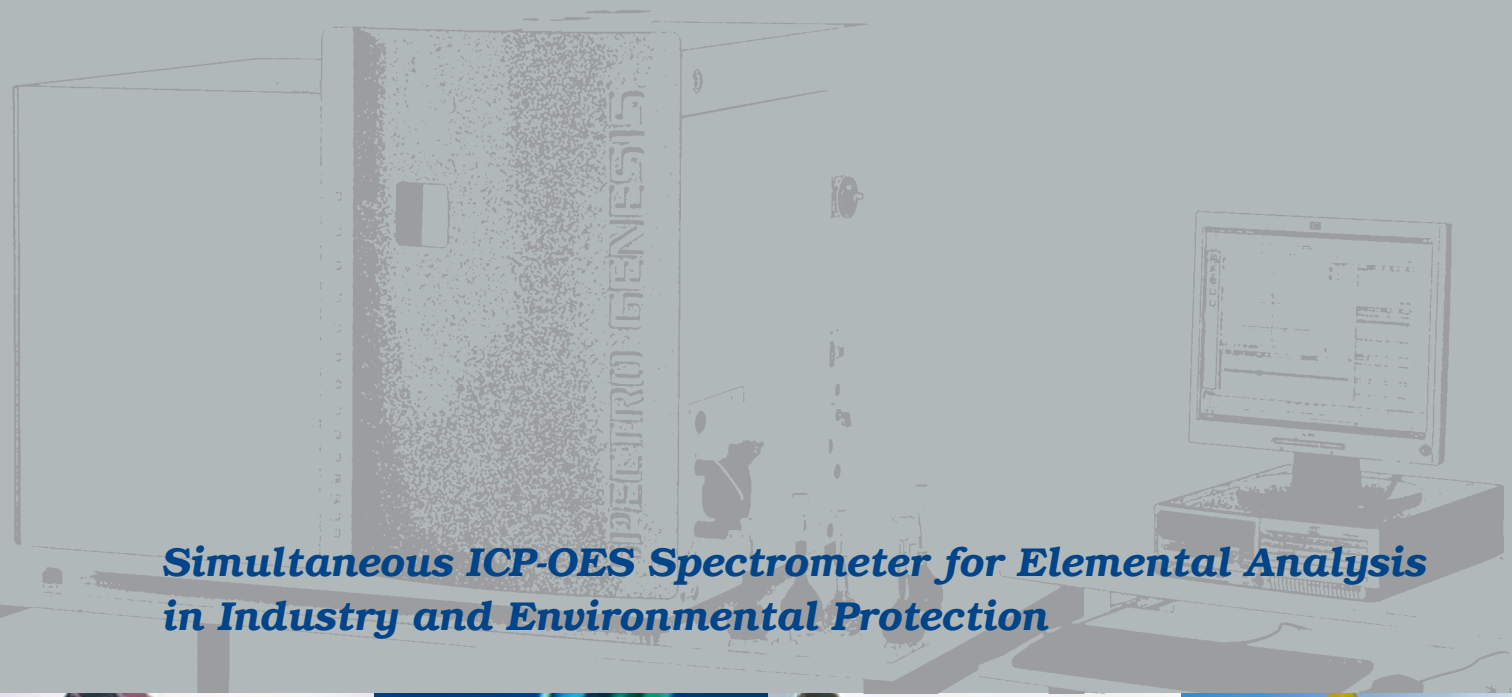
SPECTRO

SPECTRO GENESIS FEx17c



Simultaneous ICP-OES Spectrometer for Elemental Analysis in Industry and Environmental Protection

AMETEK®
MATERIALS ANALYSIS DIVISION

Tailor-made for Application and Operator

The SPECTRO GENESIS is the first and only ICP-OES spectrometer 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 water, waste water, industrial waste water, soil, sewage sludge, filter dust, wear metals in oil and additives in oil.

Compliant to national and international norms, they are delivered ready for use straight out of the box with an application package that includes the sample introduction system, sample preparation instructions and method documentation. Major ICP system components have been developed and innovative functions have been added. The result is clear: An ICP system that has been optimized for the selected applications; one that sets new standards for analysis reliability and simplicity of operation.

The SPECTRO GENESIS offers a real economic alternative to sequential ICP and Atomic Absorption spectrometers, enabling those who are unfamiliar with ICP to profit from the advantages of leading CCD ICP technology and to use a powerful, low cost and user friendly analytical system.

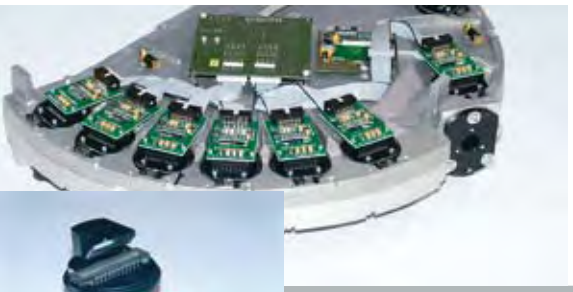
An extensive package of accessories is available for the SPECTRO GENESIS to further expand its application range. This includes, but is not limited to, a wide range of sample introduction systems, autosamplers, an autodilutor, an ultrasonic nebulizer and a hydride generator.

The SPECTRO GENESIS housing is compact and stable - the footprint small - and offers easy access to all components. Light weight, it can be placed on any laboratory table. Chemically resistant surfaces and ergonomically placed connections as well as many other design features of the SPECTRO GENESIS are based on feedback from thousands of SPECTRO customers.

The SPECTRO GENESIS is equipped with powerful automation functions for the safe unattended analysis of a large number of samples. With an optional autosampler, several hundred samples can be processed without operator intervention. If the relevant methods are available, simply import or define a sample list.

When the instrument conducts unsupervised measurements, a number of safety functions ensure trouble-free operation and continuous monitoring according to national and international guidelines.

- **A powerful alternative to conventional sequential ICP and Atomic Absorption spectrometers**
- **Free-running, 27 MHz generator for constant plasma power independent from plasma load**
- **Maintenance friendly sample introduction system with lock-in-place positioning**
- **Axial or radial plasma observation**
- **Simultaneous measurement of the entire spectrum from 175 to 777 nm**
- **Powerful software featuring 1-click routine operation**
- **Factory supplied, norm-conforming methods for environmental and industrial applications**



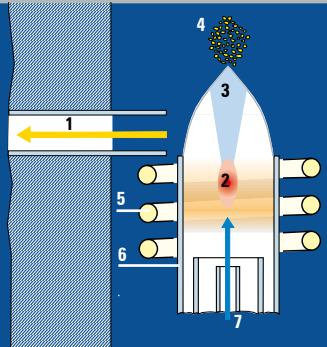
The ORCA optical system guarantees extreme stability. The CCD detectors do not need the costly cooling required for other detectors. Thermal stabilization ensures that condensing humidity cannot interfere with system performance.

Optical System The ORCA (Optimized Rowland Circle Alignment) optical system with optimized Paschen-Runge assembly is one of the most important innovations in the SPECTRO GENESIS. It covers the entire relevant wavelength range from 175 to 777 nm.

Design The cast aluminum hollow section construction of the optical system allows for direct thermal stabilization and reliable compensation for external temperature fluctuations. This guarantees high stability of the measurement results; negative influences due to temperature drift are effectively prevented.
For measurements in the UV range (<200 nm), the optic can be purged with argon - optionally nitrogen. A small optic volume guarantees short start up times and a purge rate of less than 1 l/min.

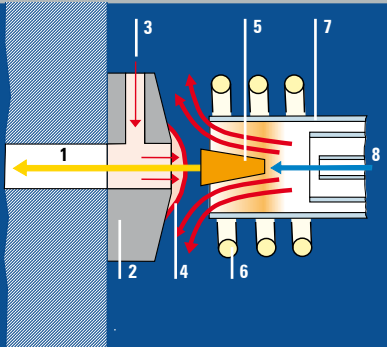
Readout System Linear CCD arrays with a large dynamic range of up to 8 decades function as detectors, making it possible to process concentrations from ppb into the percent range without blooming effects. A high speed readout system with parallel digital signal processor units enables the recording and evaluation of the complete spectrum in less than three seconds.

The advantage of the radial plasma observation, which is less sensitive to high matrix contents, is the precise determination of major components. Axial observation with the OPI improves detection sensitivity without the matrix interferences found in other axial systems.



1- Light path to optical system
2- Excitation zone
3- Emission zone
4- Recombination zone
5- RF coil
6- Plasma torch
7- Sample flow

Side-on Plasma Interface (SPI)



1- Light path to optical system
2- Water-cooled plasma interface
3- Argon supply
4- Plume
5- Analytical zone
6- RF coil
7- Plasma torch
8- Sample flow

Optical Plasma Interface (OPI)

Plasma Interface The SPECTRO GENESIS is available with two different plasma interfaces. Depending on the application, the instrument is equipped with either radial (SOP) or axial (EOP) plasma observation.

SOP Radial plasma observation is less sensitive to high matrix concentrations and the influences from organic matrices. The smaller observation volume offers advantages for applications where major elements need to be determined with high precision.

EOP Axial observation evaluates the entire emission zone, facilitating the analysis of trace contents. SPECTRO's OPI (Optical Plasma Interface) has proven itself in over
10 years of use and enables up to 10 times better detection limits without the matrix interferences usually found with other axial observation. A bayonet connection simplifies use of the OPI.

Sample Introduction System The extremely short fluid paths of the SPECTRO GENESIS sample introduction system ensure short measurement and flush times. Once adjusted in the factory, the lock-in-place mechanism correctly positions the system for optimal operation every time.

Excitation System A free-running generator with a frequency of 27.12 MHz and a power output of 0.7 to 1.7 kW is utilized. It includes automatic plasma ignition as well as an energy and argon-saving standby mode. The system independently adjusts the resonance frequency, holding the effective plasma power constant over a wide range of sample loads. This powerful generator is characterized by its robustness, reliability and stability.

ICAL Logic System SPECTRO's ICAL (Intelligent Calibration Logic) system continuously monitors the optical system and normalizes the wavelength scale. If changes are noticed, the system calls for an ICALization (measurement of the ICAL standard). If the instrument is in automatic operation mode, this step is carried out by the control logic. Methods that have been developed on one instrument can be easily transferred to other instruments – they don't have to be created for every spectrometer: A great advantage when multiple systems of the same instrument type are being used. A further advantage to ICAL is that methods for numerous and widely varying applications can be developed and offered as factory methods.

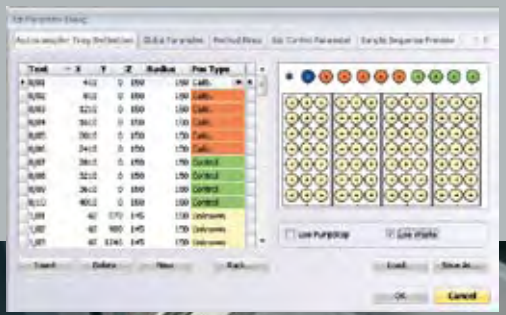
Installation of the sample introduction system is simple. Lock-in-place connections ensure correct positioning every time, further adjustment or optimization is not required.

Software The SMART ANALYZER VISION software for the SPECTRO GENESIS offers the user clear, structured and easy to understand control of all instrument functions. It consists of six main modules for manual, automatic and transient measurements, spectra viewing, method development and general configuration.
1-click routine operation and assistants for the less frequently used options are available. With dockable windows and tool bars, the user interface can be customized to specific information requirements and personal preferences.

Data and measurement results are stored in ODBC compatible databases; facilitating integration with a LIMS. The complete spectrum is stored for every measurement. This leads to the unique possibility of re-evaluating the measurement results at a later time. All of the measurement parameters, e.g., element and line selection can be edited and changed as required.

SMART ANALYZER VISION is fully compatible with US EPA, CLP as well as other standards and methods and includes an US FDA 21 CFR Part 11 compliant user and data management.

The intelligent method development assistant and predefined templates can be utilized to create methods; assisting in selection of parameters, line analysis functions as well as regression calculations. The fully automatic background correction completes the picture.



Technical Specifications

www.spectro.com/genesis

- **Dimensions (WxDxH)**
  1165x748x870 mm
  45.9 x 29.5 x 34.3 inches
- **Weight ~145 kg / ~320 lbs**
- **Ambient temperature 5-35°C / 41-95°F**
- **Specified instrument performance at 18-25°C / 64-77°F**
- **Air humidity < 80% rel., non-condensing**
- **Atmosphere free from corrosive vapors and high dust levels**
- **Water cooling (EOP)**
  Flow rate 1.5-2.5 l/min / 0.4-0.7 gal/min
  Water pressure 1-5 bar / 14.5-72.5 psi
  Inlet temperature 5-25°C / 41-77°F
- **Argon**
  Quality ≥ 4.6 (99.996%)
  Pressure 7.5 bar / 109 psi
- **Exhaust**
  Plasma: 80-120 m^3/h
  47-71 cft/min (EOP),
  Plasma: 100-140 m^3/h
  59-82 cft/min (SOP),
  Generator: ≥ 250 m^3/h / ≥ 150 cft/min
- **Electrical Connections**
  230 VAC ± 5%, 50/60 Hz,
  Fusing 30-32 A,
  Power consumption approx. 4.5 kVA

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MATERIALS ANALYSIS DIVISION

TÜVRheinland® CERT ISO 9001

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