

# SPECTROLAB S<sub>LAS01</sub>

Stationary Metal Analyzer

A true revolution in  
high-end metal analysis



# SPECTRO**LAB S**

HIGH-PERFORMANCE ARC/SPARK OPTICAL  
EMISSION SPECTROMETER (OES)



## The latest revolution in metal analysis for process control and research

SPECTRO, the arc/spark innovation leader, has spent more than 40 years developing the world's leading OES instruments. Now, it's perfected the use of solid state detectors with the proprietary CMOS+T technology to revolutionize high-end arc/spark OES analysis. SPECTRO**LAB S** is in a class of its own. It's designed to supply the fastest possible measurements; lowest limits of detection; longest uptime; and most future-proof flexibility.

By every metric, it's made to be the best-performing spectrometer available today for primary metal producers. And it's an equally excellent solution for secondary metal producers plus automotive and aerospace manufacturers, as well as makers of finished and semifinished goods, electronics, semiconductors, and more. When you demand revolutionary levels of speed, precision, throughput, and flexibility, select SPECTRO**LAB S**.



# SPECTROLAB S

## The best performance for unbeatable benefits

Users of high-end stationary metal analyzers face some challenging tasks. They must identify and measure — with especially high accuracy and precision — all the elements in their incoming, in-production, and outgoing materials. This may include research on new materials as well.

### **Groundbreaking CMOS+T capabilities**

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. (See next page.) From trace elements to multi-matrix applications, it provides extremely fast, highly accurate, exceptionally flexible analysis.

### **Ultra-high measurement speed**

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!

### **Outstanding uptime**

SPECTROLAB S regular maintenance intervention requirements (spark stand cleaning) have been reduced by a factor of 8. Additionally, the system eliminates most standardization delays. So analysis (and thus production) continues uninterrupted: sample after sample, day after day.

### **Fantastic flexibility**

Forget needing substantial hardware modifications: new elements or matrices can be added easily — via a simple software update! To fulfill almost any analytical requirement, configure any combination of 10 standard matrices: iron (Fe), aluminum (Al), copper (Cu), nickel (Ni), cobalt (Co), magnesium (Mg), titanium (Ti), tin (Sn), lead (Pb), or zinc (Zn).

### **Easy, cost-saving setup**

Many testing periods require only a single-sample, 5-minute standardization. Unique iCAL 2.0 diagnostics can usually ensure stable performance from then on — regardless of most shifts in ambient temperature or pressure! Most users save at least 30 minutes daily.

### **Compact, convenient layout**

To fit packed laboratory spaces, the SPECTROLAB S analyzer features a 27% footprint reduction from previous models. Conveniences include an easy-reach start/stop button and fixed function keys; a spark indicator light; noise minimization construction; and quick access for spark stand cleaning or tool-free air filter changes without opening the main instrument housing.

# Beyond PMT: introducing CMOS detectors

Key to any metal analyzer: its detectors, which register the wavelength and intensity of the light emitted by each element in a sample. SPECTROLAB S uses today's most advanced linear CMOS detectors.

These solid-state *complementary metal oxide semiconductor* devices are manufactured via proven integrated circuit detector technology. With CMOS, readout electronics perform analog-to-digital conversion and noise reduction on the chip itself. Results in exceptional dynamic range and higher data throughput.

Until now, many users performing metal analysis have preferred that their high-end analyzers employ *photomultiplier tube (PMT)* detectors. But this legacy vacuum tube technology comes with both advantages — and significant disadvantages. Most other spectrometer types long ago switched to semiconductors. And now, the optimized CMOS+T technology in SPECTROLAB S can meet or exceed every important PMT advantage in a metal analyzer system:

|                            | <b>PMT-based system</b>  | <b>CMOS-based SPECTROLAB S</b>  |
|----------------------------|--|---|
| <b>Flexibility</b>         | Takes significant hardware changes/downtime to add new elements, if even possible; limited number of wavelengths | Configures method for any new elements/matrices via simple software updates; no relevant wavelength limit               |
| <b>Sensitivity/LODs</b>    | Excellent low limits of detection; high sensitivity, precision; aided by techniques such as TRS, SSE             | Equals or betters all PMT LODs, sensitivity, precision; first non-PMT-detector SPECTROLAB with TRS, SSE                 |
| <b>Stability</b>           | Must sometimes use suboptimal wavelengths; stability may vary with room temperature                              | Designed for optimum correlation analytical/reference lines; resistant to temperature changes; added stability software |
| <b>Durability</b>          | With a fixed selection of wavelengths, the failure of a single PMT can cripple the entire system                 | Ultra-reliable; any detector failure compensated for by closely alternative wavelengths                                 |
| <b>Quality consistency</b> | Variable due to "one-off" nature of each PMT vacuum tube detector  | Excellent reproducibility and consistency due to regularity of semiconductor manufacturing                              |

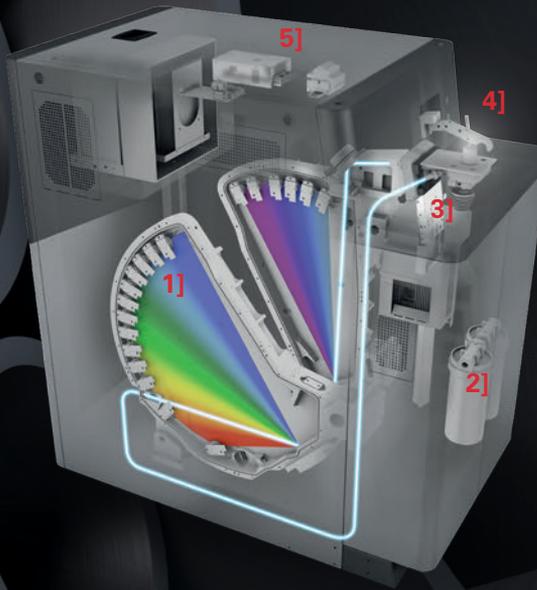
# Continuing innovations

## 1] NEW: Two dedicated optics

To ensure optimum resolution of challenging analytical lines, SPECTROLAB S employs two complete, dedicated optical systems. One precisely measures wavelengths from 120 to 240 nanometers (nm); the other, from 210 to 770 nm. Both feature advanced CMOS detectors, plus temperature stabilization and pressure compensation.

## 2] NEW: Powerful plasma generator and ignition board

The exceptionally robust new high-energy LDMOS plasma generator developed for SPECTROLAB S produces an ultra-stable spark, with frequencies up to 1000 Hz. Result: the shortest possible measurement times (example: less than 20 seconds for low alloy steel). This system also allows application-specific spark parameter settings for optimized analytical performance.



## 3] NEW: Unique application-tuned argon system

SPECTROLAB S features new volumetric flow controllers. So the system's software can configure or reconfigure different argon flows for more accurate results plus reduced argon consumption. And the argon distribution block mounts directly to the spark stand, without tubing, to eliminate leaks.

## 4] NEW: Low-maintenance spark stand

Rugged new ceramic inserts minimize breakability and eliminate coating. Together with newly controlled argon flows, the system ensures the longest possible uptime between cleanings (regular maintenance intervention requirements are reduced by a factor of 8); key especially for high-throughput automation systems.

## 5] NEW: Rapid readout system

SPECTRO's innovative GigE readout system enables the highest processing speeds for maximum data throughput and support of the instrument's superlative analytical performance. Its unique full-spectrum coverage also allows the instrument to achieve optimal optical configuration for every application.

# Functional advantages

## Ultra-low limits of detection

The unit offers the lowest limits of detection in its class — previously attainable only with PMT detectors. And on some key elements, SPECTROLAB S CMOS+T technology surpasses PMT performance. Analytical functionality is maximized by configuring the best possible relationship between given analytical lines and reference lines. Depending on application, the instrument can easily ascertain trace values for critical elements in single parts per million (ppm).

## Spectacular stability

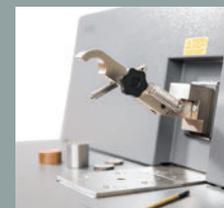
SPECTROLAB S provides both short-term and long-term stability without compromise. Unlike conventional models, its sealed, no-purge optical system maximizes light transmission stability, even in the far UV. Its software utilizes sophisticated measures such as online drift correction and iCAL 2.0 pressure compensation for reproducible readings, even over successive shifts or maintenance intervals.

## Excellent ease of use

Even for less experienced personnel, SPECTRO's familiar, intuitive user interface takes effortless operation to a new level. Instead of multiple dialog boxes, a simplified operator view presents clear choices via dedicated toolbar buttons. Tailored application profiles eliminate complicated method development.

## Affordable cost of ownership

In addition to iCAL 2.0 standardization savings, the system's UV-PLUS purification uses a long-lasting filter cartridge to eliminate expensive argon purging or vacuum pumps. Component access, advanced diagnostics, and other improvements make maintenance easier and prevent expensive unplanned downtime.



# Superior analytical software

SPECTRO**LAB S** provides powerful software capabilities to improve analytical performance. Many features are possible only with the instrument's new CMOS+T technology.

**Online drift correction.** Compensates for measurement variation trends over time or sample differences, helping to ensure ongoing measurement stability.

**Dynamic preburn.** Shortens measurement time on better-quality samples.

**Plasma control.** Observes and stores plasma characterization, indicating potential issues such as argon quality changes to ensure efficient cleaning and longer uptimes.

**Background correction.** On matrices such as aluminum (Al), "calculates out" high background to improve signal-to-noise ratio for more accurate reading on selected analytical lines.



**Full spectrum scan.** Captures full coverage of entire relevant analytical spectrum simultaneously, from 120 to 770 nm. So allows comparison of encountered spectra to investigate elements not installed or expected.

**Time-resolved spectroscopy (TRS).** Measuring discrete segments within a single spark discharge, reduces background noise and interference to minimize LODs. (Previously available only on PMT detectors.)

**Single spark evaluation (SSE).** Records and analyzes successive sparks, so system can alert users to inclusions in otherwise "clean" materials, such as manganese sulfide (MnS) in steel. (Previously available only on PMT detectors.)

## Superb operating software

Proven Spark Analyzer Pro operating software has provided formidable functionality for previous SPECTRO metal analyzers. New features include:

- *Extended result distribution* exports data to almost any popular archive system for full reporting and documentation.
- *Shift summary* allows personnel to call up key information from previous shifts.
- *Multisample type standardization* permits combining several samples into a new standard as a type correction.
- *3-D diagnosis* maximizes instrument availability, flagging maintenance reminders from optical system pressure and temperature to voltage supply and more.
- *Backup/restore tool* safeguards against data loss.

|     | C         | Si        | Mn        | P         | S         | Cr        | Mo        | W         | Al        | Co        | Cu        | Nb        | Con       |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|     | Conc. [%] |
| 1   | 0.213     | 0.182     | 0.204     | 0.0159    | 0.0019    | 0.042     | 1.07      | 0.0222    | 0.0398    | 0.0026    | 0.0242    | 0.0204    | 0.0       |
| 2   | 0.207     | 0.183     | 0.208     | 0.0152    | 0.0027    | 0.048     | 1.08      | 0.0208    | 0.0406    | 0.0025    | 0.0244    | 0.0193    | 0.0       |
| 3   | 0.218     | 0.188     | 0.210     | 0.0148    | 0.0016    | 0.046     | 1.08      | 0.0311    | 0.0407    | 0.0029    | 0.0247    | 0.0206    | 0.0       |
| ave | 0.208     | 0.184     | 0.207     | 0.0158    | 0.0021    | 0.046     | 1.08      | 0.0314    | 0.0404    | 0.0027    | 0.0244    | 0.0201    | 0.0       |

|     | W         | W         | Fe        |
|-----|-----------|-----------|-----------|
|     | Conc. [%] | Conc. [%] | Conc. [%] |
| 1   | 0.000     | <0.002    | 0.0       |
| 2   | 0.000     | <0.002    | 0.0       |
| 3   | 0.000     | <0.002    | 0.0       |
| ave | 0.000     | <0.002    | 0.0       |



### The leading line: SPECTRO metal spectrometers

The flagship SPECTROLAB S leads today's most comprehensive suite of advanced arc/spark metal analyzers. These include the midrange SPECTROMAXx stationary metal analyzer, the entry-level SPECTROCHECK stationary metal analyzer, the SPECTROTEST mobile metal analyzer, and the SPECTROPORT portable metal analyzer. Whatever the product, SPECTRO's more than 40 years of experience in elemental analysis and unparalleled record of technological innovation ensure the best results in the business.

### Excellent support with comprehensive AMECARE services

Metal producers demand the greatest possible productivity from their operations — and their instruments. AMECARE Performance Services maximizes uptime for SPECTROLAB S 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 proactive performance maintenance, performance upgrades, applications solutions, consultation, targeted training, and ongoing support.



[www.spectro.com](http://www.spectro.com)

#### GERMANY

SPECTRO Analytical Instruments GmbH  
Boschstrasse 10  
D-47533 Kleve  
Tel: +49.2821.892.0  
Fax: +49.2821.892.2202  
[spectro.sales@ametek.com](mailto:spectro.sales@ametek.com)

#### U.S.A.

SPECTRO Analytical Instruments Inc.  
91 McKee Drive  
Mahwah, NJ 07430  
Tel: +1.800.548.5809  
+1.201.642.3000  
Fax: +1.201.642.3091  
[spectro-usa.sales@ametek.com](mailto:spectro-usa.sales@ametek.com)

#### CHINA

AMETEK Commercial  
Enterprise (Shanghai) CO., LTD.  
Part A1, A4 2nd Floor Building No.1 Plot Section  
No.526 Fute 3rd Road East; Pilot Free Trade Zone  
200131 Shanghai  
Tel.: +86.400.100.3885, +86.400.189.7733  
Fax: +86.21.586.609.69  
[spectro-china.sales@ametek.com](mailto:spectro-china.sales@ametek.com)

Subsidiaries: ► **FRANCE:** Tel +33.1.3068.8970, Fax +33.1.3068.8999, [spectro-france.sales@ametek.com](mailto:spectro-france.sales@ametek.com), ► **GREAT BRITAIN:** Tel +44.1162.462.950, Fax +44.1162.740.160, [spectro-uk.sales@ametek.com](mailto:spectro-uk.sales@ametek.com), ► **INDIA:** Tel +91.22.6196.8200, Fax +91.22.2836.3613, [sales.spectroindia@ametek.com](mailto:sales.spectroindia@ametek.com), ► **ITALY:** Tel +39.02.94693.1, Fax +39.02.94693.650, [spectro-italy.sales@ametek.com](mailto:spectro-italy.sales@ametek.com), ► **JAPAN:** Tel +81.3.6809.2405, Fax +81.3.6809.2410, [spectro-japan.info@ametek.co.jp](mailto:spectro-japan.info@ametek.co.jp), ► **SOUTH AFRICA:** Tel +27.11.979.4241, Fax +27.11.979.3564, [spectro-za.sales@ametek.com](mailto:spectro-za.sales@ametek.com),

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