectors are now incorporated into SPECTRO ARCOS. These surpass the performance of legacy ***charge-coupled device (CCD)*** detectors.

Even at extreme light intensities, CMOS technology completely eliminates blooming and reads trace elements' low signals despite adjacent high-intensity peaks. It allows added range — from high plasma loads to cool plasma applications. Its thermal stabilization via the optical system does away with on-chip sub-zero cooling. Should one detector fail, all others remain fully operational. And single-unit costs for CMOS detectors are drastically lower than 2-D models.



## High-speed readout

In concert with a high-power generator plus onboard signal processing, a new high-speed GigE readout system enables full spectrum transport in under 100 milliseconds, and sharply boosts overall spectra processing speeds. Result: shorter sample-to-sample analysis times.

With SPECTRO ARCOS's simultaneous measurement, these capabilities handle challenges such as transient signals. On a sample introduced via ***electrothermal vaporization (ETV)*** or laser ablation, the system can achieve 10 full-spectrum acquisitions per second.

## Highest-power generator

SPECTRO ARCOS features an extremely agile, free-running 2000 W ***laterally diffused metal oxide semiconductor (LDMOS)*** generator. Its solid-state, high-energy-efficiency design is air-cooled, avoiding the need for a complex, breakdown-prone external cooler. It permits warmup in less than 10 minutes, for higher productivity.

The generator's robust design features high matrix compatibility, and allows the system to adjust quickly to changing and/or high sample loads while maintaining a stable plasma. So SPECTRO ARCOS can measure volatile organics and high-TDS samples with ease.

# Intelligent designs for **easy usability**

Customer inputs leading to numerous improvements have helped maximize ease of use for the latest SPECTRO ARCOS models.

### Ergonomic approach

The analyzer's sleek chassis fits any standard lab bench. Its polyurethane/aluminum construction resists chemicals and corrosion. Its layout emphasizes thoughtful features such as ultra-short fluid paths. Its plasma torch's bayonet coupling is self-aligning. And users enjoy easy, safe accessibility to components from both sides and front for operation or maintenance.

### New valve option

For high-productivity labs seeking the shortest possible sample-to-sample times, a SPECTRO Intelligent Valve System upgrade kit is now available for SPECTRO ARCOS.

This portable, fully integrated unit — which includes the coil, valve, and vacuum pump — is controlled and supplied through an Ethernet connection. It may be affixed via magnets wherever needed in close proximity to the nebulizer, independent of type and location (unlike conventional fixed valves). With quick loading of samples into the coil, it bypasses lengthier tubing between the autosampler and the sample introduction system, so maximum throughput is achieved. SPECTRO ARCOS software fully controls the valve's timing according to the samples being analyzed.

### Flexible sample introduction system

A thermally insulated, illuminated compartment accommodates a large variety of sample introduction systems. Preadjusted setup makes for rapid startup, without the need for comprehensive optimization.

### New cassette-style pump

Previous models have required manipulating tubing and making complicated pressure adjustments to allow operation of the sampling system's peristaltic pump. Altogether, each setup could take up to 10 steps. Now, a new cassette-style, high-durability design makes setup much simpler — in 3 easy steps! And the system adjusts automatically to attain perfect tubing pressure at all times, ensuring optimal precision.

### New camera kit option

An optional, portable video camera allows users to remotely monitor the sample introduction system, the nebulizer, or even the plasma — to catch issues immediately and minimize downtime.












# Superior solutions for **simplicity** and **savings**

### Eliminate expensive gas purging

Rather than suffering the trouble-prone, costly continuous gas purging that plagues the optical systems of all other leading ICP-OES designs, SPECTRO ARCOS eliminates purging altogether. Its exclusive no-purge UV-PLUS technology features a small purifying cartridge (good for at least 2 years) in an argon-filled, hermetically sealed system. So users get fast startup, no chance of contamination — and annual gas consumables savings up to about $3500 (€3000) annually.

### Stay stable with controlled gas flows

Many ICP-OES models use simple on/off solenoids at a few points to try to regulate instrument gas flows. But to achieve the ultra-precise flows so critical for ultra-stable measurements, in SPECTRO ARCOS *all* gas flow volumes are fully software-operated. Result: fast, precise, extremely stable control.

### Enjoy an easy interface with total traceability

Users get an easy, intuitive, customizable experience with SPECTRO ICP Analyzer Pro operating software. It delivers streamlined workflows plus raw data processing speeds up to 1500x faster than older models. Where operators increasingly must work with multiple complicated instruments, SPECTRO ARCOS keeps things simple — and fast, even for huge data throughputs and challenging scope changes. In addition, audit trail functionality logs any changes for retrieval in clear formats — including method, version, calculations, user permissions, and timestamp. Users get solid security and full traceability.

### Avoid complex, costly external coolers

SPECTRO produces the only totally air-cooled ICP-OES analyzer design on the market. It saves users from having to buy, install, power, and maintain an elaborate, expensive — and often short-lived — water-based external cooling system.



## COMPLETE FAMILY OF SOLUTIONS

**Premier products**

The flagship SPECTRO ARCOS leads SPECTRO's advanced suite of ICP-OES analyzers.

This begins with the workhorse SPECTRO GENESIS analyzer, which set a new standard for condition monitoring with analysis of wear metals in oil. Available with factory-calibrated methods, this ICP-OES provides "plug and analyze" performance — swiftly and accurately assessing component wear trends, and detecting additives, wear elements, and contaminants. SPECTRO GENESIS is easy to use, durable, and surprisingly affordable.

Where even more analytical capability is needed, the compact yet powerful midrange SPECTROGREEN analyzer specializes in ultra-reliable, accurate analyses — trace as well as higher concentrations — for environmental and many more challenging industrial applications. SPECTROGREEN pioneered the use of SPECTRO's innovative DSOI technology for high yet trouble-free sensitivity and matrix tolerance. It's also available with *twin-interface (TI)* and SOP plasma observation systems. SPECTROGREEN handles difficult matrices with ease, from certain wastewaters, soils, and sludges to organic, high-salts, and metal samples.

Across its entire product range, SPECTRO's more than 40 years of experience in elemental analysis — plus its heritage of technical innovation and excellence — ensure the best possible analytical results.

**Responsive services**

Maximize SPECTRO ARCOS reliability and uptime with AMECARE Performance Services. Hundreds of service engineers based in over 50 countries help ensure uninterrupted performance as well as maximum ROI over the instrument's life. Available programs include ultra-convenient online demos, as well as onsite demos, proactive performance maintenance, performance upgrades, applications solutions, consultation, targeted training, and ongoing support. Secure, unidirectional SPECTRO PROTEKT global remote monitoring even offers ongoing diagnostics and alerts!

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